

DEPARTMENT OF PSYCHIATRY AND BEHAVIOURAL SCIENCES  
FACULTY OF MEDICINE  
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Study of intrafamilial relationships of patients with severe psychiatric disorders in the early stages of their illness

Μελέτη των ενδοοικογενειακών σχέσεων ατόμων με μείζονες ψυχικές διαταραχές στην αρχική φάση της νόσου

**PhD thesis**

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**Heraklion, 2015**

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## **Preface**

This PhD thesis was carried out at the Department of Psychiatry and Behavioural Sciences, Faculty of Medicine, University of Crete, Heraklion, Crete, Greece between 2009 and 2015 and supervised by Dr. Alexandros N. Vgontzas, Professor of Psychiatry, Dr. Christos Lionis, Professor of General Practice and Primary Health Care, and Dr. Sofia Triliva, Associate Professor of Clinical Psychology. It consists of a compilation of eight scientific publications. This thesis includes an abstract in English and Greek languages, a general introduction, a rationale, the objectives, a brief description of the methods, the results in the form of a compilation of eight scientific publications, an overall discussion section, strengths and limitations, implications for practice and future research, and final conclusions.

This PhD thesis outlines the important role of the family in the process of psychosocial rehabilitation of patients with severe psychiatric disorders, such as schizophrenia and bipolar disorder, from the early stages of the illness and later on, thus highlighting the benefits of involving family members in care provision and decision-making. It serves as a blueprint for researchers and mental health professionals on how to involve families in patients' course to recovery and support family members to meet their needs. The presence of the mental illness can have significant consequences for all family members. The chronic stress that family members experience, along with the practical demands of caring for their relative diagnosed with psychosis, can have an impact on their daily living, health, social and family relations, careers and financial situation. With the aim of providing more specific guidance to families on how to best support their family member with psychosis, this PhD thesis is addressing both caregivers' and patients' needs.

## **Abstract**

**Background:** The role of the family in the psychosocial rehabilitation of patients with severe psychiatric disorders, such as schizophrenia and bipolar disorder, is considered extremely important as family members are the major source of caregiving. Most of the research on family functioning has included primarily chronic patients and examined certain aspects of intrafamilial transactions, such as expressed emotion and family burden. Much less attention has been given to more diverse aspects of family functioning, focusing on cohesion, flexibility and communication of the members to the families of people with severe psychiatric disorders, particularly in the early stages of the illness, right after the onset of the first episode. The study of intrafamilial relationships is especially important in the early stages of psychiatric illness since it can set the foundation for understanding the interaction and communication patterns in families of patients. Moreover, although there are plenty of reliable and valid psychometric tools to assess intrafamilial relationships, very few are translated and adapted to the Greek population.

**Aim:** Given the dearth of research on family functioning in patients experiencing their first episode of psychosis (FEP) and the particularities of Greek families, the primary aim of the present PhD thesis is to provide a comprehensive assessment of intrafamilial relationships in the early stages of the illness by examining a variety of aspects of family life and examine possible differences in family functioning of FEP patients in comparison with chronic patients with psychosis and healthy controls. More specific aims of this thesis are to describe the socio-demographic and illness-related characteristics associated with family functioning in psychosis and identify the determinants of unhealthy family functioning in FEP and chronic patients with psychosis and their families; furthermore, to examine the interplay of family dynamics, as indexed by cohesion and flexibility, with caregiver's expressed emotion, family burden, and psychological distress; finally, to determine whether dysfunctional family functioning contributes to patient relapse and rehospitalisation during a two-year follow-up. Given the lack of validated scales to evaluate family dynamics in the Greek context additional aims of this thesis are to translate and validate two useful psychometric instruments for assessing family dynamics: a) the Family Adaptability and Cohesion Evaluation Scales IV (FACES IV), and b) the Family Questionnaire for assessing expressed emotion (FQ).

**Methods:** A total of 50 FEP and 50 chronic patients recruited from the Inpatient Psychiatric Unit of the University Hospital of Heraklion, Crete, Greece, and their family caregivers participated in the study. Family functioning was assessed in terms of cohesion and flexibility (FACES IV), expressed emotion (FQ), family burden (Family Burden Scale; FBS) and caregivers' psychological distress (General Health Questionnaire-28; GHQ-28). Patients' symptom severity (Brief Psychiatric Rating Scale; BPRS) and psychosocial functioning (Global Assessment Scale; GAS) were assessed by their treating psychiatrist within two weeks from the caregivers' assessment. Multivariate linear regression

models, structural equation modelling (path analysis), and survival analysis adjusted for confounding variables were used for the statistical analysis of the data.

**Results:** 1) Families of FEP patients presented significantly lower levels of cohesion and flexibility, and thus, experienced higher levels of dysfunction as compared to families of healthy controls. In addition, they presented higher levels of cohesion and flexibility, compared to families of chronic patients, suggesting that the family system was more balanced and functional. Caregivers of chronic patients scored significantly higher in criticism and reported higher burden and psychological distress than those of FEP patients. A high prevalence of emotional overinvolvement was found both in families of FEP and chronic patients with psychosis.

2) Both socio-demographic and clinical characteristics were found to be significantly associated with family functioning in psychosis. The caregivers' characteristics, i.e., female gender, non-working status, rural origin, urban residence, low financial status, relation to the patient (i.e. being spouses or siblings rather than parents), less frequent contact with the patient (i.e. 1-2 times per week compared to daily contact) and family structure (i.e. one parent families), were among the most significant determinants of family functioning. Also, patients' socio-demographic characteristics including older age, low educational level, rural origin, urban residence, unemployment status, as well as illness-related factors, such as earlier onset of mental illness, higher number of hospitalisations, longer duration of hospitalisation and clinical diagnosis (i.e. schizophrenia compared to bipolar disorder) impacted negatively intrafamilial relationships.

3) Increased symptom severity was associated with greater dysfunction in terms of family cohesion and flexibility, increased caregivers' expressed emotion levels primarily in the form of emotional overinvolvement rather than criticism, and psychological distress. Family burden was found to be significantly affected by both symptom severity and patient's functioning. No significant interaction effect of chronicity was observed in the afore-mentioned associations.

4) Path analysis showed that neither family cohesion nor family flexibility exerted significant direct effects on caregivers' psychological distress. Instead, the effect of flexibility was mediated by caregivers' criticism and family burden indicating an indirect effect on caregivers' psychological distress. Therefore, unbalanced levels of flexibility in the family were associated with a highly critical attitude of caregivers toward the patient, which, in turn, may lead to greater burden and higher levels of psychological distress for themselves.

5) Unbalanced levels of cohesion and flexibility were not found to be significant risk factors for relapse in psychosis over a two-year follow-up period. High expressed emotion, as indexed primarily by increased levels of criticism rather than emotional overinvolvement, was associated with increased risk of relapse and shorter time to relapse. Similarly, high levels of family burden were related to shorter time to relapse. Illness chronicity did not moderate the afore-mentioned associations.

**Conclusions:** The findings of this study indicate that unbalanced levels of cohesion and flexibility, high criticism and burden appeared to be the outcome of psychosis and not risk factors associated with

the onset of the illness. Furthermore, emotional over-involvement both in terms of positive (i.e. concern) and negative behaviours (i.e overprotection) is prevalent in Greek families from the early stages of the illness. Identifying social and illness-related characteristics, such as patient's severe psychopathology and a low psychosocial functioning, on family functioning in patients with psychosis is important to develop strategies for the rehabilitation or prevention of relapse of the patients from the early stages of the illness. Understanding the cascade of processes that mediate the impact of family dysfunction (as indexed by unbalanced flexibility levels) on caregivers' psychological distress through caregivers' behaviours (critical attitude toward the patient) and perceived burden is important in designing more effective family treatments. The present findings highlight the importance of caregivers' criticism and burden of care as targets of family psychoeducational interventions. If implemented early in the course of the disease, such interventions have the potential to reduce relapse risk for patients with psychosis.

**Keywords:** Family cohesion, family flexibility, expressed emotion, family burden, psychological distress, first episode psychosis.

## Περίληψη

**Εισαγωγή:** Ο ρόλος της οικογένειας στην ψυχοκοινωνική αποκατάσταση ασθενών με μείζονες ψυχικές διαταραχές, όπως είναι η σχιζοφρένεια και η διπολική διαταραχή, θεωρείται εξαιρετικά σημαντικός καθώς αποτελεί τη βασική πηγή φροντίδας. Στη διεθνή βιβλιογραφία αναφέρεται ένας μεγάλος αριθμός μελετών που έχουν διεξαχθεί και αφορούν σε συγκεκριμένες παραμέτρους των ενδοοικογενειακών σχέσεων ατόμων με μείζονες ψυχικές διαταραχές, όπως είναι το εκφραζόμενο συναίσθημα (expressed emotion) και η οικογενειακή επιβάρυνση (family burden). Ωστόσο, αυτό που ενδεχομένως δεν συναντάμε συχνά είναι η ενδεδειγμένη μελέτη της οικογενειακής λειτουργικότητας, εστιάζοντας στη συνοχή, την προσαρμοστικότητα και την επικοινωνία των μελών στις οικογένειες ατόμων με μείζονες ψυχικές διαταραχές, ιδιαίτερα στην αρχική φάση της νόσου, μετά την εμφάνιση του πρώτου επεισοδίου. Η μελέτη των ενδοοικογενειακών σχέσεων στην αρχική φάση της νόσου θεωρείται εξαιρετικά σημαντική, καθώς αποτελεί θεμέλιο λίθο για την κατανόηση των προτύπων αλληλεπίδρασης και επικοινωνίας στις οικογένειες των ασθενών. Παράλληλα, διαπιστώνουμε πως αν και υπάρχει πληθώρα αξιόπιστων και έγκυρων ψυχομετρικών εργαλείων για την εκτίμηση των ενδοοικογενειακών σχέσεων, πολύ λίγα είναι αυτά που έχουν μεταφραστεί και προσαρμοστεί στα ελληνικά δεδομένα.

**Σκοπός:** Σκοπός της παρούσας διατριβής είναι να διερευνηθούν οι ενδοοικογενειακές σχέσεις ψυχωτικών ασθενών στην αρχική φάση της νόσου και να εκτιμηθούν πιθανές διαφορές σε σχέση με το οικογενειακό περιβάλλον των χρόνιων ψυχωτικών ασθενών καθώς και υγιών ατόμων. Πιο ειδικοί στόχοι της μελέτης είναι να εκτιμηθεί η επίδραση κοινωνικοδημογραφικών χαρακτηριστικών και κλινικών παραμέτρων της ασθένειας στις ενδοοικογενειακές σχέσεις και τον τρόπο λειτουργίας της οικογένειας. Επιπλέον, να διαπιστωθεί ο ρόλος της οικογενειακής συνοχής και προσαρμοστικότητας τόσο στη διαμόρφωση του εκφραζόμενου συναισθήματος και της οικογενειακής επιβάρυνσης, όσο και στην ψυχική υγεία των μελών της οικογένειας. Τέλος, να εκτιμηθεί η επίδραση του οικογενειακού περιβάλλοντος στην εξέλιξη της πορείας της ασθένειας και την πιθανότητα υποτροπής και νοσηλείας του ασθενούς. Ένας ακόμη στόχος της παρούσας διατριβής είναι να πραγματοποιηθεί η στάθμιση δυο σημαντικών ψυχομετρικών εργαλείων για την εκτίμηση των ενδοοικογενειακών σχέσεων: α) της Κλίμακας Εκτίμησης Οικογενειακής Συνοχής και Προσαρμοστικότητας (Family Adaptability and Cohesion Evaluation Scale IV - FACES IV), και β) του Ερωτηματολογίου Οικογένειας για την εκτίμηση του εκφραζόμενου συναισθήματος (Family Questionnaire - FQ).

**Μέθοδος:** Στη μελέτη συμμετείχαν 50 οικογένειες ασθενών με πρώτο επεισόδιο σχιζοφρένειας ή διπολικής διαταραχής, 50 οικογένειες χρόνιων ψυχωτικών ασθενών, και 50 υγιείς οικογένειες. Οι ενδοοικογενειακές σχέσεις εκτιμήθηκαν αναφορικά με την οικογενειακή συνοχή και προσαρμοστικότητα (FACES IV), το εκφραζόμενο συναίσθημα (FQ), την οικογενειακή επιβάρυνση (Family Burden Scale - FBS) και την ψυχική υγεία των μελών της οικογένειας (General Health

Questionnaire-28 - GHQ-28). Η ψυχιατρική συμπτωματολογία (Brief Psychiatric Rating Scale - BPRS) και η ψυχοκοινωνική λειτουργικότητα (Global Assessment Scale - GAS) των ασθενών εκτιμήθηκε από τον θεράποντα ψυχίατρο μέσα σε διάστημα δυο εβδομάδων από την εκτίμηση της οικογένειας. Πολυπαραγοντικά μοντέλα γραμμικής παλινδρόμησης, μοντέλα ανάλυσης διαδρομών (path analysis) και ανάλυσης επιβίωσης (survival analysis) χρησιμοποιήθηκαν για τη στατιστική επεξεργασία των δεδομένων.

**Αποτελέσματα:** 1) Οι οικογένειες των ασθενών με πρώτο επεισόδιο σχιζοφρένειας ή διπολικής διαταραχής δυσλειτουργούν παρουσιάζοντας χαμηλά επίπεδα συνοχής και προσαρμοστικότητας σε σχέση με τις οικογένειες των υγιών ατόμων. Οι οικογένειες των χρόνιων ψυχωτικών ασθενών παρουσιάζουν χαμηλότερη συνοχή και προσαρμοστικότητα σε σχέση με τις οικογένειες των ασθενών με πρώτο επεισόδιο, ενώ οι συγγενείς τείνουν να είναι πιο επικριτικοί απέναντι στον ασθενή και να αναφέρουν υψηλή υποκειμενική και αντικειμενική επιβάρυνση. Τέλος, όσο πιο χρόνια είναι η ασθένεια τόσο περισσότερο επιβαρύνεται η ψυχική υγεία των μελών της οικογένειας. Πολύ υψηλά επίπεδα συναισθηματικής υπερεμπλοκής διαπιστώνονται τόσο στις οικογένειες των ασθενών με πρώτο επεισόδιο όσο και σε εκείνες των χρόνιων ασθενών.

2) Μεταξύ των πιο σημαντικών παραγόντων που βρέθηκαν να επιδρούν στις ενδοοικογενειακές σχέσεις των ασθενών με μείζονες ψυχικές διαταραχές συγκαταλέγονται: α) κοινωνικοδημογραφικά χαρακτηριστικά του συγγενή: φύλο, επαγγελματική κατάσταση, τόπος καταγωγής και διαμονής, κοινωνικοοικονομικό επίπεδο, είδος της συγγένειας με τον ασθενή (π.χ. γονέας, σύζυγος, κλπ) και δομή της οικογένειας, β) κοινωνικοδημογραφικά χαρακτηριστικά του ασθενή: ηλικία, εκπαιδευτικό επίπεδο, τόπος καταγωγής και διαμονής, επαγγελματική κατάσταση, γ) κλινικές παράμετροι της ασθένειας: έναρξη της ψυχικής ασθένειας, αριθμός των προηγούμενων νοσηλείων, διάρκεια της τελευταίας νοσηλείας και χρονική απόσταση από αυτή, καθώς επίσης η διάγνωση του ασθενούς.

3) Όσο πιο σοβαρή είναι η ψυχιατρική συμπτωματολογία του ασθενή τόσο πιο δυσλειτουργικά τα επίπεδα της συνοχής και προσαρμοστικότητας στην οικογένεια, πιο υψηλά τα επίπεδα του εκφραζόμενου συναισθήματος υπό την μορφή της αυξημένης συναισθηματικής υπερεμπλοκής (και όχι των επικριτικών σχολίων), και τόσο πιο επιβαρυνμένη η ψυχική υγεία των μελών της οικογένειας. Επιπλέον, όσο πιο υψηλή είναι η ψυχιατρική συμπτωματολογία του ασθενούς και όσο πιο χαμηλή η ψυχοκοινωνική του λειτουργικότητα, τόσο πιο υψηλά τα επίπεδα της οικογενειακής επιβάρυνσης που αναφέρουν οι συγγενείς. Δεν διαπιστώθηκε σημαντική ρυθμιστική επίδραση της χρονιότητας της νόσου στις προαναφερθείσες σχέσεις.

4) Το μοντέλο που υποστηρίζει ότι δυσλειτουργικά επίπεδα συνοχής και προσαρμοστικότητας της οικογένειας συμβάλλουν στην εκδήλωση συναισθηματικά φορτισμένων συμπεριφορών των συγγενών προς τον ασθενή, επιδεινώνει την ψυχική υγεία των φροντιστών και αυξάνει την επιβάρυνση που αισθάνονται επιβεβαιώθηκε μέσω των αναλύσεων διαδρομών. Ειδικότερα το μοντέλο αυτό προσδιορίζει ότι η επικριτική στάση των συγγενών απέναντι στον ασθενή και τα υψηλά επίπεδα οικογενειακής επιβάρυνσης διαμεσολαβούν στην αρνητική επίδραση της οικογενειακής

δυσλειτουργίας επί της ψυχικής υγείας των φροντιστών. Συγκεκριμένα, δυσλειτουργικά επίπεδα προσαρμοστικότητας στην οικογένεια φαίνεται να ενισχύουν την επικριτική στάση των συγγενών απέναντι στον ασθενή, στάση η οποία αυξάνει την επιβάρυνση και δυσφορία που βιώνουν οι συγγενείς ως φροντιστές και, εν τέλει, επιδεινώνει την ψυχική τους υγεία.

5) Η οικογενειακή δυσλειτουργία, η οποία χαρακτηρίζεται από μη ισορροπημένα επίπεδα συνοχής και προσαρμοστικότητας, δεν αποτελεί παράγοντα κινδύνου για υποτροπή και νοσηλεία του ασθενούς μέσα σε χρονικό διάστημα δυο ετών από την εκτίμηση της λειτουργικότητας της οικογένειας. Ωστόσο, υψηλά επίπεδα εκφραζόμενου συναισθήματος, που προσδιορίζονται κυρίως από την έντονα επικριτική στάση των μελών της οικογένειας απέναντι στον ασθενή (και όχι από συναισθηματική υπερεμπλοκή), καθώς και υψηλά επίπεδα οικογενειακής επιβάρυνσης, αποτελούν παράγοντες κινδύνου που οδηγούν σε ταχύτερη εμφάνιση υποτροπών. Δεν διαπιστώθηκε σημαντική ρυθμιστική επίδραση της χρονιότητας της νόσου στις προαναφερθείσες σχέσεις.

**Συμπεράσματα:** Τα αποτελέσματα της παρούσας διατριβής συνιστούν ότι το δυσλειτουργικό ενδοοικογενειακό περιβάλλον αποτελεί πιθανότατα έκβαση της νόσου και όχι την αιτία για την εμφάνισή της. Η συναισθηματική υπερεμπλοκή, τόσο ως θετική (π.χ. ενδιαφέρον, ανησυχία) όσο και ως αρνητική διάσταση (π.χ. υπερπροστασία και έλεγχος), αποτελεί κύριο χαρακτηριστικό των οικογενειών των ασθενών με μείζονες ψυχικές διαταραχές από την αρχική φάση της νόσου. Η εκτίμηση της επίδρασης κοινωνικών παραγόντων και κλινικών παραμέτρων της ασθένειας, όπως η ψυχιατρική συμπτωματολογία και η λειτουργικότητα του ασθενούς, στην οικογενειακή λειτουργικότητα αποτελεί ζήτημα μείζονος σημασίας για την αναγνώριση των παραγόντων εκείνων που συμβάλλουν στην αποκατάσταση, ή αντίθετα στην υποτροπή του ασθενούς, από τα αρχικά στάδια της νόσου. Ο προσδιορισμός του ψυχολογικού μηχανισμού μέσω του οποίου η δυσλειτουργία της οικογένειας (π.χ. μη ισορροπημένα επίπεδα προσαρμοστικότητας) επιδρά στην ψυχική υγεία των συγγενών (π.χ. ψυχολογική δυσφορία), ενισχύοντας την επικριτική τους στάση απέναντι στον ασθενή και αυξάνοντας την επιβάρυνση που αισθάνονται, μπορεί να συμβάλει στο σχεδιασμό στοχευμένων παρεμβάσεων για την βελτίωση του οικογενειακού κλίματος από τα πρώτα κιόλας στάδια εκδήλωσης της νόσου. Αυξημένα επίπεδα κριτικής προς τον ασθενή και επιβάρυνσης από τη φροντίδα του καταδεικνύονται ως μακροχρόνιοι προγνωστικοί παράγοντες για την πορεία της νόσου. Συγκεφαλαιώνοντας, θα λέγαμε ότι η εφαρμογή επιλεγμένων ψυχοεκπαιδευτικών παρεμβάσεων που εστιάζουν τόσο στον ασθενή όσο και την οικογένειά του από τα αρχικά κιόλας στάδια της νόσου, δύνανται να βελτιώσουν τις δυσλειτουργικές ενδοοικογενειακές αλληλεπιδράσεις και να μειώσουν την οικογενειακή επιβάρυνση, καθιστώντας την οικογένεια σύμμαχο και αρωγό στην ψυχοκοινωνική αποκατάσταση του ασθενούς.

**Λέξεις-κλειδιά:** Οικογενειακή συνοχή, οικογενειακή ευελιξία, εκφραζόμενο συναίσθημα, οικογενειακή επιβάρυνση, ψυχολογική δυσφορία, αρχική φάση ψύχωσης.

## PhD thesis publications

This thesis consists of a compilation of eight scientific publications: two validation studies, one review paper, and five research papers.

### Validation studies

1. **Koutra, K.**, Triliva, S., Roumeliotaki, T., Lionis, C., & Vgontzas, A. N. (2012). Cross-cultural adaptation and validation of the Greek version of the Family Adaptability and Cohesion Evaluation Scales IV Package (FACES IV Package). *Journal of Family Issues*, 34(12), 1647-1672.
2. **Koutra, K.**, Economou, M., Triliva, S., Roumeliotaki, T., Lionis, C., & Vgontzas, A. N. (2014). Cross-cultural adaptation and validation of the Greek version of the Family Questionnaire for assessing expressed emotion. *Comprehensive Psychiatry*, 55(4), 1038-1049.

### Review paper

1. **Koutra, K.**, Vgontzas, A. N., Lionis, C., & Triliva, S. (2014). Family functioning in first-episode psychosis: a systematic review of the literature. *Social Psychiatry and Psychiatric Epidemiology*, 49, 1023-1036.

### Research papers

1. **Koutra, K.**, Triliva, S., Roumeliotaki, T., Lionis, C., & Vgontzas, A.N. (2014). Identifying the socio-demographic and clinical determinants of family functioning in Greek patients with psychosis. *International Journal of Social Psychiatry*, first published, June 27, 1-14.
2. **Koutra, K.**, Triliva, S., Roumeliotaki, T., Stefanakis, Z., Basta, M., Lionis, C., & Vgontzas, A.N. (2014). Family functioning in families of first-episode psychosis patients as compared to chronic mentally ill patients and healthy controls. *Psychiatry Research*, 219, 486-496.
3. **Koutra, K.**, Triliva, S., Roumeliotaki, T., Basta, M., Lionis, C., & Vgontzas, A.N. Family functioning in first-episode and chronic psychosis: the role of patient's symptom severity and psychosocial functioning. *Community Mental Health Journal*, in revision.
4. **Koutra, K.**, Simos, P., Triliva, S., Lionis, C., & Vgontzas, A.N. Linking family cohesion and flexibility with expressed emotion, family burden and psychological distress in caregivers of patients with psychosis: a path analytic model. *Social Psychiatry and Psychiatric Epidemiology*, under review.
5. **Koutra, K.**, Triliva, S., Roumeliotaki, T., Basta, M., Simos, P., Lionis, C., & Vgontzas, A.N. Impaired family functioning in psychosis and its relevance to relapse: a two-year follow-up study. *Comprehensive Psychiatry*, in revision.

## **1. General introduction**

An emphasis toward community care and deinstitutionalisation of psychiatric patients has gained wide acceptance since the early 1960s. The increase in community mental health care has transferred the onus of patient care on family members (Bloch, Szmukler, Herrman, Benson, & Colussa, 1995). Based on the concept of psychosocial rehabilitation, families of individuals with psychosis are actively participating in the care of their relatives. The family has thus become an important agent impacting upon the patients' mental functioning and the course of recovery.

The study of family interactions is especially important in the early stages of the illness when most of the changes are observed (Birchwood & Macmillan, 1993). A diagnosis of mental illness affects the entire family at its core, changing relationships and shifting priorities. Clinicians working with patients with a diagnosis of schizophrenia and related psychotic disorders recognise the importance of the family in initial treatment-seeking, ongoing assistance with adherence, and the social support that is a vital aspect of treatment planning and the recovery process. Family members provide far-reaching and sustained psychosocial support, emotional and tangible assistance during the early course and throughout the long-term trajectory of the illness (Addington & Burnett, 2004). Therefore, the involvement of the family in the overall treatment plan is of great importance, since relatives could play an integral part of the treatment process.

### **1.1. First episode psychosis**

First Episode Psychosis (FEP), or so called early psychosis, refers to the first time someone experiences a psychotic episode. FEP may lead to a broad range of clinical diagnoses. FEP usually occurs in late adolescence or early adulthood; a time of great change and upheaval, that is crucial for the development of identity, independence, sexuality, intimate relationships, study and career plans (Harris et al., 2005; Mackrell & Lavender, 2004).

The onset of psychosis is usually preceded by a long period of rising symptomatology and functional decline. Without appropriate early intervention, significant disruption to the young person's psychosocial development can ensue. The period between the onset of psychotic symptoms and initiation of treatment, often called duration of untreated psychosis, can last days, months or even years (McGlashan, 2006; Wunderink, Nienhuis, Sytma, & Wiersma, 2006). Several studies have suggested that the longer the duration of untreated psychosis the worse the prognosis of the illness (Addington, Van Mastrigt, & Addington, 2004; Harrigan, McGorry, & Krstev, 2003; Larsen, Moe, Vibe-Hansen, & Johannessen, 2000). Furthermore, in psychotic disorders, the initial treatment period is critical (Birchwood, Fowler, & Jackson, 2000; Birchwood & Macmillan, 1993) and predictive of long-term outcome. The patient's illness often contributes to one or more relapses which are risky, disruptive and may contribute to an increased chance of treatment resistance. Relapses are common during the initial five years after a FEP (Robinson et al., 1999) and any relapse during this critical

period increases the risk for further relapse and a chronic course (Harrison et al., 2001). Thus, early intervention in FEP is important in alleviating the distress and anxiety associated with psychotic symptoms, reducing the risk of suicide (Addington, Williams, Young, & Addington, 2004), as well as preventing relapses.

## **1.2. The role of the family in severe mental illness**

Concern with family's emotional climate and its influence on the patient diagnosed with schizophrenia began in the 1950s. Therapists working with families of patients with schizophrenia noted unclear, confusing, and conflicting communication patterns in family sessions. Some characterisations of such patterns are double bind interaction (Bateson, Jackson, Haley, & Weakland, 1956), pseudo-mutuality and pseudo-hostility (Wynne, Ryckoff, & Day, 1958), marital schism and skew (Lidz, Cornelison, Fleck, & Terry, 1957), "scapegoating" (Ackerman, 1958; Vogel & Bell, 1960), etc, all resulting in what has been termed by Fromme-Riechmann (Fromm-Reichmann, 1948) as "schizophrenogenic families". These patterns were viewed as reflecting dysfunctional family structures and relationships among family members and were thought to contribute to the development and persistence of the patient's psychotic symptoms. In addition to unclear and ambiguous communication, these families were thought to have a culture of shared denial of feelings and to be overly involved or "enmeshed" with each other.

Over the years researchers became more interested in how the family might play a part in the course rather than the cause of schizophrenia. The role of the family in the course of mental illness has been examined extensively ever since George Brown's seminal studies of the families of patients with schizophrenia (Brown, Birley, & Wing, 1972; Brown, Monck, Carstairs, & Wing, 1962) in terms of family factors influencing patient relapse and illness course and outcome (Leff & Vaughn, 1985). Family members' attitudes toward the patient, as measured by the level of Expressed Emotion (EE) and Family Burden (FB) associated with the caring role, have received most of the research attention (Awad & Voruganti, 2008; Wearden, Tarrier, Barrowclough, Zastowny, & Rahill, 2000).

The construct of EE within families was developed in the 1960s and 1970s (Brown et al., 1972; Brown & Rutter, 1966). Initially it was applied toward understanding schizophrenia within the family system, and describing the emotional environment and the attitudes of caregivers toward the patient by incorporating the key aspects of negative interpersonal relationships (Kuipers, 1992; Scazufca & Kuipers, 1996; Vaughn, 1989). EE constitutes the amount of critical comments (CCs), hostility (H), and/or emotional over-involvement (EOI) that relatives have toward a family member experiencing mental health challenges. CCs express dislike or disapproval of the patient's behaviour; H reflects disapproval or rejection of the patient; and EOI includes an exaggerated or overprotective attitude towards the patient, as reflected by an intrusive style of relating and the carer's evident emotional distress. Several decades of research have established EE as a highly reliable psychosocial predictor of psychiatric relapse in psychosis (Butzlaff & Hooley, 1998; Cechnicki, Bielańskab,

Hanuszkiewicz, & Darenb, 2013; Hooley, 2007). Researchers have positioned EE within the diathesis-stress model of psychopathology, conceptualising it as an environmental stressor that can precipitate or cause relapse of psychosis among people with a genetic vulnerability (Hooley & Hiller, 2000).

FB refers to the negative impact of the individual's mental disorder on the entire family (Biegel & Schultz, 1999; Schene, 1990) and it is often the result of the addition of the caregiving role to already existing family roles (Schene, 1990). FB is distinguished into two types: objective and subjective (Provencher & Mueser, 1997; Reinhard, 1994; Schene, Tessler, & Gamache, 1994). Objective burden involves the disruption to the family/household due to the individual's illness, and is usually observable (i.e. household routines, relationships, and finances) (Szmukler, 1996). Subjective burden involves the psychological consequences of the individual's illness for the family (i.e. health problems, distress) (Schene et al., 1994). It has long been established that families of patients with psychosis experience a great deal of FB (Bulger, Wandersman, & Goldman, 1993) in different life domains, including reduction of subjective health (Vaddadi, Soosai, Gilleard, & Adlard, 1997; Wittmund, Wilms, Mory, & Angermeyer, 2002), restrictions in leisure time, daily routine and social contacts, problems in working life, coping with the patients' symptoms and emotional problems (Kuipers, 1993; Provencher, 1996).

### **1.3. A systemic view of psychosis**

A systemic view of psychosis entails understanding the effect of the disorder on the family system and, vice versa, the effects of the family system on the presentation and outcome of the disorder. As we have already mentioned, family climate has been found to have a significant impact on the course of psychosis with EE being one of the most consistently significant predictors of patient relapse (Butzlaff & Hooley, 1998; Cechnicki et al., 2013; Hooley, 2007). On the other hand, the diagnosis of a severe psychiatric disorder affects intrafamilial relationships. Family dynamics and roles have to be adjusted to accommodate the illness. Within a family system, a change in a family member's major social role, such as the assumption of the role of the patient, brings about changes in the role relationships of the entire family. Such changes imply that the previous balance of family relationships is disturbed and a new, changed balance has to be achieved for the continued functioning of the family unit. Consequently, since the identified patient may disturb the social functioning of the entire family as a system, a comprehensive understanding of family roles is considered imperative.

### **1.4. Family functioning and the Circumplex Model of Marital and Family Systems**

Family functioning, which refers to the quality of interactions among family members, is a broad concept and is often used as an umbrella term encompassing numerous constructs, including family's emotional cohesion and adaptability to change. Effective family functioning can be facilitated or prevented depending on level of cohesion and adaptability of the family (Minuchin, Rosman, &

Baker, 1978). Using a systemic perspective, various clinical researchers have developed schemata and portraits of healthy family functioning (Epstein, Bishop, & Baldwin, 1982; Olson, Russell, & Sprenkle, 1989; Olson, Sprenkle, & Russell, 1979; Whitaker & Bumberry, 1988).

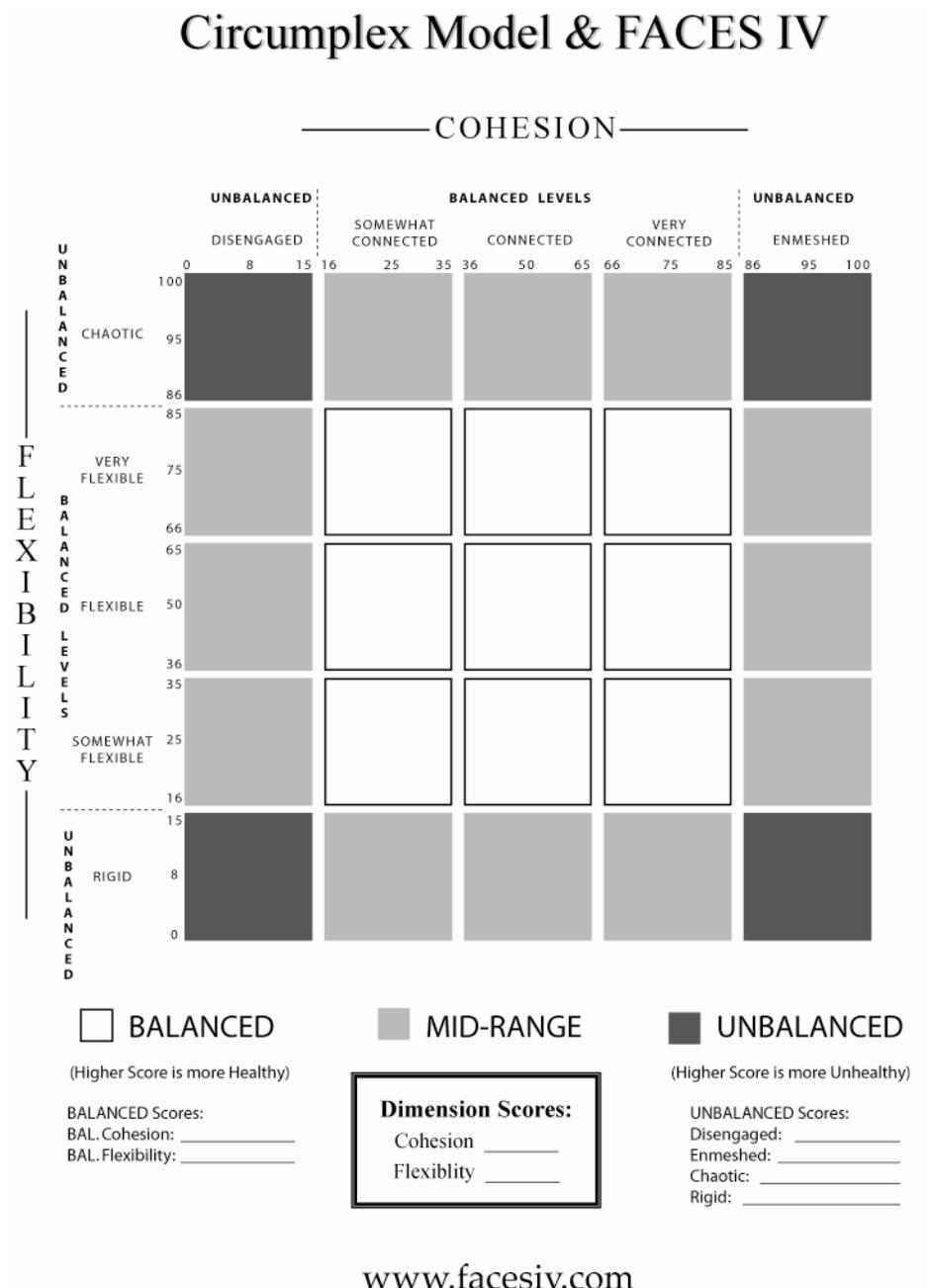
Olson and associates developed the Circumplex Model of Marital and Family Systems, describing the family's level of functioning (Olson et al., 1979). The Circumplex Model is a model that illustrates the changes a family system undergoes developmentally in reaction to an adverse event or a major life change (Olson & Gorall, 2003) and represents one of the most extensively used models of family functioning both in clinical and research settings. The Model is particularly useful as a "relational diagnosis", because it focuses on the relational system and it is comprised of three key concepts for understanding family functioning: family cohesion, flexibility, and communication (Olson, 2000). Family cohesion is defined as the emotional bonding that family members have toward one another (Olson, 1993), whereas family flexibility is defined as the quality and expression of leadership and organization, role relationship, and relationship rules and negotiations (Olson & Gorall, 2006). Communication is defined as the positive skills in conveying information used by the family members (Olson & Gorall, 2006) and it is viewed as a facilitating dimension that helps families negotiate cohesion and flexibility (Olson, Gorall, & Tiesel, 2007).

Within the Circumplex Model, some of the specific concepts used to assess family cohesion are emotional bonding, boundaries, coalitions, decision making, time, space, friends, interests, and recreation. The specific indicators used to measure family flexibility include leadership in terms of control and discipline, negotiation style, role relationships, and relationship rules. Family communication is assessed by focusing on the family as a group with regard to speaking and listening skills, self-disclosure, clarity, empathy, continuity tracking, respect and regard, and effective problem solving (Olson & Gorall, 2003). Whereas positive communication skills are believed to facilitate healthy family functioning, a lack of communication skills is believed to inhibit the family system's ability to change when needed (Olson, 2000; Olson, Russel, & Sprenkle, 1983).

The main hypothesis of the Circumplex Model is that balanced levels of cohesion and flexibility are most conducive to healthy family functioning. Conversely, unbalanced levels of cohesion and flexibility (very low or very high levels) are associated with unhealthy family functioning. This hypothesis is commonly referred to as the curvilinear hypothesis (Olson & Gorall, 2006). In terms of cohesion, family systems need to maintain a balance between separateness versus togetherness. Balanced families are able to shift between being apart and being connected in a fluid manner. Unbalanced families tend to be stuck at either extreme of separateness or togetherness and are unable to find a balance. Too much togetherness in the family leads to enmeshment which curtails or eliminates autonomy and independence. Too much separation between family members leads to disengagement which can result to a lack of loyalty and emotional closeness among the family members; a problematic situation when dealing with a stressor or adverse life event (Olson & Gorall, 2003). In terms of flexibility, family systems need to balance stability and change. In balanced

families, there is the ability to maintain stability and also to change when necessary. Unbalanced families seem to be either too focused on stability or too open to change. Too little flexibility leads to rigidity, whereas too much flexibility leads to chaos. To be rigid means to never change and to be chaotic means always changing. Finally, balanced families are open to communication and feedback from other sources, so that they can better adjust their levels of cohesion and flexibility. Unbalanced families ignore or are unable to accept feedback from others so as to improve their ability to change their level of cohesion and flexibility (Olson & Gorall, 2003).

**Figure 1.** The Circumplex Model of Marital and Family Systems



### **1.5. The role of the family in severe psychiatric disorders in Greece**

In Greece, the vast majority of patients diagnosed with psychosis return to their communities (Basta et al., 2013; Madianos, Papaghelis, Filippakis, Hatjiandreou, & Papageorgiou, 1997) after discharge from hospital and depend on the assistance and continued involvement of their families. While living with a patient with long-term psychosis, the majority of family members experience stigma-related phenomena which are associated with changes in social status, isolation and constant tension (Koukia & Madianos, 2005). Like other Mediterranean societies, Greek society does not easily tolerate deviant behaviour, although some changes in attitudes toward mental illness were observed over the last decades (Madianos, Economou, Hatjiandreou, Papageorgiou, & Rogakou, 1999). Although the Greek family is seemingly a nuclear family (Georgas, 1999; Katakis, 1998; Papadiotis & Softas-Nall, 2006; Softas-Nall, 2003), in reality it functions as an extended one (Georgas, 1999; Georgas, 2000) characterised by cohesiveness and tight knit bonds and interactions. Strong family values in Greek families contribute to the sense of concern and obligation that family members have to care for their identified patient. In Greece the family is considered a pillar of society and, thus, problems are expected to be solved by the whole family. This type of family has been called “extended urban family” (Georgas, 2000). In this regard, illness in one family member may affect family dynamics and result in substantial burden for the entire family.

### **1.6. The necessity of using standardised tools in assessing family dynamics**

With the rapid development of family therapy and interventions in Greece, there has been an increasing need for standardised assessment tools of assessing family dynamics in the Greek population. Healthy family functioning has been a key area of interest for mental health professionals who provide family interventions. Effective communication, cohesion and flexibility, are often suggested as key dimensions to describe healthy family functioning (Olson et al., 2007). Furthermore, the construct of EE is a well-established measure of the family environment which has been shown to be predictive of outcome in mental and physical illnesses in a variety of cultural settings (Bhugra, 2003). The question is if these dimensions postulated in other societies are applicable to the Greek culture. When measures of family functioning are being applied in cultures where they have not been used before, they must be accompanied by fieldwork to establish the norms and the context, thus embedding specific dimensions of family dynamics in the specific cultural context. The translation and cross-cultural adaptation of the instrument for use in a new country, language and consequently culture is essential to reach equivalence between the original source and target versions of the assessment tool.

## **2. Rationale and aims of the present thesis**

The influential role of the family in the outcome of chronic psychosis is well documented as most of the research studies include patients with recurring episodes and a chronic course of the disorder. However, there has been relatively little research on the family environment of patients experiencing their first episode of psychosis, a point in time when most of the changes in family dynamics are observed. Furthermore, the existing studies in FEP patients examined certain aspects of intrafamilial transactions, including the affective attitudes and behaviours expressed to the patient from his/her family members, usually characterised as EE, and the burden of care. To the best of our knowledge, to date there are virtually no empirical data in regard to family cohesion and flexibility in the context of FEP, while no study compared FEP and chronic patients with psychosis in terms of these family variables. Furthermore, no study has explored in depth the association of both caregivers' and patients' socio-demographic characteristics, as well as clinical features of the illness with family cohesion and flexibility, whereas such research with regard to EE and FB is limited. Moreover, few studies have explored how family cohesion and flexibility conjoint with other aspects of the family emotional atmosphere, such as EE, FB and caregiver's psychological distress, affects patient outcomes whereas there is a paucity of data in regard to the effect of the family environment in the course of the disorder for FEP versus chronic patients with psychosis. Finally, although previous research has identified specific characteristics in Greek families that may influence the type of care they provide, there is a scarcity of published research on whether and how the family environment is associated with caregivers' psychological well-being.

It is clear that dysfunctional family dynamics can importantly impact on the course of the disorder and patient's recovery. Understanding of the family dynamics early on is critical in developing effective intervention and preventive strategies. Moreover, instead of focusing on a single dimension, such as EE or FB, a thorough approach of family functioning by examining constructs, such as family's emotional cohesion and flexibility to change, would appear more useful for a more complete understanding of such a complex entity as the family. Such knowledge may increase our understanding of the intrafamilial relationships of patients with psychosis, thereby making it easier to identify patients and relatives who need intervention.

Given the dearth of research on family functioning in FEP patients and the particularities of Greek families, the primary aim of the present thesis is to provide a comprehensive assessment of intrafamilial relationships in a sample of FEP and chronic patients with a diagnosis of schizophrenia or bipolar disorder, as well as healthy controls, by examining a variety of family life's aspects. The specific aims of this study are:

- 1) To systematically review the existing literature that has examined intrafamilial relationships in FEP patients.

- 2) To describe the socio-demographic and illness-related characteristics associated with family functioning in psychosis and identify the determinants of unhealthy family functioning in FEP and chronic patients with psychosis and their families.
- 3) To investigate possible differences in family functioning of FEP patients in comparison with chronic patients with psychosis and healthy controls.
- 4) To examine the effect of patient's symptom severity and psychosocial functioning in a variety of aspects of family life in FEP and chronic patients with psychosis.
- 5) To test a model accounting for caregivers' psychological distress that takes into account perceived family cohesion and flexibility, emotionally charged behaviours toward the patient (as indexed by EE), and caregiver's sense of burden associated with the presence of mental illness in the family (as indexed by FB).
- 6) To determine whether dysfunctional family functioning contributes to patient relapse and patient rehospitalisation during a two-year follow-up.

Given the lack of validated scales to evaluate family dynamics in the Greek context additional aims of this study are:

- 1) To translate and validate the Family Adaptability and Cohesion Evaluation Scales IV (FACES IV; Olson et al., 2007) in a Greek sample of healthy family members in an attempt to determine whether it is a valid research tool to assess family functioning in terms of cohesion and flexibility in the Greek family.
- 2) To translate, adapt and examine the psychometric properties of the Family Questionnaire (FQ; Wiedemann et al., 2002) in a Greek sample of caregivers of patients with severe psychiatric disorders in order to determine whether it is a useful tool for the study of family EE in the Greek context.

Specific research hypotheses to be addressed in the context of this thesis are:

*Hypothesis 1:* Both socio-demographic and illness-related factors would have an effect to unhealthy family functioning in psychosis in terms of unbalanced levels of cohesion and flexibility, high levels of EE, FB, and caregivers' psychological distress.

*Hypothesis 2:* Families of FEP patients would show unbalanced levels of cohesion and flexibility and higher levels of psychological distress as compared to families of healthy controls, and more balanced levels of cohesion and flexibility and lower levels of psychological distress than families of chronic patients. Furthermore, chronicity would adversely affect caregivers' level of EE and FB.

*Hypothesis 3:* Family dysfunction in terms of cohesion and flexibility, as well as high levels of relatives' EE, FB, and psychological distress would be related to patient's greater severity of illness and impaired functioning, and these associations would differ in FEP and chronic patients.

*Hypothesis 4:* Dysfunctional levels of family cohesion and flexibility would negatively affect caregivers' behaviour toward the patient resulting in high EE levels, which in turn might affect their sense of burden and psychological distress. These associations would be different in families of FEP as compared with those of chronic patients.

*Hypothesis 5:* Dysfunctional family functioning as indexed by unbalanced levels of cohesion and flexibility, high levels of EE (characterised by high levels of CC rather than EOI), high FB and caregivers' psychological distress would be associated with patient relapse, and these associations would differ in FEP and chronic patients.

### **3. Methods**

This section provides a brief summary integrating the methods used for the different research papers included in this dissertation. Further methodological details regarding each research paper can be found in the results section. In addition, detailed information about the methodology of the two validation studies and the systematic review of the literature can be found in the results section, as well.

#### **3.1. Design**

The present research employed both a cross-sectional (papers 4-7) and prospective longitudinal design (paper 8).

#### **3.2. Participants**

Sample size estimation was based on medium expected effect sizes, according to Cohen's criteria (1988), for 0.80 power and 0.05 confidence level. Hence, a total of 100 out of 104 patients (Response Rate 96.1%) consecutively admitted to the Inpatient Psychiatric Unit of the University Hospital of Heraklion, Crete, Greece, and their key caregivers were recruited. The sample consisted of 50 FEP patients and 50 chronic patients diagnosed with schizophrenia or bipolar disorder. The patients and their key caregivers were contacted and informed about the purpose of the study during a 12-month period (October 2011 – October 2012). The key caregiver was defined as the person who provides the most support devoting a substantial number of hours each day in taking care of the patient. For the purposes of this study, FEP patients were recruited upon first hospitalisation whereas chronic patients had two or more hospitalisations.

To be eligible for inclusion in the study, the patients had to meet the following criteria: (i) to be between 17 and 40 years old, (ii) to have a good understanding of the Greek language, (iii) to have been out of hospital for at least 6 weeks and considered as stabilised by their treating psychiatrist, (iv) to be living with a close relative, and (v) to have a diagnosis of schizophrenia or bipolar disorder according to the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) or International Classification of Disease (ICD-10) and with no evidence of organicity, significant intellectual handicap, or primary diagnosis of substance abuse. Inclusion criteria for the caregivers were: (i) to be between 18 and 75 years old, (ii) to have a good understanding of the Greek language, (iii) to have no diagnosed psychiatric illness, and (iv) to be either living with, or directly involved in the care of the patient.

The sample of 50 control families was drawn from several sources including a random sample of individuals recruited from community cultural associations and community care centres of the Municipality of Heraklion. Controls were age and gender-matched with the initial sample of 50

caregivers of FEP patients. At the time of participation in the study, control families reported no history of psychiatric illness in the family.

### **3.3. Procedure**

Caregivers were interviewed by the first author in individual sessions at the Psychiatric Clinic, where participants were asked to take part in a study focusing on family functioning of patients with schizophrenia or bipolar disorder. Caregivers were given an information sheet describing the aims of the study. The time needed to complete the interview was approximately 75 to 90 minutes. Patients' socio-demographic and clinical data were extracted from medical records and confirmed during the interview by the caregivers, whereas patients' symptoms and functioning were also assessed by their treating psychiatrist within two weeks from the caregivers' assessment. Patients were followed-up for two years after the baseline family assessment, at 6, 12, 18, and 24 months. According to national hospitalisation regulations, readmissions, when necessary, were to the University Hospital of Heraklion, where readmission was determined by senior psychiatrists. All participants involved in the present study provided written informed consent. The study was approved by the Ethics Committee of the University Hospital.

### **3.4. Measures**

#### ***3.4.1. Caregivers' assessment***

*Socio-demographic characteristics:* Socio-demographic characteristics, such as relative's gender, age, education, marital status, employment status, origin and current residence, financial status, family structure, relation to the patient, contact with the patient, etc, were collected through structured questionnaires administered by the researchers.

*Family Adaptability and Cohesion Evaluation Scales IV Package:* Family functioning was assessed by means of the Family Adaptability and Cohesion Evaluation Scales IV Package (FACES IV Package) (Olson et al., 2007), a 62-item self-report instrument assessing family cohesion, flexibility, communication, and satisfaction. To determine the amount of balance versus unbalance in a family system, Cohesion, Flexibility, and Total Circumplex ratio scores were calculated. Scores  $\geq 1.0$  indicate the presence of balanced levels of cohesion and flexibility, as well as functional global family functioning. The FACES IV Package has been translated and validated for the Greek population by Koutra and colleagues (2013), and has demonstrated good psychometric properties.

*Family Questionnaire:* Family caregivers' EE was measured via the Family Questionnaire (FQ) (Wiedemann, Rayki, Feinstein, & Hahlweg, 2002), a 20-item self-report instrument measuring emotional responses and behaviours of relatives of patients with schizophrenia in terms of EOI and CC. The developers provide a cut-off point of 23 points as an indication of high CC, and 27 points for

EOI. The FQ has been translated and validated for the Greek population by Koutra and colleagues (2014), and has demonstrated good psychometric properties.

*Family Burden Scale:* The Family Burden Scale (FBS) (Madianos et al., 2004) was used to measure FB. The scale consists of 23 items assessing objective (economic burden, impact on daily activities/social life, patient's aggressiveness) and subjective (impact on health) dimensions of caregiver burden. The developers recommend the use of a cut-off total score of 24 points. The scale has been originally developed and standardised in the Greek population and has demonstrated good psychometric properties.

*General Health Questionnaire:* The General Health Questionnaire-28 item version (GHQ-28) (Goldberg et al., 1997), a self-administered instrument that screens for non-psychotic psychopathology in clinical and non-clinical settings, was used to assess caregivers' psychological distress. Its four subscales measure somatic symptoms, anxiety/insomnia, social dysfunction, and severe depression. The instrument has been adapted for the Greek population by Garyfallos and colleagues (1991), and has demonstrated good psychometric properties.

#### **3.4.2. Patients' assessment**

*Socio-demographic characteristics:* Socio-demographic characteristics, such as patient's gender, age, education, marital status, employment status, origin and current residence, financial status, and illness-related characteristics, such as clinical diagnosis, onset of illness, age at onset, hospitalisation to psychiatric clinic, longer and last hospitalisation (prior to the study period), as well as therapeutic interventions received were collected through structured questionnaires administered by the researchers.

*Brief Psychiatric Rating Scale:* The Brief Psychiatric Rating Scale (BPRS) (Overall & Gorham, 1962), a comprehensive 18-item symptom scale, was used to assess patient's symptoms. In the present study, the BPRS total score was used to assess global symptom change. The scale has been translated and standardised for the Greek population by Paneras and Crawford (2004), and has demonstrated good psychometric properties.

*Global Assessment Scale:* The Global Assessment Scale (GAS) (Endicott, Spitzer, Fleiss, & Cohen, 1976) was used for evaluating the overall functioning of the patients on a continuum from illness to health (scores range between 0-100). The scale has been translated and standardised for the Greek population by Madianos (1987), and has demonstrated good psychometric properties.

*Assessment of patient relapse:* Patients' outcome over a two-year follow up period was measured by the following variables: (i) the presence/absence of relapse within the first 6, 12, 18 and 24 months following the baseline family assessment, as a dichotomous variable (0=no relapse, 1=relapse); (ii) time to relapse; (iii) total number of psychiatric admissions and (iv) total length of stay at psychiatric

hospitals during the two-year study period; (v) whether hospitalisations were voluntary or involuntary. The presence of relapse (requiring hospitalisation) was assessed through computerised hospital records. Patient charts were reviewed for the remaining outcome variables.

### 3.5. Potential confounders

Potential confounders included caregivers' and patients' characteristics that have an established or potential association with chronicity of mental illness and family functioning variables. Caregivers' characteristics included relative's age, education (low level:  $\leq 9$  years of school, medium level:  $\leq 12$  years of school and  $>9$  years of school, high level: some years in university or university degree), origin (urban vs. rural), marital status (single, married, divorced/widowed), financial status (no individual income,  $<10.000\text{€}$ ,  $10.000\text{€}$ - $20.000\text{€}$ ), family structure (two-parent family vs. one-parent family), number of family members, and number of children in the family. Patients' characteristics included patient's age, education (low level:  $\leq 9$  years of school, medium level:  $\leq 12$  years of school and  $>9$  years of school, high level: some years in university or university degree), residence (urban vs. rural), working status (working vs. not working), financial status (no individual income,  $<10.000\text{€}$ ,  $10.000\text{€}$ - $20.000\text{€}$ ), diagnosis (schizophrenia vs. bipolar disorder), onset of mental illness ( $\leq 12$  months, 1-4 years,  $>4$  years), age at illness's onset, number of hospitalisations, last hospitalisation (up to 6 months, 7-12 months,  $>1$  year), longer hospitalisation (up to 20 days vs. 20+ days), symptom severity and psychosocial functioning.

### 3.6. Statistical analysis

Multivariate linear regression models, structural equation modelling, and survival analysis adjusted for confounding variables were used for the statistical analysis of the data. Potential confounders which correlated with either the outcomes or the exposures of interest at  $p < 0.2$ , as well as *a priori* selected potential confounders were included in the multivariate models. Effect modification by illness chronicity was evaluated using the likelihood ratio test through inclusion of the interaction terms in the models (modification effects were evaluated at  $p < 0.10$ ). Estimated associations are described in terms of  $\beta$ -coefficients, Hazard Ratios (HR) and their corresponding 95% confidence intervals (CI). Estimated direct, indirect and total effects in path analyses are described in terms of standardised regression coefficients and evaluated using both the Sobel test and corresponding bootstrapped 95% CI's. Invariance of regression coefficients (structural paths) between the two groups of patients (first episode, chronic) was assessed based on  $\Delta\chi^2$  and  $\Delta\text{CFI}$  indices (with a cutoff  $\leq 0.01$ ). All hypothesis testing was conducted assuming a 0.05 significance level and a two-sided alternative hypothesis. All statistical analyses were performed using SPSS Statistics 20 software (IBM, Armonk, NY, USA) and the IBM SPSS AMOS 20 (IBM, Armonk, NY, USA).

A detailed description of the statistical methods used to analyse data regarding each paper can be found in the respective results sections.

**Table 1.** Brief description of the methods used in each paper of this dissertation

<b>Papers of this PhD thesis</b>	<b>Study design and participants</b>	<b>Family Measures</b>	<b>Statistical analysis</b>
<i>Validation studies</i>			
<ul style="list-style-type: none"> <li>• Cross-cultural adaptation and validation of the Greek version of the Family Adaptability and Cohesion Evaluation Scales IV Package (FACES IV Package)</li> </ul>	<ul style="list-style-type: none"> <li>• Cross-sectional study</li> <li>• 584 family members (non-clinical population)</li> </ul>	<ul style="list-style-type: none"> <li>• FACES IV</li> </ul>	<ul style="list-style-type: none"> <li>• Factor analysis</li> <li>• Reliability tests</li> </ul>
<ul style="list-style-type: none"> <li>• Cross-cultural adaptation and validation of the Greek version of the Family Questionnaire for assessing expressed emotion</li> </ul>	<ul style="list-style-type: none"> <li>• Cross-sectional study</li> <li>• 176 patients with schizophrenia or bipolar disorder and their caregivers</li> </ul>	<ul style="list-style-type: none"> <li>• FQ</li> <li>• FBS</li> <li>• GHQ-28</li> </ul>	<ul style="list-style-type: none"> <li>• Factor analysis</li> <li>• Reliability tests</li> <li>• Structural equation modelling</li> </ul>
<i>Systematic review</i>			
<ul style="list-style-type: none"> <li>• Family functioning in first-episode psychosis: a systematic review of the literature</li> </ul>	<ul style="list-style-type: none"> <li>• 27 studies</li> </ul>	<ul style="list-style-type: none"> <li>• Family functioning measures</li> </ul>	<ul style="list-style-type: none"> <li>• Search of the MEDLINE and PsycINFO databases (1990-2013)</li> </ul>
<i>Research studies</i>			
<ul style="list-style-type: none"> <li>• Identifying the socio-demographic and clinical determinants of family functioning in Greek patients with psychosis</li> </ul>	<ul style="list-style-type: none"> <li>• Cross-sectional study</li> <li>• 100 patients (50 FEP and 50 chronic) and their caregivers</li> </ul>	<ul style="list-style-type: none"> <li>• FACES IV</li> <li>• FQ</li> <li>• FBS</li> <li>• GHQ-28</li> </ul>	<ul style="list-style-type: none"> <li>• Multivariable linear regression analysis</li> </ul>
<ul style="list-style-type: none"> <li>• Family functioning in families of first-episode psychosis patients as compared to chronic mentally ill patients and healthy controls</li> </ul>	<ul style="list-style-type: none"> <li>• Cross-sectional study</li> <li>• 50 FEP patients, 50 chronic patients, and 50 controls</li> <li>• 150 family members</li> </ul>	<ul style="list-style-type: none"> <li>• FACES IV</li> <li>• FQ</li> <li>• FBS</li> <li>• GHQ-28</li> </ul>	<ul style="list-style-type: none"> <li>• Multivariable linear regression analysis</li> </ul>
<ul style="list-style-type: none"> <li>• Family functioning in first-episode and chronic psychosis: the role of patient's symptom severity and psychosocial functioning</li> </ul>	<ul style="list-style-type: none"> <li>• Cross-sectional study</li> <li>• 100 patients (50 FEP and 50 chronic) and their caregivers</li> </ul>	<ul style="list-style-type: none"> <li>• BPRS</li> <li>• GAS</li> <li>• FACES IV</li> <li>• FQ</li> <li>• FBS</li> <li>• GHQ-28</li> </ul>	<ul style="list-style-type: none"> <li>• Multivariable linear regression analysis</li> </ul>
<ul style="list-style-type: none"> <li>• Linking family cohesion and flexibility with expressed emotion, family burden and psychological distress in caregivers of patients with psychosis: a path analytic model</li> </ul>	<ul style="list-style-type: none"> <li>• Cross-sectional study</li> <li>• 100 patients (50 FEP and 50 chronic) and their caregivers</li> </ul>	<ul style="list-style-type: none"> <li>• FACES IV</li> <li>• FQ</li> <li>• FBS</li> <li>• GHQ-28</li> </ul>	<ul style="list-style-type: none"> <li>• Structural equation modelling (path analysis)</li> <li>• Multivariable linear regression analysis</li> </ul>
<ul style="list-style-type: none"> <li>• Impaired family functioning in psychosis and its relevance to relapse: a two-year follow-up study</li> </ul>	<ul style="list-style-type: none"> <li>• Prospective study, two-year follow-up</li> <li>• 100 patients (50 FEP and 50 chronic) and their caregivers</li> </ul>	<ul style="list-style-type: none"> <li>• FACES IV</li> <li>• FQ</li> <li>• FBS</li> <li>• GHQ-28</li> </ul>	<ul style="list-style-type: none"> <li>• Survival analysis</li> <li>• Multivariable binary logistic regression analysis</li> </ul>

*Abbreviations:* FEP: First-Episode Psychosis; FACES IV Package: Family Adaptability and Cohesion Evaluation Scales IV Package; FQ: Family Questionnaire; FBS: Family Burden Scale; GHQ-28: General Health Questionnaire-28 item; BPRS: Brief Psychiatric Rating Scale; GAS: Global Assessment Scale.

## 4. Results

### Main findings

- Both scales (FACES IV Package and FQ) appeared to be valid and reliable instruments for future use in both research and clinical assessment of intrafamilial relationships (Papers 1 and 2).
- While many studies have been conducted examining the role of family functioning on the course of illness for chronic patients with psychosis, few investigators have considered the role of family functioning on FEP focusing on specific components of intrafamilial transactions, such as EE and FB. Family functioning, as conceptualised by the Circumplex Model of Marital and Family Systems, has not been previously studied in the context of FEP (Paper 3).
- A number of socio-demographic and clinical characteristics were significantly associated with family functioning in psychosis. Caregivers' characteristics including gender, employment status, origin, residence, financial status, relation to the patient, contact with the patient and family structure, were among the most significant determinants of family functioning. Also, patients' socio-demographic characteristics including age, education, origin, residence, and employment status, as well as illness-related factors, such as onset of mental illness, number of hospitalisations, last hospitalisation, longer hospitalisation and clinical diagnosis impacted intrafamilial relationships (Paper 4).
- Families of FEP patients presented significantly lower levels of cohesion and flexibility thus experienced higher levels of dysfunction, as compared to families of healthy controls; also, they presented higher levels of cohesion and flexibility, thus the family system was viewed as more balanced and functional, as compared to chronic families. Caregivers of chronic patients scored significantly higher in CC, and reported higher burden and psychological distress than those of FEP patients. A high prevalence of EOI was found both in families of FEP and chronic patients with psychosis (Paper 5).
- Increased symptom severity was associated with unbalanced family cohesion and flexibility, increased caregivers' EE levels primarily in the form of EOI and psychological distress. Both increased symptom severity and patient's impaired functioning significantly impacted FB levels. No significant interaction effect of chronicity was observed in the afore-mentioned associations (Paper 6).
- The proposed model of caregivers' psychological distress that takes into account perceived family dynamics in terms of cohesion and flexibility, emotionally charged behaviours toward the patient (as indexed by EE), and caregiver's sense of burden of the caregiving experience (as indexed by FB) was confirmed independently of disease chronicity. Neither family cohesion nor family flexibility was found to have significant direct effects on caregivers' psychological distress. Instead, the effect of flexibility was mediated by caregivers' CC and FB indicating an indirect effect on caregivers' psychological distress. Thus, the more dysfunctional the levels of flexibility

in the family, the more likely for the caregivers to adopt a highly critical attitude toward the patient, which, in turn, lead to greater burden and consequently, higher levels of psychological distress for themselves (Paper 7).

- Dysfunctional family functioning in terms of cohesion and flexibility was not associated with relapse in psychosis over a two-year follow-up period. Certain characteristics of family functioning including high levels of CC and FB were found to be significant predictors of early clinical relapse leading to hospitalisation. No significant interaction effect of illness chronicity was observed in the afore-mentioned associations (Paper 8).

## 4.1. Paper 1

### **Cross-cultural adaptation and validation of the Greek Version of the Family Adaptability and Cohesion Evaluation Scales IV Package (FACES IV Package)\***

**Koutra, K.,** Triliva, S., Roumeliotaki, T., Lionis, C., & Vgontzas, A. N.

The aim of the present study was to examine the psychometric properties of the Greek version of Family Adaptability and Cohesion Evaluation Scales IV (FACES IV) Package. The original FACES IV displays a six-factor structure with two balanced scales—Balanced Cohesion and Balanced Flexibility—and four unbalanced scales—Disengaged, Enmeshed, Rigid, and Chaotic—and has been shown to have satisfactory internal and test–retest reliability. A total of 584 family members agreed to participate in the study. The findings indicated that the Greek version displays similar factor structure to the original version. Cronbach’s  $\alpha$  coefficients for the six scales ranged from .59 to .79. The test–retest correlation coefficients ranged between .94 and .97. The Family Communication Scale and the Family Satisfaction Scale demonstrated high internal consistency and test–retest reliability. Thus, the Greek version of the FACES IV Package appears to be a valid and reliable instrument to be used in both research and clinical assessment of family functioning.

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# Cross-Cultural Adaptation and Validation of the Greek Version of the Family Adaptability and Cohesion Evaluation Scales IV Package (FACES IV Package)

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## Abstract

The aim of the present study was to examine the psychometric properties of the Greek version of Family Adaptability and Cohesion Evaluation Scales IV (FACES IV) Package. The original FACES IV displays a six-factor structure with two balanced scales—Balanced Cohesion and Balanced Flexibility—and four unbalanced scales—Disengaged, Enmeshed, Rigid, and Chaotic—and has been shown to have satisfactory internal and test–retest reliability. A total of 584 family members agreed to participate in the study. The findings indicated that the Greek version displays similar factor structure to the original version. Cronbach's  $\alpha$  coefficients for the six scales ranged from .59 to .79. The test–retest correlation coefficients ranged between .94 and .97. The Family Communication Scale and the Family Satisfaction Scale demonstrated high

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internal consistency and test–retest reliability. Thus, the Greek version of the FACES IV Package appears to be a valid and reliable instrument to be used in both research and clinical assessment of family functioning.

**Keywords**

family functioning, cohesion, flexibility, communication, satisfaction

**Introduction**

Family functioning refers to the quality of interactions among family members. Cohesion, adaptability, and communication are the key dimensions along which family functioning is characterized. Effective family functioning can be facilitated or prevented depending on level of cohesion and adaptability of the family (Minuchin, Rosman, & Baker, 1978). Using a systemic perspective, clinical researchers have developed schemata and portraits of healthy family functioning (Epstein, Bishop, & Baldwin, 1982; Olson, Russell, & Sprenkle, 1989; Olson, Sprenkle, & Russell, 1979; Whitaker & Bumberry, 1988). Additionally, a variety of measures have been developed to assess family functioning (Epstein, Baldwin, & Bishop, 1983; Olson, Bell, & Portner, 1978; Olson, Gorall, & Tiesel, 2007; Olson, Portner, & Bell, 1982; Olson, Portner, & Lavee, 1985).

Olson and his associates developed the Circumplex Model of Marital and Family Systems, describing the family's level of functioning (Olson et al., 1979). The Circumplex Model represents one of the most extensively used models of family functioning, both in clinical and academic settings. The model is particularly useful as a "relational diagnosis," because it focuses on the relational system and it is composed of three key concepts for understanding family functioning: family cohesion, flexibility, and communication (Olson, 2000). Family cohesion is defined as the emotional bonding that family members have toward one another (Olson, 1993). Family flexibility is defined as the quality and expression of leadership and organization, role relationship, and relationship rules and negotiations (Olson & Gorall, 2006). Flexibility as previously used in the model was defined as the amount of change in family leadership, role relationships, and relationship rules (Olson, 1993). Family communication is defined as the positive communication skills used by the family members (Olson & Gorall, 2006). Communication is viewed as a facilitating dimension that helps families negotiate cohesion and flexibility issues (Olson et al., 2007). Positive communication skills

enable couples and families to alter their levels of cohesion and flexibility to meet developmental or situational demands (Olson & Gorall, 2003).

Within the Circumplex Model, some of the specific concepts used to assess family cohesion are emotional bonding, boundaries, coalitions, decision making, time, space, friends, interests, and recreation. The specific indicators used to measure family flexibility include leadership in terms of control and discipline, negotiation style, role relationships, and relationship rules. Family communication is assessed by focusing on the family as a group with regard to speaking and listening skills, self-disclosure, clarity, empathy, continuity tracking, respect and regard, and effective problem solving (Olson & Gorall, 2003). Whereas positive communication skills are believed to facilitate healthy family functioning, a lack of communication skills is believed to inhibit the family system's ability to change when needed (Olson, 2000; Olson, Russel, & Sprenkle, 1983).

The main hypothesis of the Circumplex Model is the following: "Balanced levels of cohesion and flexibility are most conducive to healthy family functioning. Conversely, unbalanced levels of cohesion and flexibility (very low or very high levels) are associated with unhealthy family functioning." This hypothesis is commonly referred to as the curvilinear hypothesis (Olson & Gorall, 2006). The model is specifically designed for family research, clinical assessment, treatment planning, and outcome effectiveness of marital and family therapy (Olson, 2000). The Circumplex Model of Marital and Family Systems and the Family Adaptability and Cohesion Evaluation Scales (FACES) have been used in more than 1,200 research studies and have also been widely used in clinical settings over the past 25 years (Kouneski, 2002).

Family Adaptability and Cohesion Evaluation Scales IV (FACES IV; Olson et al., 2007) is the latest version of a family self-report assessment designed to assess cohesion and flexibility in family interactions, which are the two central dimensions of the Circumplex Model of Marital and Family Systems (Olson, 2000). Previous self-report assessments include three versions of the self-report measure called *FACES I* (Olson et al., 1978), *FACES II* (Olson et al., 1982), and *FACES III* (Olson et al., 1985) and the observational assessment called the *Clinical Rating Scale* (CRS; Thomas & Lewis, 1999; Thomas & Olson, 1993). FACES IV was designed to measure cohesion and flexibility in a curvilinear manner, capturing both high and low extremes of the dimensions of cohesion and flexibility, as well as the moderate regions that had been tapped by previous versions of FACES. FACES IV taps both balanced (healthy) and unbalanced (problematic) aspects of family functioning and provides a comprehensive assessment of family cohesion and flexibility dimensions using six scales. The two balanced FACES IV scales are

Balanced Cohesion and Balanced Flexibility. The four new unbalanced scales are Enmeshed and Disengaged in terms of cohesion, and Chaotic and Rigid with reference to flexibility (Olson & Gorall, 2003). The original studies have reported that FACES IV is highly reliable in the six scales and is therefore useful in research and clinical assessment of families (Olson et al., 2007).

Curvilinear interpretation is based on cohesion levels ranging from enmeshed (overly high) to disengaged (overly low) and flexibility levels ranging from chaotic (overly high) to rigid (overly low), with balanced and moderate levels in between (Kouneski, 2000). Another way to consider the Circumplex Model is as a descriptive couple and family map of 25 types of couple and family relationships (Olson & Gorall, 2003). This graphic representation of the model is an expansion of an earlier 16-type (Olson, 2000; Olson et al., 1983), which increased the number of balanced levels for each of the dimensions of cohesion and flexibility, thus increasing the number of balanced family types from four to nine. The model now includes five levels of cohesion and flexibility, making a total of 25 types of family systems. The 9 balanced types are in the central area of the model and there are 12 mid-range types, which are balanced on one dimension and unbalanced on the other dimension. The four unbalanced types have unbalanced scores (very high or very low scores) on both cohesion and flexibility (Olson & Gorall, 2003).

Using cluster analysis of the six FACES IV scales, six family types were identified ranging from the most healthy and happy to the least healthy and most problematic, and they were called *Balanced*, *Rigidly Balanced*, *Midrange*, *Flexibly Unbalanced*, *Chaotically Disengaged*, and *Unbalanced*. Considering that the previous version of the Circumplex Model allows for analysis of families who could be categorized as balanced, unbalanced, or midrange, the development of the six family types based on FACES IV provides a new family typology for studying and analyzing family relationships and allows for the comparison of the six different family types regarding a wide variety of criteria and variables (Olson & Gorall, 2006). Hence, this new version of the instrument opens up new possibilities for research in diverse cultures, settings, and family constellations. Since research and practice of family systems thinking is one of the longest traditions in Greece, the psychometric adaptation and standardization of such a robust and flexible instrument would add to the research literature and to family therapy practice.

The application of systemic thinking in Greece began in the early 1960s in the Athenian Center "Anthropos" established by George and Vaso Vasiliou (Vasiliou, 1990), who were considered as the "parents" of Greek systemic

thinking, and their trainees, including Katakis (Katakis, 1998) and her trainees and associates. Centers offering family therapy in Greece were founded in the early 1960s and multiplied significantly in the 1980s and 1990s. Family therapy research and training were developed further by the creation of the two Associations of Systemic Thinking and Family Therapy in 1990 and 1999 (Softas-Nall, 2003).

Greek society has been undergoing rapid social changes that have left a profound effect on the Greek family system and the functioning of the Greek family. Researchers have described the resulting transformation as a movement from the extended family system comprising large kin networks to the nuclear family system (Georgas, 1999; Katakis, 1998, Papadiotis & Softas-Nall, 2006; Softas-Nall, 2003). The identity of the Greek family changed dramatically from the 1960s to the 1990s (Softas-Nall, 2003). Katakis (1998) categorized the Greek family as having three forms of identity: the traditional identity, the nuclear identity, and the modern identity. The nuclear-communicative family is described as the more modern way of relating, although all three typologies exist simultaneously in the social terrain of the Greek family (Katakis, 1998). Georgas (1999) presented an ecosocial model on the psychosocial differentiation of the Greek individual and discussed family bonds, structure, and functions. Even though the impact of collective values is gradually diminishing in Greece, in comparison with other Western European societies, the extended family in Greece is still present in many ways (Georgas, 1999). Some research has been conducted on how these social changes have affected Greek families (Georgas, 1999; Katakis, 1998; Papadiotis & Softas-Nall, 2006), and validated instruments are needed to support and expand these research endeavors.

Healthy family functioning has been a key area of interest for mental health professionals who provide family interventions. With the rapid development of family therapy and interventions in Greece, there has been an increasing need for a standardized assessment tool of family functioning in the Greek population. Recently, a growing interest in cross-culturally validated family-focused assessment has begun (i.e., the Family of Origin Scale validated by Petrogiannis & Softas-Nall, 2010). Effective communication, cohesion, and flexibility are often suggested to be the key dimensions to describe healthy family functioning. The question is if these dimensions postulated in other societies are applicable to the Greek culture. The present study is an attempt to respond to this need by translating and validating the FACES IV Package in a Greek sample of healthy family members. The FACES IV Package was chosen to be translated/adapted for the Greek population because (a) it is based on a well-grounded theory of family therapy, the

Circumplex Model of marital and family systems; (b) it is a reliable and valid instrument for both research and clinical use; (c) it has been shown to discriminate between healthy and problematic functioning families, showing clinical validity; (d) it is a result of long-term study and scientific enquiry; and (e) there is a scarcity of family functioning scales available in Greece.

## **Method**

### *Participants*

A total of 620 participants recruited from university settings, large local business companies, and community cultural associations from diverse geographic regions were contacted and informed about the purpose of the present study during a 12-month period (October 2009 to October 2010). Finally, 584 (94.2%) family members agreed to participate and returned usable data. To be eligible for inclusion in the study, the participants had to have a good understanding of the Greek language and no diagnosed psychiatric illness in the family. The final sample consisted of 584 participants, 189 males (32.4%) and 395 females (67.6%), ranging in age from 17 to 65 with a mean age of 27.24 years ( $SD = 9.71$ ). The sample size was largely superior to the minimum recommended for factor analysis, which corresponds to 5 to 10 times the number of the scale items (Costello & Osborne, 2005).

The sociodemographic data for the participants are presented in Table 1. The majority of the sample (97.1%) was Greek. A total of 66.3% of the sample had finished lyceum or had some years in university (undergraduate students in the assessment period) and 31.2% had university or technical college degree. About half had no individual income, whereas 22.6% had income between €10,000 and €20,000. More than half of the participants were not working at the time of the assessment. A total of 68.0% came from urban areas, and the vast majority of the respondents were living in urban areas (92.8%). As far as family characteristics are concerned, 77.7% of the participants were single and 20.2% were married, 79.8% answered the questionnaire using their family of origin as a reference and the 20.2% their current family. Regarding participants' current living arrangement, 40.4% were living alone. In terms of family structure, the majority of the families consisted of two biological parents (89.7%). About half of the families had four members, and smaller percentages had three (14.6%) or five members (18.7%). Our sample consisted mostly of adult children (79.8%) and less of fathers (8.0%) and mothers (12.2%). Finally, most of the families had two (58.0%) or three children (19.3%; Table 1).

**Table 1.** Sociodemographic and Family Characteristics of the Participants.

	<i>n</i>	%
Gender		
Male	189	32.4
Female	395	67.6
Age (years)		
≤24	330	56.5
25-34	135	23.1
35-44	73	12.5
45+	46	7.9
Ethnicity		
Greek	567	97.1
Other	17	2.9
Education		
Elementary/high school	15	2.6
Lyceum/some years in university	387	66.3
University degree	182	31.2
Employment status		
Not working	348	59.6
Working	236	40.4
Financial status (€)		
No individual income	291	49.8
<10,000	105	18.0
10,000-20,000	132	22.6
>20,000	56	9.6
Origin		
Urban	397	68.0
Rural	187	32.0
Residence		
Urban	542	92.8
Rural	42	7.2
Marital status		
Single	454	77.7
Married	118	20.2
Divorced/widow	12	2.1
Living with		
Alone	236	40.4
With family/partner/others	348	59.6
Family		
Origin	466	79.8

*(continued)*

**Table 1. (continued)**

	<i>n</i>	%
Nuclear	118	20.2
Family structure		
Two biological parents	524	89.7
One parent	45	7.7
Step family/One step parent	15	2.6
Family member		
Father	47	8.0
Mother	71	12.2
First child	226	38.7
Second child	165	28.3
Third child	61	10.4
Fourth or younger child	14	2.4
Family members		
2	28	4.8
3	85	14.6
4	319	54.6
5	109	18.7
6+	43	7.4
Children in the family		
0	14	2.4
1	72	12.3
2	339	58.0
3	112	19.2
4+	47	8.0

The FACES IV Package was administered to university students by the first and second authors in group settings in the classroom where participants were asked to take part in a study assessing family functioning in Greece. The scale was also administered to other participants recruited from large local business companies and community cultural associations who completed the FACES IV package individually and returned it in person a week later. Participants who were parents and/or spouses were asked to describe their current family, whereas single young adults, most of whom were university students, were asked to describe their family of origin. The time needed to complete the questionnaires was approximately 20 to 30 minutes. Two weeks after the initial test, a subset of 150 randomly chosen participants from the

original sample were reassessed to measure the test–retest reliability of the scales. Eventually, 147 (38 men, 109 women) out of 150 participated (retest response rate 98.0%). The 15-day interval was chosen because this period of time is considered neither too long for a person’s mental status to have changed nor too short from the first application. All participants involved in the cultural adaptation and reproducibility (test–retest reliability) procedure were informed about the scope and the purpose of the study and provided written informed consent. The study was approved by the Ethical Committee of the University Hospital in Heraklion, Crete, Greece.

### Measures

*Sociodemographic characteristics.* Sociodemographic characteristics, such as gender, age, education, employment status, origin and current residence, financial status, and so on, were collected through structured questionnaires administered by the researchers. Additionally, participants were asked to respond using either their current family or family of origin (if they had no current family). Detailed information regarding marital status, current living arrangement, and family characteristics, such as family structure, family members, role of the respondent in the family, number of children in the family, was also obtained.

*FACES IV Package (Olson et al., 2007).* The FACES IV Package contains the six scales from the Family Adaptability and Cohesion Evaluation Scales IV (FACES IV), as well as the Family Communication Scale and the Family Satisfaction Scale. Family communication was included because it is the third dimension in the Circumplex Model and family satisfaction is important as an outcome measure. The FACES IV Package includes 62 items in total: 42 items from FACES IV, 10 items on Family Communication, and 10 items on Family Satisfaction. The developer suggests that the entire FACES IV Package of 62 items must be used in any study using FACES IV. The scales included in FACES IV Package are self-report and they can be completed by all family members older than 12 years.

FACES IV (Olson et al., 2007) measures family functioning in terms of family cohesion and family flexibility. The instrument contains six scales comprising seven items each, with a total of 42 items. Each family member rates his/her agreement or disagreement with how well each item describes his/her family by selecting among the five alternative responses: 1 = *strongly disagree*, 2 = *generally disagree*, 3 = *undecided*, 4 = *generally agree*, 5 = *strongly agree*. FACES IV displays a six-factor structure of family functioning. There are two balanced scales that assess Balanced Cohesion and

Balanced Flexibility and four unbalanced scales assessing the high and low extremes of cohesion and flexibility—Disengaged and Enmeshed for cohesion, Rigid and Chaotic for flexibility. These scales have very good levels of reliability and validity. Reliabilities of the six FACES IV scales are as follows: Balanced Cohesion = .89, Balanced Flexibility = .80, Disengaged = .87, Enmeshed = .77, Rigid = .83, Chaotic = .85. In general, the alpha reliability was very good for all six scales (Gorall, Tiesel, & Olson, 2006).

Family Communication Scale (Olson & Barnes, 1996) is a 10-item scale that addresses many of the most important aspects of communication in a family system. Communication is considered a facilitating dimension in the circumplex model, and the Family Communication Scale is a short and reliable assessment tool that can be used with a variety of family constellations and families at various life cycle stages. The Family Communication Scale is a revised version of the Parent-Adolescent Communication Scale (Barnes & Olson, 1989). The respondents are asked to state the degree of their agreement or disagreement with how well each item describes their families by selecting among the five alternative responses: 1 = *strongly disagree*, 2 = *generally disagree*, 3 = *undecided*, 4 = *generally agree*, 5 = *strongly agree*. The internal consistency reliability of the scale is .90 and test-retest reliability is .86.

Family Satisfaction Scale is also a 10-item scale that assesses the satisfaction of family members in regard to family cohesion, flexibility, and communication (Olson, 1995). This is an important addition to the package since it assesses satisfaction with the current family system. The respondents are asked to state how satisfied or dissatisfied they are for each item describing their families by selecting among the five alternative responses: 1 = *very dissatisfied*, 2 = *somewhat dissatisfied*, 3 = *generally satisfied*, 4 = *very satisfied*, 5 = *extremely satisfied*. The 10 items of the scale when taken together reveal a single satisfaction factor. Alpha reliability for the scale is .92 and test-retest reliability is .85.

All scales used are self-rating and were administered by the researchers using specific instructions. The aim was that the examiners would interfere as little as possible in the participant's completion of the scales. For homogeneity of the results, the scoring of the scales was performed only by one of the researchers.

**Translation process.** Permission was granted for the translation and validation of the scale by both the developer and the publisher of the instrument. The translation and cultural adaptation of FACES IV was performed according to the Minimal Translation Criteria developed by the Scientific Advisory Committee of the Medical Outcomes Trust (1997) taking into account also the guidelines proposed by the original developer. Two independent bilingual psychologists with advanced knowledge of the English language and Greek as

their native language translated the questionnaire into Greek (forward translation). With the contribution of a third reviewer, a reconciliation meeting was conducted to develop a consensus version (reconciliated Greek version). A psychologist, who was a native English speaker and who was blinded to the original version, retranslated the reconciliated Greek version into the source language (backward translation). The backward translation was sent to the developer of the original questionnaire for comparison and his suggestions were incorporated, thus formulating the revised Greek version of the FACES IV. As the last step of the translation procedure, a cognitive debriefing process was used for the cultural adaptation of the questionnaire (Medical Outcomes Trust, 1997). This process refers to an in-depth interview of responders that was carried out to identify any areas presenting linguistic problems and to assess the respondent's level of understanding with the purpose of revealing inappropriate items and translation alternatives. As part of this process, the questionnaire was administered to six family members, and after completing the questionnaire participants gave their general impression on the clarity of the items, the relevance of the content to their situation, the comprehensiveness of the instructions, and their ability to complete it on their own. The same issues were addressed to them for every single item and they were able to make suggestions whenever necessary. The comments made by the participants were discussed in a debriefing summary and a final debriefing decision grid was sent to the developer for comments. After completing the aforementioned procedure, the final Greek version of the FACES IV Package was ready.

### *Statistical Analysis*

Descriptive characteristics (including means, *SDs*, frequencies, and percentages) were calculated for the sociodemographic and family variables. Univariate associations between sociodemographic characteristics and outcomes in the family functioning scales were assessed using *t* test and one-way analysis of variance (ANOVA, with Bonferroni correction) for comparison of means of variables. The psychometric properties of the Greek version of FACES IV Package were evaluated as given below.

*Validity.* The original six-factor structure proposed by the authors was analyzed by carrying out a confirmatory factor analysis (CFA). To assess the hypothesized model's degree of goodness of fit, we used the chi-square ( $\chi^2$ ). When the original model resulting from the CFA did not fit satisfactorily, an exploratory factor analysis (EFA) was performed to determine the structure of the questionnaire and to highlight how the individual items grouped together. The factor structure was studied by principal component analysis using Varimax with Kaiser normalization as rotation method. The

Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy and Bartlett’s test of sphericity ( $\chi^2$ ) were employed to determine the appropriateness of the data set for factor analysis and verify the degree of interrelation between the items (Kline, 1994; Malhotra, 1996). High values ( $>.5$ ) in KMO indicate that factor analysis is appropriate. A minimum loading criterion of .30 was adopted for scale items to be maintained in each factor (Hair, Anderson, Tatham, & Black, 1998). A factor was considered important if its eigenvalues exceeded 1.0. However, since this approach usually leads to the retention of many factors hardly interpretable and with variables loading high in more than one factor, the scree-plot and interpretability criteria were also used (Costello & Osborne, 2005). Correlation between the scales was assessed using Pearson’s correlation coefficient.

*Reliability.* Internal consistency and reproducibility were measured as part of the reliability testing of the translated instrument. Internal consistency was determined by the use of Cronbach’s  $\alpha$ , requiring a minimum value of .70 for group and .90 for individual comparisons (Nunnally & Bernstein, 1994). Reproducibility (test–retest reliability) was measured by calculating the intra-class correlation coefficient (ICC) with an interval of 2 weeks. An ICC value of .70 or higher would be considered as indicating satisfactory reliability.

All statistical analyses were carried out using PASW Statistics 18 software (IBM SPSS Inc., Chicago, IL).

## Results

### *Psychometric Properties of FACES IV*

*Factor analysis.* The factor structure of FACES IV was examined by conducting both EFA and CFA. The CFA of the original six-factor structure proposed by the authors was found not to fit adequately (KMO = .873,  $\chi^2 = 7150.215$ ,  $p < .001$ ) since an unsatisfactory arrangement of the items in each one of the six scales suggested by the developer (Olson, 2011; Olson et al., 2007) was indicated. Specifically, Factor 1 included 15 items in total (6 items from Balanced Cohesion, 7 items from Balanced Flexibility, and 2 items from Disengaged). Factor 2 included 9 items (1 item from Disengaged, 4 items from Enmeshed, 2 items from Rigid, and 2 from Chaotic). Factor 3 included 5 items from the Disengaged scale and Factor 4 included 5 items from the Chaotic scale. Factor 5 included 3 items (2 from Enmeshed and 1 from Rigid), and Factor 6 included 2 items from Rigid scale.

Following the authors’ instructions (Olson et al., 2007), a principal components factor analysis with oblique rotation was carried out on the 42

FACES IV items. To determine the structure of FACES IV, a series of factor analyses were performed. Initially, 10 factors with eigenvalues greater than one were extracted, accounting for 54.89% of the variance ( $KMO = .873$ ,  $\chi^2 = 7150.215$ ,  $p < .001$ ). However, examination of the scree-plot suggested a five-factor solution as more suitable. Therefore, a second principal components factor analysis with oblique rotation and five factors forced extraction was performed. The results indicated that the majority of the items had higher loadings on Factor 1 and Factor 2, which represented the balanced scales of the FACES IV, while there were four factors with 3 to 4 items only. The conceptual analysis recommended the existence of meaningful differences regarding the arrangement of the items in each scale between our five-factor solution and that suggested by Olson (Olson, 2011; Olson et al., 2007). Additionally, we conducted further analysis, that is, two, three, four, and seven factors were extracted. Results indicated, also, an unsatisfactory arrangement of the items. Therefore, we decided to work on the items grouped together according to their correspondence to balanced scales (Balanced Cohesion/Balanced Flexibility) or unbalanced scales (Disengaged and Enmeshed for cohesion/Rigid and Chaotic for flexibility) of the original FACES IV as Rivero, Martinez-Pampliega, and Olson (2010) did in the Spanish adaptation of the scale.

The factor analysis relating to balanced items produced a bifactorial solution in its scree-plot explaining 41.89% of the variance ( $KMO = .894$ ,  $\chi^2 = 1986.222$ ,  $p < .001$ ). Factor 1 included six of seven items of the Cohesion original scale (excluding Item 19, "Family members consult other family members on important decisions") and Item 38 from the Flexibility scale ("When problems arise, we compromise"). In a similar way, Factor 2 included six of seven items from the Flexibility original scale (except Item 38) and Item 19 from the Cohesion scale. Loading coefficients ranged from .68 to .48 for Factor 1 and from .76 to .45 for Factor 2 (Table 2).

As far as the unbalanced scales are concerned, the factor analysis produced four factors explaining 41.46% of the variance ( $KMO = .816$ ,  $\chi^2 = 3815.880$ ,  $p < .001$ ). Factor 1 included five items from the Chaotic scale (Items 6, 18, 24, 36, 42), three items from the Disengaged scale (Items 3, 9, 27), two items with negative loadings from the Rigid scale (Items 23, 35), and one item from the Enmeshed scale (Item 10). Factor 2 included five items from the Rigid scale (Items 5, 11, 17, 29, 41) and three items from the Enmeshed scale (Items 16, 34, 40). Factor 3 included four items from the Disengaged scale (Items 15, 21, 33, 39), whereas Factor 4 included two items from the Enmeshed scale (Items 4, 28) and two items from the Chaotic scale (Items 12, 30).

**Table 2.** Factor Loadings Based on a Principle Components Analysis With Varimax Rotation for the Greek Version of FACES IV.

	FACES IV					
	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
<b>Balanced Scales<sup>a</sup></b>						
COH1	.65					
COH2	.68					
COH3	.59					
COH4		.48				
COH5	.64					
COH6	.48					
COH7	.57					
FLEX1		.45				
FLEX2		.47				
FLEX3		.71				
FLEX4		.76				
FLEX5		.52				
FLEX6		.53				
<b>Unbalanced Scales</b>						
FLEX7	.51					
DISEN1			.57			
DISEN2			.66			
DISEN3			.55			
DISEN4			.55			
DISEN5			.74			
DISEN6			.47			
DISEN7			.55			
ENM1				.63		
ENM2			.56			
ENM3				.72		
ENM4				.25 <sup>c</sup>		
ENM5				.59		
ENM6				.62		
ENM7				.59		
RIG1					.56	
RIG2					.61	
RIG3					.67	

*(continued)*

Table 2. (continued)

	FACES IV					
	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
RIG4					.52	
RIG5					.45	
RIG6					.58	
RIG7					.48	
CHAOT1						.67
CHAOT2						.39
CHAOT3						.68
CHAOT4						.51
CHAOT5						.43
CHAOT6						.65
CHAOT7						.69

Note. FACES IV = Family Adaptability and Cohesion Evaluation Scales IV; COH = Balanced Cohesion; FLEX = Balanced Flexibility; DISEN = Disengaged; ENM = Enmeshed; RIG = Rigid; CHAOT = Chaotic. Coefficients less than .30 are omitted from the table.

a. Analysis of items grouped together according to their correspondence to balanced scales (Balanced Cohesion/Balanced Flexibility).

b. Analysis of the four unbalanced scales (Disengaged and Enmeshed for cohesion/Rigid and Chaotic for flexibility) separately for each dimension.

c. Factor loading <.30.

Because of the unsatisfactory arrangement of items, we decided to do further analysis. With the aim of achieving a theoretical adaptation to the original model, it was decided to work separately on extreme cohesion and flexibility (Disengaged and Enmeshed for cohesion/Rigid and Chaotic for flexibility). Therefore, the factor analysis presented two factors for Unbalanced Cohesion explaining 36.66% of the variance ( $KMO = .744$ ,  $\chi^2 = 1425.559$ ,  $p < .001$ ). Factor 1 included all items from the original Disengaged scale and one item from the Enmeshed scale (Item 10, "Family members feel pressured to spend most free time together"). Factor 2 included six items from the Enmeshed scale (Items 4, 16, 22, 28, 34, 40), although the factor loading for Item 22 was slightly lower than .30 (.25). Loadings for Factor 1 ranged from .74 to .48, whereas for Factor 2 the loadings ranged from .72 to .59, with the exception of Item 22, which had a loading <.30. Similarly, the factor analysis presented two factors for Unbalanced Flexibility explaining 37.11% of the variance ( $KMO = .752$ ,  $\chi^2 = 1507.787$ ,  $p < .001$ ). Factor 1 was

found to fit exactly to the original Chaotic scale and Factor 2 to the Rigid scale. All items had higher loadings on their intended factor, with coefficients ranging from .67 to .48 for Factor 1 and from .69 to .39 for Factor 2 (Table 2).

In a second stage, we decided to run both CFA and EFA in a subsample consisting of 80% of the participants ( $n = 466$ ) who answered the items while referring to their family of origin. Our aim was to examine if this inconsistent point of reference (family of origin vs. current family) could affect the validity of the scales. Similar results to our original analysis were found (data not shown).

It appeared that the six-factor solution was meaningful, which coincided with Olson's strategy (Olson, 2011; Olson et al., 2007) to extract the number of factors proposed by the original model. The basic structure of the scales produced by the described factor analysis was similar to the original version, with only a small number of questions loading in different dimensions. However, the conceptual analysis recommended an inversion of Items 19 and 38. Similarly, we decided to remove Item 10 from the Disengaged scale and introduce it into the Enmeshed scale. Therefore, based on the interpretability issues of the produced scales, as well as internal consistency tests applied (data not shown), we decided to keep the original six scales of the FACES IV, as suggested by the developer.

*Internal consistency.* An alpha reliability analysis was conducted to examine the internal consistency of the eight scales in total (Table 3). Reliability of the six FACES IV scales is as follows: Balanced Cohesion = .79, Balanced Flexibility = .70, Disengaged = .71, Enmeshed = .59, Rigid = .64, and Chaotic = .70. Cronbach's  $\alpha$  for the Family Communication Scale was .90, and for the Family Satisfaction Scale it was .92. In general, the alpha reliability was moderate ( $<.70$ ) for Enmeshed and Rigid scales; good for Balanced Cohesion, Balanced Flexibility, Disengaged, and Chaotic scales ( $\geq .70$ ); and excellent for Family Communication and Family Satisfaction scales ( $>.70$ ).

*Test-retest reliability.* According to Table 3, all subscales showed high test-retest stability. The ICC for the six subscales of FACES IV was found to be as follows: Balanced Cohesion ICC = .96, Balanced Flexibility ICC = .97, Disengaged ICC = .94, Enmeshed ICC = .96, Rigid ICC = .97, and Chaotic ICC = .96. The ICC for the Family Communication Scale was .98, and the Family Satisfaction Scale ICC was .98.

*Intercorrelation analysis of scales.* A correlation analysis was carried out for the six scales to assess the relationships between them (see Table 4). Intercorrelations of the six FACES IV scales give information about the relationship of the scales and may also be indicators of circumplexity of the measure as proposed by the developers (Olson et al., 2006) but not confirmed by some

**Table 3.** Cronbach's  $\alpha$  Coefficient and Intraclass Correlation Coefficient for the Six Scales of FACES IV, Family Communication Scale, and Family Satisfaction Scale.

	Scale	M	SD	Cronbach's $\alpha$	ICC
FACES IV	Balanced Cohesion	28.04	4.38	.79	.96
	Balanced Flexibility	23.68	4.71	.70	.97
	Disengaged	16.18	4.79	.71	.94
	Enmeshed	15.66	4.08	.59	.96
	Rigid	18.34	4.31	.64	.97
	Chaotic	15.56	4.79	.70	.96
FCS	Communication	37.58	7.50	.90	.98
FSS	Satisfaction	35.64	7.57	.92	.98

Note. ICC = intraclass correlation coefficient; FACES IV = Family Adaptability and Cohesion Evaluation Scales IV; FCS = Family Communication Scale; FSS = Family Satisfaction Scale.

**Table 4.** Intercorrelations Between the Scales of FACES IV Package.

	FACES IV						FCS	FSS
	Balanced Cohesion	Balanced Flexibility	Disengaged	Enmeshed	Rigid	Chaotic		
Balanced Cohesion	I							
Balanced Flexibility	.65**	I						
Disengaged	-.58**	-.33**	I					
Enmeshed	.10*	.18**	.05	I				
Rigid	.22**	.26**	-.00	.47**	I			
Chaotic	-.39**	-.27**	.47**	.22**	-.05	I		
FCS	.72**	.67**	-.53**	.05	.15**	-.37**	I	
FSS	.67**	.60**	-.60**	-.03	.07	-.45**	.78**	I

Note. FACES IV = Family Adaptability and Cohesion Evaluation Scales IV; FCS = Family Communication Scale; FSS = Family Satisfaction Scale.

\*Correlation is significant at the .05 level (2-tailed). \*\*Correlation is significant at the .01 level (2-tailed).

authors (Gorall et al., 2006). Table 4 presents significant correlation coefficients between the six factors of FACES IV, the Family Communication Scale, and the Family Satisfaction Scale.

The two balanced scales of cohesion and flexibility were highly correlated ( $r = .65, p < .001$ ), which is similar to the findings of previous studies (Olson, 2011; Olson et al., 2007). Conceptually, the cohesion dimension contains

Balanced Cohesion (central area) with Disengaged (low unbalanced) and Enmeshed (high unbalanced). The findings indicated a statistically significant negative correlation of Balanced Cohesion with Disengaged ( $r = -.58, p < .001$ ) and a weak but statistically significant positive one with Enmeshed ( $r = .10, p < .05$ ), although these latter are not significantly related to each other. Conceptually, the flexibility dimension contains Balanced Flexibility (central area) with Rigid (low unbalanced) and Chaotic (high unbalanced). The findings demonstrated that Balanced Flexibility had a slight positive correlation with Rigid ( $r = .26, p < .001$ ) and a negative one with Chaotic ( $r = -.27, p < .001$ ) and these correlations were statistically significant, but the unbalanced scales of Rigid and Chaotic were not significantly related to each other. The two unbalanced scales of Disengaged and Rigid were not significantly correlated, whereas the two unbalanced scales of Disengaged and Chaotic were correlated ( $r = .47, p < .001$ ), indicating that family systems that are disengaged may also be chaotic and vice versa. The unbalanced scale of Enmeshed was also correlated with both Rigid ( $r = .47, p < .001$ ) and Chaotic ( $r = .22, p < .001$ ) scales, although the latter represent a low correlation. Looking across dimension analysis, Balanced Cohesion had a low positive relationship to the Rigid scale ( $r = .22, p < .001$ ) but a negative one to the Chaotic scale ( $r = -.39, p < .001$ ). Also, Balanced Flexibility had a negative relationship with the Disengaged scale ( $r = -.33, p < .001$ ) but a low positive correlation with the Enmeshed scale ( $r = .18, p < .001$ ).

Finally, the Family Satisfaction Scale and the Family Communication Scale were found to be highly related ( $r = .78, p < .001$ ). Satisfaction and Communication correlated with other scales as expected on the basis of the original study (strong positive correlation with Balanced and strong negative correlation with Disengaged and Chaotic unbalanced scales). A low negative correlation was also found between Satisfaction and Enmeshed scales (see Table 4).

### ***Sociodemographic Determinants of Family Functioning***

Considering the influence of several sociodemographic variables on family functioning, we examined participants' gender, age, education, and employment effects for the six scales of FACES IV and the two supplementary scales of family communication and satisfaction (Table 5). Our results indicated that males tended to score higher in the Rigid scale than females. Low-educated participants had higher scores in the Chaotic scale. Nonsignificant differences were found between younger and older participants, as well as employed and unemployed participants.

**Table 5.** Associations of Participants' Sociodemographic Characteristics and Dimensions of Family Functioning, Univariate Analysis.

	Family Adaptability and Cohesion Evaluation Scale IV																
	Balanced Cohesion		Balanced Flexibility		Disengaged		Enmeshed		Rigid		Chaotic		Family Communication Scale		Family Satisfaction Scale		
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	
Gender																	
Male	27.62	4.68	23.60	4.69	16.21	4.77	15.49	4.20	18.39	4.72*	15.34	4.81	37.30	7.34	36.33	7.41	
Female	28.23	4.22	23.72	4.73	16.17	4.80	15.73	4.03	18.29	4.11	15.67	4.78	37.72	7.58	35.31	7.63	
Age (years)																	
≤24	27.69	4.44	23.26	4.78	16.45	5.03	15.35	4.14	18.22	4.28	15.68	4.79	37.05	7.74	35.41	7.69	
25-34	28.58	3.66	23.96	4.50	16.01	4.44	15.75	3.79	18.11	3.90	15.11	4.54	38.27	7.06	36.25	7.48	
35-44	28.32	4.97	24.47	5.02	14.99	4.34	16.15	4.17	18.63	4.62	15.52	5.08	38.01	7.65	36.12	7.72	
45+	28.48	4.76	24.67	4.07	16.65	4.47	16.83	4.22	19.13	5.15	16.17	5.11	38.70	6.61	34.74	6.66	
Education																	
Elementary/high school	27.73	6.97	24.47	6.78	17.27	7.18	17.20	4.86	19.33	5.39	18.60	7.10*	37.73	9.50	33.07	8.15	
Lyceum/some years in university	27.86	4.43	23.46	4.78	16.26	4.81	15.43	4.11	18.22	4.36	15.60	4.80	37.47	7.72	35.62	7.65	
University degree	28.45	3.97	24.09	4.34	15.92	4.51	16.00	3.94	18.45	4.12	15.25	4.49	37.82	6.86	35.91	7.34	
Employment status																	
Not working	27.94	4.37	23.46	4.69	16.27	4.86	15.37	4.07	18.17	4.24	15.63	4.73	37.34	7.63	35.58	7.64	
Working	28.17	4.40	24.01	4.73	16.06	4.68	16.08	4.08	18.53	4.41	15.47	4.88	37.94	7.31	35.73	7.48	

\*Statistically significant differences ( $\alpha = .05$ ), t test for independent samples and analysis of variance.

## Discussion

The aim of the present study was to evaluate the psychometric properties of the Greek version of the FACES IV Package in a nonclinical sample. Family systems theory is one of the predominant models for research and family therapy in Greece (Softas-Nall, 2003, 2008). However, family research has not focused widely on the assessment of family functioning. There is a lack of validated multidimensional instruments to evaluate family cohesion and flexibility specifically, as well as family communication and satisfaction in Greece. However, more recently there has been a growing interest in examining the cross-cultural applicability of instruments used for family-focused assessment. Petrogiannis and Softas-Nall (2010) presented their work on the validation of a scale designed to measure perceived levels of psychological health in one's family of origin.

The original FACES IV displays a six-factor structure of family functioning with two balanced scales—Balanced Cohesion and Balanced Flexibility—and four unbalanced scales—Disengaged, Enmeshed, Rigid, Chaotic—and it has been shown to have satisfactory internal and test-retest reliability (Olson, 2011; Olson et al., 2007). The findings of the present study indicate that the Greek version of FACES IV displays similar factor structure and psychometric properties presenting strong internal consistency, structural validity, and correlation patterns that correspond well to the results of the original scale (Olson, 2011; Olson et al., 2007).

Specifically, the process of translation and cross-cultural adaptation was carefully conducted following the guidelines proposed by the Scientific Advisory Committee of the Medical Outcomes Trust (1997)—in addition to those proposed by the original developer—and resulted in a back-translated version that was very similar to the original, thus highlighting the suitability of the Greek version of FACES IV Package. The CFA of the original six-factor structure proposed by the authors was found not to exhibit acceptable fit indexes, similarly to the findings of other cross-cultural studies (Mirnics, Vargha, Toth, & Bagdy, 2010; Rivero et al., 2010). An exploratory factor analysis was carried out on the 42 FACES IV items. With the aim of achieving a theoretical adaptation to the original model, it was decided to work on the items grouped together according to their correspondence to balanced or unbalanced scales of the original FACES IV, as Rivero et al. (2010) did in the Spanish adaptation of FACES IV. Our findings support the bifactorial structure of balanced scales—Balanced Cohesion and Balanced Flexibility—with a satisfactory arrangement of the items since almost all the items expected are included and the four-factor structure of the unbalanced scales. However,

because of the unsatisfactory arrangement of the items in the extreme scales, the exploratory factor analysis reflected the need to work separately on extreme cohesion and flexibility; thus, further analysis for the unbalanced scales was run. For the two unbalanced scales of flexibility—Rigid and Chaotic—all items are found to fit exactly to the factor they intended to be. For the unbalanced scales of cohesion—Disengaged and Enmeshed scales—factor analysis reveal similarities with the structure of the original scales.

In terms of synthesis of the six scales of the Greek FACES IV, the fact that they are found to be very similar to the original structure and to other studies firmly supports the validity of the scale. The factor analysis indicate that only three items (Item 10, 19, 38) from the total of 42 items are found to have a high loading in a different scale from the one they were expected to fit. Moreover, only one item (Item 22 from the Enmeshed scale) is found to have a slightly lower loading than .30, and it is retained in the Enmeshed scale. We believe that this happened because a large portion of the sample based their responses on their family of origin. However, when we conducted additional analysis in a subsample of those participants who answered the items according to their family of origin, similar results to our original analysis were found. A possible explanation for the differences observed in three items (Items 10, 19, and 38) would be that the specific items seem to be rated differently by the Greek participants in our sample when compared with the U.S. sample. Perhaps compromise and enmeshment have a different emotional valence and are experienced differently in tightly Greek families. Similar findings for one or two but not always the same items have been reported not loading to the appropriate factor in other cross-cultural studies (Mirnic et al., 2010; Rivero et al., 2010). With the aim of respecting and adhering to the original model, however taking into serious consideration these cultural differences, we decided to follow the six-factor structure proposed by Olson and his colleagues (Olson, 2011; Olson et al., 2007), which includes seven items in each one of the six factors of FACES IV.

Inspection of the intercorrelations of the subscales raised some concerns about the ability of the Greek version of FACES IV scale to adequately capture the Circumplex Model. First, Balanced Cohesion and Balanced Flexibility, hypothesized to be orthogonal dimensions, are positively correlated indicating the concordance in balanced family functioning where healthy functioning is greatest, similarly to the original FACES IV. The pattern of the correlations found in our study confirms results of the U.S. study (Olson, 2011; Olson et al., 2007) in general, with differences in the relationship between Balanced Cohesion and Enmeshed scales (low positive in our study vs. low negative in the original study), as well as Balanced Flexibility

and Rigid scale (positive relation in our study while almost no correlation in the original study). Furthermore, in our sample, Disengaged and Enmeshed scores are found not to be significantly related, even though they are postulated to be opposite extremes of a single cohesion dimension. Finally, when we examined dimension analysis, a low positive relationship between Balanced Cohesion and Rigid is found in the Greek version of FACES, contrary to the low negative one found in the original FACES IV scale (Olson, 2011; Olson et al., 2007).

An alpha reliability analysis was conducted to examine the internal consistency of the six FACES IV scales and also the two scales assessing family communication and family satisfaction. The results indicate that Balanced Cohesion, Balanced Flexibility, Disengaged and Chaotic scales obtained good reliability indexes with Cronbach's alpha coefficient, whereas the internal consistency index in the case of Enmeshed and Rigid scales was a little lower though acceptable. All of the reliability results generated are lower than those originally reported for this instrument (Olson, 2011; Olson et al., 2007). Removing any of the items in these three factors did not lead to an improvement of the factor reliability, indicating adequate internal consistency. The Family Communication Scale and the Family Satisfaction Scale appear to have a high internal consistency similar to the values of reliability obtained by Olson (Olson, 2011; Olson et al., 2007). Similar results were obtained by other studies investigating the psychometric properties of FACES IV in Spain (Rivero et al., 2010) and Hungary (Mirmics et al., 2010). In addition, a high level of test-retest correlation was registered by all FACES IV scales, as well as the Family Communication Scale and the Family Satisfaction Scale, with results showing significant correlations between test and retest applications, thus indicating the instrument's high temporal stability.

The strengths of the present study include its large sample size, the use of standardized procedures for the translation and cross-cultural adaptation of the original questionnaire, and the high participation rate (94.2%). Nevertheless, there are some methodological limitations of our study. A possible limitation would be that it was performed on a nonrepresentative sample of the Greek population. Although the participants of the present study represent a community sample from diverse geographic regions, the sample largely comprised young, unemployed, unmarried, and highly educated subjects. Significant differences were found for family functioning between the two sexes and between education groups as well, suggesting that males perceive their families as more rigid than females, whereas people with low education perceive their families as more chaotic. Future research should be performed on larger and representative samples by collecting data from different age

groups and educational levels, as well as from clinical populations. Given the fact that family values have drastically changed in Greece the past 30 years (Georgas, 1999; Katakis, 1998; Papadiotis & Softas-Nall, 2006; Softas-Nall, 2003), conducting research including cohorts of wide age range and more representative samples in terms of employment, education, and marital status could shed light into multigenerational changes and processes. Despite these limitations, statistical data strongly support the applicability of the measure in our country and show similar dimensions characterizing family functioning in Greece and the United States.

The results of the present study replicate previous research findings to a considerable degree in terms of internal and test-retest reliability, intercorrelations, and construct validity of FACES IV Package in the Greek population. According to Gorall (2002), the FACES IV scales have been shown to discriminate between healthy and unhealthy functioning families, showing clinical validity. Additionally, they could be used for assessing family functioning of clinical and nonclinical families. The developer suggests that the entire FACES IV Package of 62 items must be used in any study using FACES IV. Therefore, we encourage both researchers and clinicians to use the entire FACES IV Package, which enables them to have a comprehensive and reliable evaluation of a family system's functioning. The FACES IV Package can be used as a research tool to study cohesion and adaptability in the Greek family in relation to different populations, or it can be used as a supplement to clinical interviews when exploring family issues and conducting assessments to make treatment decisions. Furthermore, the assessment of family members' satisfaction in regard to family functioning is considered to be an important addition to the package since it assesses satisfaction with the current family system. Thus, we submit FACES IV Package as a valid and reliable family assessment instrument useful for research and clinical work with families.

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## 4.2. Paper 2

### **Cross-cultural adaptation and validation of the Greek version of the Family Questionnaire for assessing expressed emotion\***

**Koutra, K.**, Economou, M., Triliva, S., Roumeliotaki, T., Lionis, C., & Vgontzas, A. N.

Expressed emotion (EE) has proved to be an established factor in short-term relapse in schizophrenia. The aim of the present study was to examine the psychometric properties of the Greek version of the Family Questionnaire (FQ), a brief self-report questionnaire measuring the EE status of relatives of patients with schizophrenia in terms of criticism (CC) and emotional overinvolvement (EOI). The translated and adapted 20-item FQ was administered to 176 family caregivers of patients with schizophrenia and bipolar disorder. Caregivers' burden (Family Burden Scale) and psychological distress (General Health Questionnaire-28) were also evaluated. The findings indicated that the Greek version displays a two-factor structure with two subscales of EE – CC and EOI - with 10 items each, similarly to the original version. The convergent validity of the subscales was highly supported by correlations with caregivers' burden and psychological distress. The Cronbach's  $\alpha$  coefficient measuring internal consistency for the two scales were 0.90 for CC and 0.82 for EOI. The test-retest correlation coefficients measuring reproducibility were 0.99 and 0.98 for CC and EOI, respectively. The Greek version of the FQ appears to be a valid and reliable instrument to be used in both research and clinical assessment of family EE.

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## Cross-cultural adaptation and validation of the Greek version of the Family Questionnaire for assessing expressed emotion

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### Abstract

Expressed emotion (EE) has proved to be an established factor in short-term relapse in schizophrenia. The aim of the present study was to examine the psychometric properties of the Greek version of the Family Questionnaire (FQ), a brief self-report questionnaire measuring the EE status of relatives of patients with schizophrenia in terms of criticism (CC) and emotional overinvolvement (EOI). The translated and adapted 20-item FQ was administered to 176 family caregivers of patients with schizophrenia and bipolar disorder. Caregivers' burden (Family Burden Scale) and psychological distress (General Health Questionnaire-28) were also evaluated. The findings indicated that the Greek version displays a two-factor structure with two subscales of EE—CC and EOI—with 10 items each, similarly to the original version. The convergent validity of the subscales was highly supported by correlations with caregivers' burden and psychological distress. The Cronbach's  $\alpha$  coefficient measuring internal consistency for the two scales were 0.90 for CC and 0.82 for EOI. The test–retest correlation coefficients measuring reproducibility were 0.99 and 0.98 for CC and EOI, respectively. The Greek version of the FQ appears to be a valid and reliable instrument to be used in both research and clinical assessment of family EE.

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### 1. Introduction

Expressed emotion (EE) is an indicator of aspects of emotional behavior within a family; more specifically, it refers to patterns of communication between a patient and his or her family. It has long been studied as an index of family stress in relation to the course of psychiatric illness [1]. EE comprises five components [2]: i) Criticism (CC), which refers to critical comments made by a family member about the patient's behavior; ii) Hostility (H) remarks, which reflect disapproval or rejection toward the patient; iii) Emotional Overinvolvement (EOI), referring to an exaggerated and disproportionate emotional response toward the patient, as

reflected by the intrusive style of the relationship with the patient and evident emotional distress by the carer; iv) Warmth (W), which denotes expressions of empathy, understanding, affect and interest toward the patient; and v) Positive Remarks (PR), which refer to expressions of approval, positive appraisal or appreciation of the patient and/or his/her behavior. However, in most studies family level of EE is obtained only through aggregating scores from the CC, H, and EOI components, which have shown to bear the highest predictive value in relation to relapse [3].

Several decades of research have established EE as a highly reliable psychosocial predictor of psychiatric relapse in schizophrenia [4–6]. Researchers have positioned EE within the diathesis–stress model of psychopathology, conceptualizing it as an environmental stressor that can potentially precipitate/cause relapse of psychosis among people with a genetic vulnerability [7]. Relatives and carers exceeding threshold levels of EE generally communicate using negative language or interaction patterns toward

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patients [8–10], which, in turn, may lead to interpersonal stress and may yield risk factors associated with psychotic and other disorders [11]. In a similar vein, patients from high-EE environments are more disruptive; presenting odd and troublesome behavior, such as being disagreeable or critical, while interacting with family members, in comparison to patients from low-EE environments [12–14]. In addition to research conducted on family members, EE has been studied in relation to professional carers [15].

A variety of measures have been developed in order to assess EE in patient–relative relationships. Among these, the main instrument employed is a semi-structured interview especially designed to identify the presence of EE, the Camberwell Family Interview (CFI) [16], based on the work of G.W. Brown [17]. However, the time-consuming administration (between 1 and 2 hours) and coding limits (approximately 3 hours) has led researchers to look for an alternative. In this manner, the Five-Minute Speech Scale (FMSS) [18] was developed, which is a more feasible tool, though it still requires coding by a qualified rater. Although the FMSS requires less time to administer (approximately 5 minutes) and score (approximately 20 minutes) as compared to the CFI, the primary disadvantage of using this instrument involves inflated Type II error rates.

Difficulties with measurement limit the clinical utility of the EE, and in response to this, researchers have developed several shorter methods for measuring EE. Several self-report questionnaires have been developed to assess EE experienced by either relatives or patients. A recent review of EE instruments [19] has identified nine valid alternative measures, which has facilitated the clinical and research utility of EE. Although self-report questionnaires cannot be expected to provide the depth of information yielded by the CFI, they do constitute a time- and cost-effective way of eliciting attitudes germane to the EE index and they dispense with the dichotomous high/low measure of the CFI that has previously been criticized [20].

More recently, Wiedemann and colleagues [21] have developed the Family Questionnaire (FQ), a brief questionnaire that enables accurate assessment of CC and EOI. The FQ is easier to administer and less time consuming than the CFI or the FMSS, although it is at least equivalent to the FMSS in terms of validity. Furthermore, the FQ is suitable for repeated administration, there is no need for any training before its use, and the time needed for administration and evaluation is minimal [21]. The preliminary version of the FQ included 130 items derived from three different sources, such as clinicians' reports about common statements made by family members about a relative with schizophrenia and common ways of behaving with such a relative, EE-related concepts or existing EE questionnaires. Items were generated for the areas of "intrusiveness," "emotional response," "attribution of illness" and "coping skills," whereas items relating to attitude and behavior areas recorded in the CFI were also included. Finally, a number of items reflecting the CFI evaluation criteria [16] were generated for the areas of

CC and EOI. All items were evaluated for breadth of coverage, ease of understanding and acceptance by a team of EE experts. The next step included the selection of 30 items that had the highest correlations with the CC or EOI subscales of the CFI. The final version of the FQ was produced after the deletion of 10 items resulting in a shorter version of a 20-item questionnaire consisting of two scales—CC and EOI—with 10 items each [21].

During the last decades, the construct of family EE has been a key area of interest for mental health professionals who provide family interventions. The family's EE has been shown to be predictive of outcome in mental and physical illnesses in a variety of cultural settings [22]. Apart from its predictive value, EE has been extremely productive, in that it has led to the development of family interventions capable of modifying the family behavior patterns that underlie it [23]. Thus, it has been useful in both structuring and evaluating the effectiveness of psychosocial treatment in psychosis. With the rapid development of family therapy and interventions in Greece, there has been an increasing need for a standardized assessment tool of family EE in the Greek population. The main objectives of the present study were to translate, adapt and examine the psychometric properties of the FQ in a Greek sample of caregivers of patients with psychotic disorders in order to determine whether it is a useful tool for the study of family EE in Greece. The FQ was chosen for being translated and adapted to the Greek population since it has been shown to be a research-applicable alternative measure of EE in psychotic disorders with good psychometric properties in both research and clinical contexts. Within this study, we also described the socio-demographic and clinical characteristics associated with family EE, and assessed the extent to which family burden and caregivers' psychological distress may affect family EE.

## 2. Methods

### 2.1. Participants

A total of 180 participants recruited from the Psychiatric Clinic of the University Hospital of Heraklion, Crete, Greece, and the University Mental Health Research Institute of Athens, Greece, were contacted and informed about the purpose of the present study during a 12-month period (December 2010–December 2011). In Heraklion, family caregivers of 125 patients consecutively admitted to the Psychiatric Clinic were selected from the hospital's electronic database; in Athens, the family caregivers of 55 patients who participated in four psychoeducational groups which took place during a 1-month period in the University Mental Health Research Institute of Athens were, also, selected. Finally, 176 (response rate = 97.7%) family members agreed to participate and returned usable data ( $n = 121$  from Heraklion and  $n = 55$  from Athens). The key caregiver was defined as the person who provides the most

support devoting a substantial number of hours each day in taking care of the patient. To be eligible for inclusion in the study, the caregivers had to have a good understanding of the Greek language and no diagnosed psychiatric illness, and had to be either living with, or directly involved in the care of a patient with schizophrenia or bipolar disorder according to the *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR)* or *International Classification of Disease (ICD-10)*.

## 2.2. Measures

### 2.2.1. Socio-demographic characteristics

Socio-demographic characteristics, such as relative's gender, age, education, marital status, employment status, origin and current residence, individual income etc., were collected through structured questionnaires administered by the researchers. The socio-demographic indicators of the patient included the characteristics mentioned previously and the following: clinical diagnosis, illness's onset, patient's age at illness's onset, hospitalization to psychiatric clinic, therapeutic interventions, such as psychotherapy, pharmacotherapy, and participation to psychosocial rehabilitation programs.

### 2.2.2. Family Questionnaire

Expressed emotion was measured via the FQ [21]. The FQ is a 20-item self-report questionnaire measuring the EE status of relatives of patients with schizophrenia in terms of EOI and CC. EOI includes unusually over-intrusive, self-sacrificing, overprotective, or devoted behavior, exaggerated emotional response, and over-identification with the patient. CC is defined as an unfavorable comment on the behavior or the personality of the person to whom it refers [16]. The measure consists of 10 items for each subscale. Responses range from 1 "never/very rarely" to 4 "very often" and a higher total score indicates higher EE. The developers provide a cut-off point of 23 as an indication of high CC, and 27 for EOI. The FQ has excellent psychometric properties including a clear factor structure, good internal consistency of subscales (ranging from 0.78 to 0.80 for EOI and from 0.91 to 0.92 for CC) and good inter-rater reliability in relation to the CFI of EE. The instrument was created as an efficient self-report alternative to the CFI, it has good correlations with the ratings in the CFI subscales CC (78% correct classifications) and EOI (71% correct classifications), as well as with the overall CFI EE ratings (74% correct classifications). In addition, the FQ has displayed a similar level of accuracy and substantially higher sensitivity compared to the FMSS, without requiring audio taping and audiotape scoring [21].

### 2.2.3. Family Burden Scale

The Family Burden Scale (FBS) [24] was used to measure FB. The FBS consists of 23 items. The four FBS dimensions are defined as follows: A) impact on daily activities/social life (eight items): defined in terms of burden experienced

regarding disruption of daily/social activities; B) aggressiveness (four items): captures the presence of episodes of hostility, violence and destruction of property; C) impact on health (six items): assesses signs and symptoms of psychopathology reported by the family caregiver; and D) economic burden (five items): defined in terms of financial problems created by the patient's illness. Factor A, B, and D items tap objective burden; whereas C items underlie subjective burden. The scale has been originally developed and standardized in the Greek population. The internal consistency reliability of the four FBS dimensions ranges from 0.68 to 0.85 and test-retest reliability from 0.88 to 0.95. The developers provide a cut-off point of 24 (for the total scale score) to produce the best values of sensitivity (78%) and specificity (85%).

### 2.2.4. General Health Questionnaire

The General Health Questionnaire-28 item version (GHQ-28) [25], a self-administered instrument that screens for non-psychotic psychopathology in clinical and non-clinical settings, was used to assess relatives' psychological distress. Its four subscales measure somatic symptoms, anxiety/insomnia, social dysfunction and severe depression. In the GHQ-28 the respondent is asked to compare his recent psychological state with his usual state on a four-point scale (0—not at all, 1—no more than usual, 2—rather more than usual, 3—much more than usual). In the present study the Likert scoring procedure (0, 1, 2, 3) is applied providing a more acceptable distribution of scores and the total scale score ranges from 0 to 84. Higher scores on the scale are indicative of poorer psychological well-being. The cut-off score for identifying cases of psychiatric disorder is 23/24 for Likert scoring. The internal consistency reliability of the four GHQ-28 factors range from 0.76 to 0.87. The 28-item version of this instrument has been adapted for the Greek population by Garyfallos et al. [26], and has demonstrated good psychometric properties.

## 2.3. Translation process of the FQ

Permission was granted for the translation and validation of the scale by the developer of the instrument. The translation and cultural adaptation of the FQ was performed according to the Minimal Translation Criteria developed by the Scientific Advisory Committee of the Medical Outcomes Trust [27] taking into account also the guidelines proposed by the original developer. Two independent bilingual psychologists with advanced knowledge of the English language and Greek as their native language translated the questionnaire into Greek (forward translation). With the contribution of a third reviewer, a reconciliation meeting was conducted to develop a consensus version (reconciliated Greek version). A psychologist, who was a native English speaker and who was blinded to the original version, retranslated the reconciliated Greek version into the source language (backward translation). The backward translation was sent to the developer of the original questionnaire for

comparison and his suggestions were incorporated, thus formulating the revised Greek version of the FQ. As the last step of the translation procedure, a cognitive debriefing process was used for the cultural adaptation of the questionnaire [27]. This process refers to an in-depth interview of responders that was carried out in order to identify any areas presenting linguistic problems and to assess the respondent's level of understanding with the purpose of revealing inappropriate items and translation alternatives. As part of this process, the questionnaire was administered to five family members of members with schizophrenia, and after completing the questionnaire participants gave their general impression on the clarity of the items, the relevance of the content to their situation, the comprehensiveness of the instructions and their ability to complete it on their own. The same issues were addressed to them for every single item and they were able to make suggestions whenever necessary. The comments made by the participants were discussed in a debriefing summary and a final debriefing decision grid was sent to the developer for comments. After completing the aforementioned procedure, the final Greek version of the FQ was ready.

#### 2.4. Procedure

The FQ was administered to family caregivers of mental health patients by the first author in individual sessions in the Psychiatric Clinic of the University Hospital of Heraklion, Crete, Greece, where participants were asked to take part in a study assessing family functioning of patients with schizophrenia or bipolar disorder in Greece. The scale was also administered by the second author to family members of patients with schizophrenia or bipolar disorder recruited from psychoeducational groups which took place in the University Mental Health Research Institute of Athens who completed the FQ individually and returned it in person at the end of the group session. Caregivers were given an information sheet describing the aims of the study. The time needed to complete the questionnaire was approximately 10 to 15 minutes. Caregivers recruited from the Psychiatric Clinic of the University Hospital of Heraklion were, also, given the FBS and the GHQ-28 scales. Two weeks after the initial test, a subset of 60 randomly chosen participants from the original sample were re-assessed by means of the FQ to measure the test–retest reliability of the scale. Eventually, 55 (11 men, 44 women) of 60 participated (retest response rate 91.6%). The 15-day interval was chosen because this period of time is considered neither too long for a person's mental status to have changed, nor too short from the first application. All participants involved in the cultural adaptation and reproducibility (test–retest reliability) procedure were informed about the scope and the purpose of the study and provided written informed consent. The study was approved by the Ethical Committee of the University Hospital in Heraklion, Crete, Greece.

#### 2.5. Statistical analysis

The psychometric properties of the Greek version of the FQ were evaluated as follows:

- (a) **Validity:** An exploratory factor analysis (EFA) was performed to determine the structure of the questionnaire and to highlight how the individual items grouped together. The factor structure was studied by principal component analysis using Varimax with Kaiser normalization as rotation method. The Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy and the Bartlett's test of sphericity ( $\chi^2$ ) were employed to determine the appropriateness of the dataset for factor analysis and verify the degree of interrelation between the items [28,29]. High values (>0.5) in KMO indicate that factor analysis is appropriate. A minimum loading criterion of .30 was adopted for scale items to be maintained in each factor [30]. A factor was considered important if its eigenvalues exceeded 1.0. However, since this approach usually leads to the retention of many factors hardly interpretable and with variables loading high in more than one factor, the screeplot and interpretability criteria were also used [31]. Finally, the original two-factor structure proposed by the authors was analyzed by carrying out a confirmatory factor analysis (CFA). To assess the hypothesized model's degree of goodness of fit we used several indices, the chi-square ( $\chi^2$ ) among others. Given that it is very sensitive to variations in size of the sample, additional measures of goodness of fit were used, such as the root mean square of approximation (RMSEA), for which values below 0.08 are considered acceptable (poor fit >0.100; mediocre fit 0.080–0.100; reasonable fit 0.050–0.080). We, also, used the normed fit index (NFI), the comparative fit index (CFI) and the goodness-of-fit index (GFI), for which values of 0.90 or over reflect a good fit [30].

Distributions of the subscale scores are reported in terms of range, means, and standard deviations. Convergent validity was examined using cross-sectional data to examine the strength of association between subscale scores of the Greek version of the FQ and specific aspects of caregivers burden (FBS) as well as their psychological distress (GHQ-28), using Spearman's rho correlation coefficient (non-normal distribution).

- (b) **Reliability:** Internal consistency and reproducibility were measured as part of the reliability testing of the translated instrument. Internal consistency was determined by the use of Cronbach's  $\alpha$ , requiring a minimum value of 0.70 for group and 0.90 for

individual comparisons [32]. Reproducibility (test–retest reliability) was measured by calculating the intraclass correlation coefficient (ICC) with an interval of 2 weeks. An ICC value of 0.70 or higher would be considered as indicating satisfactory reliability.

Descriptive characteristics (including means, SDs, frequencies and percentages) were calculated for the socio-demographic variables. Univariate associations between non-normally continuous dependent variables (FQ) and categorical independent variables were studied using non-parametric statistical methods (Mann–Whitney and Kruskal–Wallis tests). Spearman's rho correlation coefficient was used to estimate the strength of the association between non-normally continuous dependent and independent variables. Structural equation modeling was used to evaluate the hypothesized direct and indirect effects of the specific measures of caregiver burden and psychological distress and the two components of expressed emotion—EOI and CC. Overall model fit was assessed by the chi-square ( $\chi^2$ ), as well as additional measures of goodness of fit, such as RMSEA, NFI, CFI, GFI [30].

All statistical analyses were performed using SPSS Statistics 20 software (IBM, Armonk, NY), except CFA which was performed with the IBM SPSS AMOS 20 (IBM, Armonk, NY).

### 3. Results

#### 3.1. Sample characteristics

The socio-demographic data for the caregivers participated in the study are presented in Table 1. The final sample consisted of 176 caregivers, 39 males (22.2%) and 137 females (77.8%), ranging in age from 28 to 77 years with a mean age of 55.73 years (SD = 10.52). The majority of the sample (96.0%) were Greek. Half of the sample had finished elementary or high school. The 88.1% of the respondents were living in urban areas and the 60.8% were married. Finally, the 76.7% were living with the patient, and the 91.5% had daily contact with the patient.

Patients' socio-demographic and clinical characteristics are presented in Table 2. The sample consisted of 176 patients, 123 males (69.9%) and 53 females (30.1%), ranging in age from 17 to 50 years with a mean age of 31.10 years (SD = 6.09). The vast majority of the sample were Greek (98.9%), single (88.1%) and living in urban areas (92.6%). The 55.1% had finished lyceum or had some years in university. The 84.7% were not working at the time of the assessment, whereas half of the sample had no income. Finally, the 75.6% of the patients were living with their parents. As far as diagnosis is concerned, the 79.5% of the patients had a diagnosis of schizophrenia and the 20.5% had a diagnosis of bipolar disorder. For 68 of the 176 patients, this was their first episode of schizophrenia or

Table 1  
Socio-demographic and family characteristics of the relatives participated in the study.

	N	%
Gender		
Male	39	22.2
Female	137	77.8
Ethnicity		
Greek	169	96.0
Other	7	4.0
Education		
Elementary/High school	88	50.0
Lyceum/Some years in university	60	34.1
University degree	28	15.9
Employment status		
Not working	65	36.9
Working	111	63.1
Individual income		
No individual income	43	24.4
<10,000€	57	32.4
10,000€–20,000€	57	32.4
>20,000€	19	10.8
Origin		
Urban	118	67.0
Rural	58	33.0
Residence		
Urban	155	88.1
Rural	21	11.9
Marital status		
Single	15	8.5
Married	107	60.8
Divorced/Widowed	54	30.7
Number of children		
0	14	8.0
1	22	12.5
2	67	38.1
3+	73	41.4
Relation to patient		
Parent	155	87.0
Sibling	16	9.1
Partner	4	2.3
Other	3	1.7
Living with the patient		
No	41	23.3
Yes	135	76.7
Contact with the patient		
Daily	161	91.5
1–2 times/week	10	5.7
1–2 times/2 weeks	2	1.1
1–2 times/month	3	1.7

bipolar disorder, while for 85 their second or more. The patients had an onset of illness between 15 and 46 years of age with a mean age of 23.52 years (SD = 5.87). More than half of the patients (56.8%) had an onset of illness of 4 years or longer. The length of hospitalization was up to 10 days for the 17.6% of the sample, 11–20 days for the 27.2%, 21–30 days for the 19.4%, and more than a month for the 22.7%. All patients were under pharmacotherapy, whereas only a limited proportion of patients were additionally under psychotherapy (8.0%) or underwent a psychosocial rehabilitation program (4.0%).

Table 2  
Patients' socio-demographic and clinical characteristics.

	Socio-demographic characteristics		Clinical characteristics	
	N	%	N	%
Gender			Diagnosis	
Male	123	69.9	Schizophrenia	140 79.5
Female	53	30.1	Bipolar disorder	36 20.5
Ethnicity			Onset of mental illness	
Greek	174	98.9	≤ 2 months	31 17.6
Other	2	1.1	1–4 years	45 25.6
Education			>4 years	100 56.8
Elementary/High school	54	30.7	Any hospitalization	
Lyceum/Some years in university	97	55.1	None	23 13.1
University degree	25	14.2	1	68 38.6
Employment status			2 or more	85 48.3
Not working	27	15.3	Duration of longer hospitalization	
Working	149	84.7	Up to 10 days	31 17.6
Individual income			11–20 days	48 27.2
No individual income	92	52.3	21–30 days	34 19.4
<10,000€	67	38.1	30+ days	40 22.7
10,000€–20,000€	13	7.4	No hospitalization	23 13.1
>20,000€	4	2.2	Last hospitalization	
Origin			Within the last 6 months	50 28.4
Urban	163	92.6	6–12 months	21 11.9
Rural	13	7.4	1–2 years	73 41.5
Residence			3–4 years	9 5.1
Urban	161	91.5	No hospitalization	23 13.1
Rural	15	8.5	Pharmacotherapy	
Marital status			Yes	176 100
Single	155	88.1	No	0 0.0
Married	8	4.5	Psychotherapy	
Divorced/Widowed	13	7.4	Yes	14 8.0
Number of children			No	162 92.0
0	157	89.2	Psychosocial rehabilitation	
1	10	5.7	Yes	7 4.0
2	4	2.3	No	169 96.0
3	5	2.8		
Living				
Alone	26	14.8		
With family/partner/others	150	85.2		

### 3.2. Psychometric properties of the FQ

#### 3.2.1. Factor analysis

The factor structure of the FQ was examined by conducting both exploratory and confirmatory factor analyses. A principal components factor analysis with oblique rotation was carried out on the 20 FQ items. In order to determine the structure of FQ, a series of factor analyses were performed. Initially, four factors with eigenvalues greater than one were extracted, accounting for 60.02% of the variance ( $KMO = 0.878$ ,  $\chi^2 = 1610.626$ ,  $p < 0.001$ ). Examination of the scree-plot suggested a four-factor solution as more suitable. The results indicated that the majority of the items had higher loadings on factor 1 and

Table 3  
Factor loadings based on a principle components analysis with varimax rotation for the Greek version of FQ.

Item number	Family Questionnaire	
	Factor 1—EOI	Factor 2—CC
Item 11	0.72	
Item 13	0.71	
Item 3	0.70	
Item 19	0.67	
Item 5	0.61	
Item 7	0.59	
Item 17	0.59	
Item 1	0.58	
Item 9	0.42	
Item 15	0.42	
Item 20		0.85
Item 12		0.81
Item 4		0.80
Item 16		0.80
Item 8		0.72
Item 14		0.72
Item 10		0.69
Item 18		0.68
Item 2		0.57
Item 6		0.34

Coefficients less than .30 are omitted from the table.

Abbreviations: EOI: emotional overinvolvement; CC: critical comments.

factor 2, which represented the two scales of the FQ—EOI and CC—while there were two factors with two to three items only. Many items loaded onto multiple factors, suggesting that the factors were indistinct. Additionally, we conducted further analysis i.e., two factors were extracted accounting for 48.14% of the variance ( $KMO = 0.878$ ,  $\chi^2 = 1610.626$ ,  $p < 0.001$ ). The results indicated a satisfactory arrangement of the items. Specifically, factor 1 (EOI) included 10 items in total and factor 2 (CC) included 10 items. Loadings for factor 1 ranged from 0.72 to 0.42, while those for factor 2 ranged from 0.85 to 0.57 with the exception of item 6 which had a loading very close to 0.30 (0.34). It appeared that the two-factor solution was meaningful to extract the number of factors proposed by the original questionnaire (Table 3).

The CFA (Fig. 1) was performed on the two-factor model (EOI and CC). Fit indexes were adequate,  $\chi^2 = 410.627$ ,  $df = 169$ ,  $p < 0.001$ ,  $RMSEA = 0.090$ ,  $NFI = 0.756$ ,  $CFI = 0.838$ ,  $GFI = 0.804$ . These coefficients indicate a modest, yet, acceptable fit of our data to the hypothesized model. In EOI, all standardized structural coefficients fluctuated from 0.42 to 0.67, and in CC from 0.35 to 0.90. The covariance between EOI and CC dimensions was 0.45.

#### 3.2.2. Internal consistency and test–retest reliability

An alpha reliability analysis was conducted to examine the internal consistency of the two subscales (Table 4). Reliability of the two subscales of the FQ is as follows: EOI = 0.82 and CC = 0.90. In general, the alpha reliability

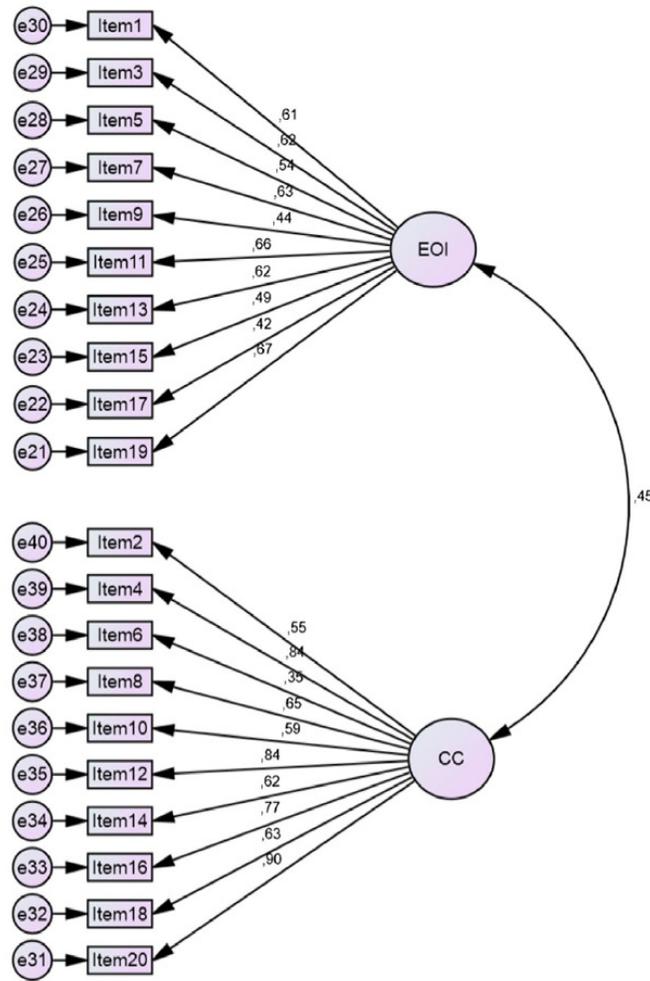


Fig. 1. Confirmatory factor analysis results for the Greek version of the Family Questionnaire. Abbreviations: EOI: emotional overinvolvement; CC: critical comments.

Table 4  
Cronbach's  $\alpha$  coefficient and intraclass correlation coefficient (ICC) for the two subscales of the FQ.

	Scale	M (SD)	Cronbach's $\alpha$	ICC
Family Questionnaire	Emotional overinvolvement	28.70 (5.64)	0.82	0.98
	Critical comments	23.89 (7.17)	0.90	0.99

Abbreviations: M: mean; SD: standard Deviation; ICC: intraclass correlation coefficient.

was excellent ( $>0.70$ ) for both subscales of the FQ. According to Table 4, the two subscales of the FQ showed high test–retest stability. The intraclass correlation coefficient (ICC) for the EOI subscale is 0.98 and for the CC subscale is 0.99.

### 3.2.3. Inter-correlation analysis of the FQ subscales

A correlation analysis was carried out for the two subscales of the FQ to assess the relationships between

Table 5  
Correlations between the subscales of the FQ, the FBS and the GHQ-28.

	FQ		
	Emotional overinvolvement	Critical comments	FQ_All
<b>FQ</b>			
Emotional Overinvolvement	1	0.46*	0.81*
Critical comments		1	0.89*
FQ_All			1
<b>FBS</b>			
Economic burden	0.37*	0.30*	0.39*
Impact on daily activities/social life	0.27*	0.59*	0.53*
Aggressiveness	0.27*	0.59*	0.53*
Impact on health	0.51*	0.53*	0.61*
FBS_All	0.48*	0.65*	0.68*
<b>GHQx28</b>			
Somatic symptoms	0.43*	0.39*	0.48*
Anxiety and insomnia	0.45*	0.46*	0.54*
Social dysfunction	0.50*	0.33*	0.47*
Severe depression	0.36*	0.32*	0.39*
GHQ-28_All	0.55*	0.49*	0.61*

Abbreviations: FQ: Family Questionnaire; FBS: Family Burden Scale; GHQ-28: General Health Scale-28.

\*  $p < 0.05$ ; Spearman's rho correlation coefficient.

them. The two subscales of EOI and CC were moderately correlated between themselves ( $r = 0.46$ ;  $p < 0.001$ ). EOI ( $r = 0.81$ ,  $p < 0.001$ ) and CC ( $r = 0.89$ ,  $p < 0.001$ ) were highly correlated with the FQ total score (Table 5).

### 3.2.4. Convergent validity

Convergent validity was determined through correlations between the two subscales scores and the total FQ score, as well as the total score of the FBS and its subscales and the GHQ-28 total score and its subscales. The FQ total score was significantly and positively correlated with the total scores of the FBS ( $r = 0.68$ ,  $p < 0.001$ ) and the total score of the GHQ-28 ( $r = 0.61$ ,  $p < 0.001$ ). All dimensions of the FQ were related to FBS and GHQ-28 subscales, and their totals as well, with values ranging from 0.27 to 0.65. Results are also illustrated in Table 5.

### 3.2.5. Associations of family EE with socio-demographic and clinical characteristics

Considering the influence of several socio-demographic variables on family EE, we examined both caregivers' and patients' gender, age, education and employment status effects for the two subscales—EOI and CC—of the FQ (Table 6). Our results indicated that females, older caregivers, and those who were not working tended to score higher in EOI scale than males, younger caregivers, and those who were working. Also, caregivers who were parents and divorced/widowed reported higher EOI scores toward the patient. Living with the patient was associated to higher CC scores. Non-significant differences were found with regard to caregivers' level of education. As far as

clinical characteristics are concerned, higher EOI and CC scores were found for patients being hospitalized for two or more times, whereas higher CC scores were found for patients with an onset of mental illness of 4 years or more. There were neither significant associations between the FQ subscales and patients' diagnosis nor with patient's socio-demographic characteristics such as age, gender, education, employment and marital status.

### 3.2.6. Structural equation model

Results associated with our path model based on the hypothesis that higher levels of burden would be directly or indirectly associated with higher levels of caregivers' EOI and CC by increasing caregivers' psychological distress are presented in Fig. 2. The model revealed a good fit to the data:  $\chi^2(1) = 3.16$  ( $p = 0.07$ ), GFI = 0.99, AGFI = 0.87, NFI = 0.98, CFI = 0.99, RMSEA = 0.13. According to this model, family burden was found to have a direct effect on EOI ( $\beta = 0.23$ ,  $p = 0.010$ ) and CC ( $\beta = 0.57$ ,  $p = 0.010$ ). Furthermore, caregivers' psychological distress had a direct effect on EOI ( $\beta = 0.41$ ,  $p = 0.010$ ), although the effect on CC was not significant ( $\beta = 0.13$ ,  $p > 0.05$ ). The indirect effect of family burden in caregivers' EE was significant for the EOI component ( $\beta = 0.23$ ,  $p = 0.010$ ) but non-significant for the CC component ( $\beta = 0.08$ ,  $p > 0.05$ ).

## 4. Discussion

The primary aim of the present study was to evaluate the psychometric properties of the Greek version of the FQ in a sample of family caregivers of patients with psychotic disorders. Based on the concept of psychosocial rehabilitation, families of individuals with severe psychiatric disorders, such as schizophrenia and bipolar disorder, are actively participating in the care of their relatives nowadays. The family has thus become an important agent affecting the patients' mental functioning and the course of recovery [33]. EE has been extensively researched across psychiatric disorders as the strongest family factor that influences the course of an illness [6]. In Greece, even though there has been a growing interest recently in examining the cross-cultural applicability of instruments used for family-focused assessment [i.e. the Family of Origin Scale (FOS) designed to measure perceived levels of psychological health in one's family of origin validated by Petrogiannis and Softas-Nall [34]; the Family Adaptability and Cohesion Evaluation Scales IV Package (FACES IV Package) designed to assess family cohesion and adaptability as well as communication and satisfaction validated by Koutra and colleagues [35]], there is a lack of validated multidimensional instruments to evaluate family EE.

The original FQ is a brief, self-report questionnaire that have consistently yielded good construct validity, clear factor structure, good internal consistency of subscales and acceptable relationship to the CFI [21]. To the best of our

Table 6  
Associations of socio-demographic and clinical characteristics and the two subscales of the FQ, univariate analysis.

	FQ			FQ	
	EOI	CC		EOI	CC
Caregivers' characteristics			Patients' characteristics		
Age	0.215*	-0.082	Age	-0.040	0.078
Gender, M (SD)			Gender, M (SD)		
Male	25.92 (4.88)*	23.36 (6.45)	Male	28.74 (5.50)	23.76 (7.05)
Female	29.50 (5.61)	24.04 (7.37)	Female	28.62 (6.00)	24.19 (7.48)
Education, M (SD)			Education, M (SD)		
Elementary/High school	29.47 (5.93)	22.78 (8.24)	Elementary/High school	29.37 (5.52)	24.30 (7.11)
Lyceum/Some years in university	28.05 (5.54)	25.30 (5.73)	Lyceum/Some years in university	28.25 (5.68)	24.02 (7.32)
University degree	27.71 (4.68)	24.32 (5.81)	University degree	29.04 (5.79)	22.48 (6.77)
Employment status, M (SD)			Employment status, M (SD)		
Not working	26.42 (5.71)*	23.29 (6.61)	Not working	26.70 (5.80)	22.22 (8.09)
Working	30.05 (5.17)	24.23 (7.48)	Working	29.07 (5.55)	24.19 (6.97)
Marital status, M (SD)			Marital status, M (SD)		
Single	24.27 (4.51)*	23.73 (6.68)	Single	28.87 (5.69)	23.83 (7.15)
Married	29.08 (5.44)	23.33 (7.35)	Married	26.75 (4.40)	25.25 (9.48)
Divorced/Widowed	29.19 (5.86)	25.04 (6.90)	Divorced/Widowed	27.92 (5.72)	23.69 (6.23)
Relation to patient, M (SD)			Diagnosis, M (SD)		
Parent	29.28 (5.61)*	23.72 (7.18)	Schizophrenia	28.46 (5.57)	23.46 (7.40)
Sibling	24.06 (4.22)	25.25 (6.32)	Bipolar disorder	29.67 (5.88)	25.56 (5.95)
Partner	27.00 (5.48)	26.25 (9.53)	Any hospitalization, M (SD)		
Other	26.33 (1.53)	22.00 (10.39)	None	28.83 (5.55)*	24.54 (5.89)*
Living with the patient, M (SD)			One	27.00 (5.41)	19.81 (6.63)
No	27.59 (6.08)	26.02 (6.84)*	Two or more	30.01 (5.54)	26.92 (6.34)
Yes	29.04 (5.48)	23.24 (7.16)	Onset of mental illness, M (SD)		
			≤12 months	26.90 (5.09)	20.74 (8.26)*
			1–4 years	29.44 (5.45)	23.73 (6.88)
			>4 years	28.93 (5.82)	24.93 (6.70)

\* Statistically significant differences at  $p < 0.05$ , based on Mann–Whitney  $U$ -test for two independent samples, Kruskal–Wallis one-way analysis of variance by ranks and Spearman's rho correlation coefficient.

knowledge, the FQ is the first self-report measure validated in Greece that enables assessment of family EE from the caregiver's perspective. The content of the items was built upon empirical findings and based on the model provided by Vaughn and Leff [36]. The process of translation and cross-cultural adaptation was carefully conducted following the guidelines proposed by the Scientific Advisory Committee of the Medical Outcomes Trust [27]—in addition to those proposed by the original developer—and resulted in a back-translated version which was very similar to the original, thus highlighting the suitability of the Greek version of the FQ.

The original FQ displays a two-factor structure of family EE with two subscales—EOI and CC—and it has been shown to have satisfactory internal and test–retest reliability [21]. The findings of the present study indicate that the Greek version of FQ displays similar factor structure and psychometric properties presenting strong internal consistency, structural validity, and correlation patterns that correspond well to the results of the original scale.

Specifically, an exploratory factor analysis was carried out on the 20 FQ items. Our findings support the bifactorial structure of the FQ—EOI and CC—with a satisfactory arrangement of the items since all the items expected are included. The CFA demonstrated that even though the two-factor model tested did not offer the most desirable fit to our data, the fit indices were finally considered as acceptable. Specifically, the CFA model produced a significant chi-square value ( $\chi^2 = 410.627$ ,  $df$  169,  $p < 0.001$ ), suggesting that the model would not fit the data. However, we suggest the  $Chi/df$  index as a useful ratio for assessing model fit rather than using chi-square alone [37]. If this value is less than 5, the model fits reasonably well, and a ratio close to 2 indicates a good fit. The  $Chi/df$  for the two-factor model of the FQ tested was 2.43, indicating that the data fit the two-factor CFA model relatively well. Furthermore, the additional fit indices of this analysis were very close to the suggested cut-off points, i.e. RMSEA (0.090) is in the middle of the mediocre fit level (0.080–0.100), while NFI

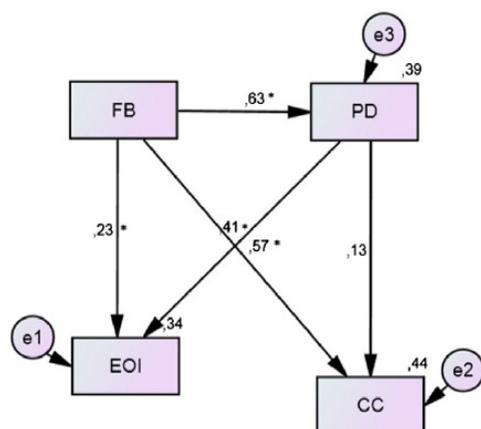


Fig. 2. Effect of family burden and caregivers' psychological distress in expressed emotion. Abbreviations: FB: family burden; PD: psychological distress; EOI: emotional overinvolvement; CC: critical comments. \* $p < 0.05$ .

(0.756), CFI (0.838), and GFI (0.804) approach the suggested value of 0.90 [30], and values as high as 0.080 are deemed acceptable [38].

In terms of synthesis of the two scales of the Greek FQ, the fact that they are found to be very similar to the original structure firmly supports the validity of the scale. Furthermore, with respect to convergent validity, we found high correlations between the FQ scores and caregivers' burden (FBS) as well as their psychological distress (GHQ-28), which suggests that EE evaluated with a self-report instrument and from a caregiver's perspective is a relevant construct that may have prognostic significance in family-based interventions.

An alpha reliability analysis was conducted to examine the internal consistency of the two FQ subscales. The results indicate that EOI and CC subscales obtained good reliability indexes with Cronbach's  $\alpha$  coefficient. All of the reliability results generated appear to have a high internal consistency similar to the values of reliability obtained by Wiedemann and colleagues [21]. Removing any of the items in these three factors did not lead to an improvement of the factor reliability indicating adequate internal consistency. In addition, a high level of test–retest correlation was registered by the two subscales of the FQ, with results showing significant correlations between test and retest applications thus indicating the instrument's high temporal stability consistently with the original scale's findings [21].

Regarding the FQ associations with clinical and socio-demographic variables, we found that higher EOI levels toward the patient were reported by female caregivers, those who were older and did not work, as well as those who were parents and divorced or widowed. Non-significant associa-

tions between the aforementioned variables and CC levels were found. However, a higher level of CC was found to be expressed by caregivers who were living with the patient. Patient's hospitalization was also found to be related to both EOI and CC scores, with higher EOI and CC levels found for patients being hospitalized for two or more times consistently with the results of previous studies [39–41]. Our data, also, indicated that the longer duration of illness was associated with higher levels of CC toward the patient. At this point, it is important to emphasize that such crude associations might not persist if a multivariable analysis would be applied adjusting simultaneously for other covariates or potential confounders. Future research could investigate such associations through multivariable modeling. Furthermore, future studies including comparison groups of various cultural backgrounds should examine whether these behaviors (high EOI and/or CC toward the patient) are a culturally driven response to a chronic distressing illness (i.e. high values for family and parental responsibilities) or risk factors contributing to the onset and maintenance of these disorders.

In this study we, also, evaluated the direct and indirect effects of family burden and caregivers' psychological distress on the two components of EE—EOI and CC. A direct impact of family burden on both EOI and CC, as well as an indirect impact on EOI, were found. Our findings are consistent with the hypothesis that families who experience greater burden are at an increased risk for negative health consequences themselves, thus experiencing higher levels of psychological distress, and that these stressful feelings influence caregivers' behavior leading them to behave in a different way toward the patient than caregivers who evaluate the caregiving experience as less distressing. Previous research has shown that the families' appraisal of the impact of the illness had the greatest impact on their psychological well-being [42,43]. Even though one would expect that greater family burden and psychological distress would make caregivers more critical rather than overprotective toward the patient, we found exactly the opposite in our sample, which is consistent with the results of other studies that EOI is a dominant cultural feature of the behavior of Greek families [40].

The strengths of the present study include its large sample size, the use of standardized procedures for the translation and cross-cultural adaptation of the original questionnaire and the high participation rate (97.7%). Nevertheless, there are some methodological limitations of our study. A possible limitation would be that it was performed on a non-representative sample of the Greek population, since the majority of patient-caregiver pairs were recruited from the University Hospital of Heraklion, Crete, Greece, and a smaller proportion of the sample recruited from the University Mental Health Research Institute of Athens, Greece. Future research should be performed on larger and representative samples by collecting data from different diagnostic groups. A second limitation is that specific

clinical variables (i.e. number and duration of hospitalizations) were collected from a self-report survey completed by family caregivers as opposed to using medical reports. However, diagnoses and the majority of clinical variables were established by medical reports thus limiting a potential bias related to these findings. Another possible limitation would be the inability of our study to validate the cut-off score of the two subscales of the FQ due to the lack of an existing validated instrument for comparison. With the aim of respecting and adhering to the original model, however taking into serious consideration possible cultural differences, we decided to keep the cut-off scores proposed by Wiedemann and colleagues [21] which provide a cut-off point of 23 as an indication of high CC, and 27 for EOI. Despite these limitations statistical data strongly support the applicability of the measure in our country and show similar dimensions characterizing family EE in Greece.

The results of the present study replicate previous research findings to a considerable degree in terms of internal and test–retest reliability, inter-correlations, and construct and convergent validity of the FQ in the Greek population. The two key components of the FQ—EOI and CC—proposed in the present study, are widely recognized behaviors and emotional styles, congruent with the EE construct in severe psychiatric disorders, such as schizophrenia and bipolar disorder. Several family-based interventions have addressed these two components so as to improve the caregiving experience and illness outcome [e.g. Falloon's model [44]]. Future research on this area should focus on: (i) using the FQ in more variable research settings, thus promoting its use in other clinical populations, (ii) determining a reliable cut-off point for the questionnaire and (iii) applying the Greek version of the FQ in clinical settings. Consequently, we encourage both researchers and clinicians to use the FQ which enables them to have a comprehensive and reliable evaluation of family EE. The FQ can be used as a research tool to study EE in the Greek family in relation to different populations, or it can be used as a supplement to clinical interviews when exploring family issues and conducting assessments to inform treatment decisions. Thus, this study has substantiated that the FQ is a valid and reliable assessment instrument useful for research and clinical work with families in the Greek context.

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### 4.3. Paper 3

#### Family functioning in first-episode psychosis: a systematic review of the literature\*

Koutra, K., Vgontzas, A. N., Lionis, C., & Triliva, S.

**Purpose:** The influential role of family in the outcome of chronic schizophrenia is well documented. However, there has been relatively little research on the intrafamilial relationships of people experiencing their first episode of psychosis (FEP), a point in time when most of the changes in family dynamics are observed. The aim of this article is to present a review of the literature focusing on the family environment of FEP patients. **Methods:** We carried out a computerised literature search on MEDLINE and PsycINFO (1990-2013), and a manual search of references of pertinent articles. In total, 27 studies investigating expressed emotion (EE) and family burden (FB) in FEP were identified and fulfilled the inclusion criteria. **Results:** Similar to chronic patients, a high prevalence of high EE in carers of FEP patients was reported. High EE status appears to be independent of the patient's illness-related characteristics, but dependent of relatives' attributions. In contrast to chronic patients, low levels of FB and psychological distress among family members of FEP patients were observed indicating that in the early stages of the illness family involvement is not yet associated with significant disruption in their lives. Studies assessing FB in chronic patients have found a well-established link of FB with patient's illness-related factors, but in FEP patients the families' appraisal of FB is more closely associated with their coping mechanisms. **Conclusions:** Further studies evaluating family functioning in terms of cohesion and adaptability will shed light on the intrafamilial relationships in FEP patients which may be associated with the long-term outcome of this chronic illness.

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## Family functioning in first-episode psychosis: a systematic review of the literature

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### Abstract

**Purpose** The influential role of family in the outcome of chronic schizophrenia is well documented. However, there has been relatively little research on the intrafamilial relationships of people experiencing their first episode of psychosis (FEP), a point in time when most of the changes in family dynamics are observed. The aim of this article is to present a review of the literature focusing on the family environment of FEP patients.

**Methods** We carried out a computerized literature search on MEDLINE and PsycINFO (1990–2013), and a manual search of references of pertinent articles. In total, 27 studies investigating expressed emotion (EE) and family burden (FB) in FEP were identified and fulfilled the inclusion criteria.

**Results** Similar to chronic patients, a high prevalence of high-EE in carers of FEP patients was reported. High-EE status appears to be independent of the patient's illness-related characteristics, but dependent of relatives' attributions. In contrast to chronic patients, low levels of FB and psychological distress among family members of FEP patients were observed indicating that in the early stages of the illness family involvement is not yet associated with

significant disruption in their lives. Studies assessing FB in chronic patients have found a well-established link of FB with patient's illness-related factors, but in FEP patients the families' appraisal of FB is more closely associated with their coping mechanisms.

**Conclusions** Further studies evaluating family functioning in terms of cohesion and adaptability will shed light on the intrafamilial relationships in FEP patients which may be associated with the long-term outcome of this chronic illness.

**Keywords** Family functioning · Expressed emotion · Family burden · First-episode psychosis

### Introduction

Based on the concept of psychosocial rehabilitation, families of patients with psychosis are actively participating in the care of their relatives [1]. The study of family interactions is especially important in the early stages of the illness when most of the changes are observed [2]. Clinicians working with patients with a diagnosis of psychosis recognize the importance of the family in initial treatment-seeking, ongoing assistance with adherence, and the social support that is a vital aspect of treatment planning and the recovery process [3]. Therefore, the involvement of the family in the overall treatment plan is of great importance, since relatives could be an integral part of the treatment process.

First-episode psychosis

First-episode psychosis (FEP), or so called early psychosis, refers to the first time when someone experiences a

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psychotic episode. FEP may lead to a broad range of clinical diagnoses, and usually occurs in late adolescence or early adulthood; a time of great change and upheaval, that is crucial for the development of identity, independence, sexuality, intimate relationships, study and career plans [4, 5]. The onset of psychosis is usually preceded by a long period of increasing symptomatology and functional decline and without appropriate early intervention, significant disruption to the patients' psychosocial development can ensue. The period between the onset of psychotic symptoms and initiation of treatment, often called duration of untreated psychosis (DUP), can last for days, months or even years [6, 7]. Several studies have suggested that the longer the DUP the worse the prognosis of the illness [8–10]. Also, relapses are common during the first 5 years after a FEP [11] and any relapse during this critical period increases the risk for further relapse and a chronic course [12]. Thus, early intervention in FEP is important in alleviating the distress and anxiety associated with psychotic symptoms, reducing the risk of suicide [13], as well as preventing relapses.

#### The role of the family in severe mental illness

The role of the family in the course of mental illness has been examined extensively ever since George Brown's seminal studies of the families of patients with schizophrenia [14, 15] in terms of family factors influencing patient relapse and illness course and outcome [16]. Family members' attitudes toward the patient, as measured by the level of expressed emotion (EE) and family burden (FB) associated with the caring role, have received most of the research attention [17, 18].

The construct of EE within families was developed in the 1960s and 1970s [14, 19], initially for applications in understanding psychotic disorders within the family, to describe the emotional environment and the attitudes of caregivers toward the patient by incorporating the key aspects of negative interpersonal relationships [20–22]. EE constitutes the amount of relatives' critical comments (CCs), hostility (H), and/or emotional over-involvement (EOI) toward the patient. CCs express dislike or disapproval of the patient's behavior; H reflects disapproval or rejection of the patient; and EOI includes an exaggerated or overprotective attitude towards the patient, as reflected by an intrusive style of relating and the carer's evident emotional distress. Several decades of research has established EE as a highly reliable psychosocial predictor of relapse in psychosis [23–25].

FB refers to the negative impact of the individual's mental disorder on the entire family [26, 27] and it is often the result of taking on the caregiving role to already existing family roles [27]. Burden is distinguished into

objective and subjective [28–30]. Objective burden involves the disruption to the family/household due to the individual's illness [31]. Subjective burden involves the psychological consequences of the individual's illness for the family [30]. It has long been established that families of patients with psychosis experience a great deal of FB [32] in different life domains, including reduction of subjective health [33, 34], restrictions in leisure time, daily routine and social contacts, problems in working life, coping with the patients' symptoms and emotional problems [35, 36]. Furthermore, clinical characteristics, such as symptom type and severity, impaired functioning and higher frequency of relapses were found to predict burden [37].

#### Aim of the study

There has been relatively little research on the family environment of FEP patients. Most of the research studies on family functioning that were identified included chronic patients, and examined certain aspects of intrafamilial transactions, such as EE and FB. No systematic investigation has been conducted to determine whether family functioning in FEP plays different roles. Since family dynamics play a role in the recovery-relapse and early-relapse after the first episode is detrimental to the course of the disease, developing understanding of the family dynamics earlier can improve intervention and preventive strategies. In addition, by investigating family factors early in the course of the illness, we expect to obtain a clear picture of family interactions which may be less negatively affected by the chronic and episodic course of the patients' illness. This paper aims to review studies investigating the link between family functioning and FEP. The reviewed studies are summarized in two outcome sections: (a) family expressed emotion, and (b) family burden.

#### Methods

A comprehensive search of the MEDLINE and PsycINFO databases (1990–2013) was conducted using the terms “family functioning”, “family cohesion”, “family adaptability”, “family expressed emotion”, “family burden”, “family caregiving”, “first-episode psychosis”, “recent-onset psychosis”, and “early-onset psychosis”. The following criteria for eligibility were defined: (a) published in an English language journal (b) date of publication from 1990 onwards (c) sampled FEP patients and their caregivers (d) focused on the family's response or the contribution of family members to a member's mental illness, and (e) grounded in a family model or conceptual framework, included at least one family measure, and/or proposed to develop a theory or concept relevant to

**Table 1** Summary of studies investigating expressed emotion and family burden in patient-relative relationships in first-episode psychosis

Citation and country	Study design and participants	Family measures	Key findings
Addington et al. [51]	Cross-sectional study	PGWB	The 26 % of carers demonstrated severe distress and the 21 % moderate distress
Calgary Early Psychosis Program (EPP) Calgary, Alberta, Canada	238 patients and their carers	ECI	Caregivers' burden was high indicating that they were experiencing many difficulties High burden were associated with patients' negative and positive symptoms and poor social functioning Increased levels of distress were associated with having younger patients with a younger age of onset; however, it was the family's appraisal of the impact of the illness that was associated with their psychological well being
Alvarez-Jimenez et al. [58]	Prospective study, 7-month follow-up	FQ	CC and EOI represent distinct constructs
EPISODE II trial Australia	48 patients and their carers	ECI	Baseline EOI was more strongly correlated with family stress compared with CC, whereas CC yielded a stronger association with DUP than EOI Carers' CC at follow-up was not significantly predicted by either baseline family stress, burden of care or patient-related variables. Conversely, baseline EOI predicted both family stress and burden of care at 7-month follow-up FB at follow-up was a function of baseline EOI and patients' depressive symptoms
Bachmann et al. [38] Heidelberg, Germany	Cross-sectional study	FMSS	Carers of first-episode and chronic patients with schizophrenia and depression did not differ significantly regarding their EE status In first-episode patients, the 52.5 % of relatives were classified as high-EE; in chronic patients, the 45 % EE status of relatives was not disease-specific, and it was found to be independent of chronicity of illness
Barrelet et al. [39] Geneva, Switzerland	Prospective study, 9-month follow-up 36 patients and their carers	CFI	There was identified 66 % of high-EE household At 9-month follow-up, the relapse rate for the high-EE group (33 %) was significantly higher than for the low-EE group (0 %) Only CC was principally responsible for the prognostic validity and discriminated significantly between relapsers and non-relapsers
Boydell et al. [52] Aetiology and Ethnicity in Schizophrenia and Other Psychoses (AESOP) study UK	Cross-sectional study 124 patients and their carers	GHQ-28 ECI	The overall level of caregivers' distress was high Feelings of caregivers' burden were also high, increased in men, and with carer age Neither ethnicity nor social class nor social support was associated with distress or burden Compulsory treatment was predicted by carer burden; this was evident in the black Caribbean group
Cotton et al. [59] EPISODE II trial Australia	Cross-sectional study 81 patients and 63 carers	FQ ECI	Carer-related factors, such as EOI and burden of care, were associated with a reduction in patients' QoL
Gonzalez-Blanch et al. [60] Cantabria (Spain) First-Episode Psychosis Program (PAFIP) Spain	Prospective observational study 23 patients and their carers	SBAS FQ	The 53 % of the caregivers showed high levels of EE No severe family burden was observed Family subjective and objective burden were correlated with EOI, but not with CC

Table 1 continued

Citation and country	Study design and participants	Family measures	Key findings
Heikkilä et al. [41] Turku, Finland	Cross-sectional study  42 patients and their carers	FMSS	A high-EE score was found in 40 % of the caregivers; high EOI was found in 24 %, and high CC in 17 % of the families  High-EE was associated with the caregiver's not being a spouse and the patient's being young and unmarried  High-EE was not associated with pre-morbid characteristics, symptom dimensions or the diagnostic group of the patient
Heikkilä et al. [40] Turku, Finland	Cross-sectional study  42 patients and their carers	FMSS	Patients' good cognitive functioning was associated with high-EE  Patients' socio-demographic characteristics and psychopathology were not significantly associated with EE
Huguelet et al. [42] Geneva, Switzerland	Prospective study, 5-year follow-up  44 patients and their carers	CFI	29 households were categorized as high-EE (66 %) and 15 as low-EE (34 %)  Relapse rate was observed in the same proportion during the follow-up period (48 % the first year versus 45 % in the fifth year)  After the third year, patients living with high-EE relatives were significantly more maladjusted and relapsed more than those living with low-EE relatives  At intake, the patients presenting more pre-morbid features lived in high-EE households
Lee et al. [43]	Prospective study, 6-and 12-month follow-ups  65 patients and their carers	CFI	Patients were less likely to relapse within 6- and 12-month follow-up periods when their caregivers were rated high on EE warmth, or when they perceived more positive affect from the family  Patients' perceptions of positive affect and EE ratings of warmth appeared to be stronger predictors of relapse outcome than CC and other EE variables
NHS early intervention for psychosis and community mental health teams UK McCleery et al. [53]	Prospective study, 6, 12, and 24-month follow-ups	CBI	Caregivers' burden was the most significant predictor of psychological distress, whereas the severity of symptoms or impaired functioning was not linked to psychological distress
Calgary Early Psychosis Program (EPP) Canada McNab et al. [44] Australia	113 patients and their carers  Cross-sectional study  40 patients and 53 carers	ECI PGWB  FQ	Caregivers' burden improved significantly over the follow-up period  Of high-EE parents (73.5 %), the 22.6 % were high on EOI, the 13.2 % on CC, and the 37.7 % on both  Caregivers reported low levels of control over patients' symptoms  CC was found to be associated with higher levels of patient-centered control attributions
Meneghelli et al. [45] Programma2000 Milano, Italy	Cross-sectional study  77 patients and their carers (also, 66 UHR families not included in the review)	CFI	About one-third of FEP families were classified as high-EE, with EOI being the most frequent reason  In FEP higher EE correlated with longer DUI, and higher paternal EOI with longer DUP  Severity of illness did not relate to EE in FEP families

Table 1 continued

Citation and country	Study design and participants	Family measures	Key findings
Mo et al. [46]	Cross-sectional study	LEE	Higher caregiver-rated EE was associated with the caregiver being the father, and patients being of young age and unemployed
Early Assessment for Young People with First-Episode Psychosis Program Hong Kong	139 patients and their carers		Symptom severity positively correlated with both the caregiver-rated and patient-rated total EE scores
Moller-Leimkuhler [61]	Cross-sectional study	FBQ	Caregivers' stress outcome was independent of the severity of the illness, kind of symptoms and level of psychosocial functioning at admission
Munich 5-year follow-up study Munich, Germany	83 patients and their carers (note: including patients diagnosed with depression)	FMSS FQ	EE, emotion-focused coping strategies and generalized negative stress response were found to be the most relevant predictors of burden
Moller-Leimkuhler and Obermeier [62]	Prospective study, 2-year follow-up	FBQ	Caregivers' burden improved significantly, but well being and self-rated symptoms remained elevated
Munich 5-year follow-up study Munich, Germany	63 patients and their carers (note: including patients diagnosed with depression)	FMSS FQ	EE, neuroticism, generalized negative stress response and life stressors resulted as the best predictors of burden The effects were rather time invariant than time dependent
Patterson et al. [47] Birmingham, UK	Prospective study	CFI	EE status changed over the follow-up period, with the 28 % of the relatives obtaining a different EE rating from the initial measure and the 42 % of the initially high-EE relatives resolving to low-EE
	50 patients and their carers at baseline		The developmental pathways of CC and EOI were independent despite having a similar effect on outcome for patients
	39 patient-carer pairs in 9-month follow-up		Initially, high EOI levels were reduced by follow-up, with 37 % resolving into high CC High EOI and low CC are associated with significantly high levels of perceived loss in relatives The change of EOI to CC was linked to a reduction in perceived loss
Patterson et al. [63] Birmingham, UK	Prospective study	CFI	The 28 % of the relatives—mainly among the high-EE group—changed EE status during the follow-up period
	50 patients and their carers at baseline	ECI	The appraisal of loss was linked to high EOI but not high CC relationships at baseline
	39 patient-carer pairs in 9-month follow-up		Loss reduced by 9-month follow-up in those changing from high EOI to high CC or low-EE Subjective burden of carers was linked to loss but not to EE status. Patients' and carers' appraisals of loss were strongly correlated, particularly in high EOI relationships Longer DUI was associated with high CC
Raune et al. [64] London, UK	Cross-sectional study	CFI	The 44% of carers had high-EE
	46 patients and their carers	ECI	High-EE was not related to patients' illness-related factors, carer distress or depression Avoidant coping was the strongest predictor of EE High-EE carers had higher subjective burden scores and perceived poor interpersonal functioning in patients

Table 1 continued

Citation and country	Study design and participants	Family measures	Key findings
Rosenfarb et al. [48]	Cross-sectional study	CFI	Patients from high- and low-EE environments did not differ significantly in their appraisal of the stressor
Developmental processes in schizophrenic disorders USA	22 patients and their relatives		Patients from high-EE homes were likely to use emotion-based confrontational methods to cope with the crisis, while patients from low-EE environments were likely to use avoidance and denial
Ryder et al. [54]	Cross-sectional study	PFBS	Chinese caregivers reported a higher number of burdensome behaviors and experienced more objective and subjective burden compared with Euro-Canadian caregivers
First-onset schizophrenia project Toronto, Canada	18 Chinese Canadian and 36 Euro-Canadian patients and their carers		Chinese caregivers had a more negative conceptualization of mental illness and they were more affected by the stigma of mental illness than Euro-Canadian caregivers
Stirling et al. [49] Manchester, UK	Prospective study, 12-month follow-up  33 patients and their carers	CFI	There was no association between relapse rate and household EE over a 12-month follow-up period  Correlations between individual components of EE and pre-morbid measures suggest that level of CC may be related to less acute onset of index episode, greater elapsed time since first signs of illness, and poor adjustment in the realm of work/study
Stirling et al. [50] Manchester, UK	Prospective study, 18-month follow-up  30 patients and their carers	CFI	There was no association between initial EE rating and relapse over a 18-month follow-up period  A significant association between EE rating at 18 months and psychiatric status of the patient during the follow-up period emerged
Tennakoon et al. [55] London, UK	Cross-sectional study  40 patients and their carers	IEQ ECI GHQ-12	The 12 % of caregivers were suffering from psychiatric morbidity as defined by GHQ-12 Those living with the participants had more frequent visits to their general practitioner Women caregivers, those in the professional social class, and divorced caregivers reported higher distress Caregivers used both emotional and practical strategies to cope with patients' negative symptoms and difficult behaviors and experienced more worry about these problems Carers increased supervision when patients displayed difficult behaviors
Wolthaus et al. [56] The Netherlands	Prospective study, 2-year follow-up  138 patients with a first or second psychotic episode and 103 relatives	IEQ	The disorganization symptom component (e.g., conceptual disorganization, poor attention, disorientation, disturbance of volition) was the predicting variable of the subscales supervision, tension, urging, distress, and the overall amount of caregiver burden. The agitation excitement symptoms only predicted worrying  Personality traits of patients played no substantial role in caregiver burden

Table 1 continued

Citation and country	Study design and participants	Family measures	Key findings
Wong et al. [57] New York, USA	Cross-sectional study  12 patients and their carers (also, 11 prodromal families not included in the review)	FEIS	As for objective burden, the requirement to assist the patient in activities of daily living was high, but there was little need to supervise or control behaviors reported. Impact on daily routine was intermediate  As for subjective burden, worry was as high as previously reported for more chronic patients. By contrast, there was a relative absence of displeasure/anger

*FEP* First-episode psychosis, *EE* Expressed Emotion, *FB* Family Burden, *EOI* Emotional Over-Involvement, *CC* Critical Comments, *H* Hostility, *PGWBS* Psychological General Well Being Scale, *ECI* Experience of Caregiving Inventory, *FQ* Family Questionnaire, *FMSS* Five-Minute Speech Sample, *CFI* Camberwell Family Interview, *GHQ* General Health Questionnaire, *SBAS* Social Behavior Assessment Schedule, *CBI* Caregiver Burden Inventory, *LEE* Level of Expressed Emotion Scale, *FBQ* Family Burden Questionnaire, *PFBS* Perceived Family Burden Scale, *IEQ* Involvement Evaluation Questionnaire, *FEIS* Family Experiences Interview Schedule

understanding the family system. We included studies that involved patients with first-episode schizophrenia spectrum disorders, and excluded studies of patients described as “prodromal” or “ultrahigh risk” (UHR). Moreover, controlled longitudinal treatment outcome studies were excluded from the present review. Finally, to ensure that our search was as comprehensive and current as possible, we also conducted independent searches for recent publications by leading psychosocial researchers in the field of early psychosis (e.g. Addington, Birchwood, Linszen, McGorry, Tarrrier, etc.).

In total, 27 studies were identified which fulfilled the eligibility criteria. Specifically, 18 studies were identified from the database search and a further nine studies were identified from manual search of reference section of other identified articles. The results were evaluated for relevance and methodological quality by the first and the second authors, and there was complete agreement between the two raters. Only the studies assessing family functioning for FEP patients were selected for review. Specifically, we selected papers that quantitatively evaluated family factors in a cross-sectional or prospective way to examine the levels, possible interactions between them, and their effects on the family of FEP patients. We did not include specific treatment outcomes or any other results not directly related to intrafamilial relationships in FEP in the key findings. Information on study design, sample characteristics, family measures, and results was extracted. All the studies that were reviewed are presented in Table 1.

## Results

### Study aims

Studies varied greatly in their aims and scope. Thirteen studies explored EE [38–50] and seven explored FB

[51–57] as a primary outcome, whereas seven studies evaluated EE in conjunction with FB [58–64]. Cross-sectional and prospective designs were predominantly applied in investigating EE and FB in families of patients early in the course of illness.

### Family outcomes

#### Expressed emotion

**Prevalence of EE** Although the prevalence of high-EE families in the study of Meneghelli et al. [45] was 35 % among 77 families of FEP patients (and also 66 UHR families, not included in the present review) in Milano, Italy, with EOI being the most prominent characteristic, few extant studies conducted in the early stages of the illness suggest that approximately half of the families show high-EE. Specifically, Raune et al. [64] found that the 44 % of families had high-EE in their sample of 46 FEP patients assessed in London, UK, with one-third showing high CCs (33 %), nearly one-third hostile (30 %) and over one-fifth displaying high EOI (22 %). This finding is similar to the percentage found by Heikkila et al. [41] in their sample of 42 FEP patients assessed in Finland. A high-EE score was found in 40 % of the relatives, while high EOI was found in 24 %, and high CC in 17 % of the families.

Several studies identified a higher prevalence of high-EE families. In the study of Bachmann et al. [38], who examined patients with first-episode schizophrenia and major depressive disorder in Germany, the 52.5 % of 40 FEP patients’ relatives were classified as high-EE. Similarly, in the study of Gonzalez-Blanch et al. [60], high levels of EE were found in the 53 % of the relatives of 23 FEP patients in Spain. In Switzerland, Barrelet et al. [39], in their cohort of 36 FEP patients identified 66 % of high-EE household, which is similar to the prevalence found by Huguélet et al. [42] in their sample of 44 FEP patients

(66 %). McNab et al. [44], in a sample of 53 parents of 40 FEP patients assessed in Australia, found that 73.5 % of the parents were high in EE, of whom 22.6 % were high on EOI alone, the 13.2 % on CC alone, and 37.7 % on both.

*Factors associated to relatives' EE* Study findings suggest that patients' symptoms and psychosocial functioning may have a limited impact upon carers' EE. Raune et al. [64] found no association between EE and symptom type and severity, age of onset, illness length and diagnosis, whereas increased FB and carers' avoidant coping seemed to be the strongest predictors of EE. These findings are consistent with the results of Heikkila et al. [41], which indicated that high-EE was not associated with pre-morbid characteristics, symptom dimensions or diagnosis, but with demographic characteristics (i.e., the relative's not being a spouse and the patient's being young and unmarried). In a more recent analysis, Heikkila et al. [40] found that among a vast array of psychosocial, cognitive, symptom-related, and functioning-related variables, after adjustment for the effect of the others, the measures of patients' cognitive functioning were the only variables significantly associated with EE.

In another study by Bachmann et al. [38], neither chronicity nor diagnosis was associated to relatives' EE status. According to Moller-Leimkuhler [61], EE was considered a consequence of relatives' characteristics, dependent on their extent of external beliefs of control generalized negative stress response and general life stressors rather than a response to the manifestation of the patients' disorder. Meneghelli et al. [45] found no link between EE and severity of illness or patients' psychosocial functioning; however, high-EE correlated with longer duration of untreated illness (DUI), while EOI correlated with longer DUP. Only one study found, conducted in Hong Kong by Mo et al. [46], in which EE was assessed by both 139 FEP patients and their caregivers. The results indicated that higher caregiver-rated EE was associated with the caregiver being the father, unemployed, and patients being of young age. Furthermore, patients' symptoms were positively correlated with both the caregiver-rated and patient-rated EE.

The two components of EE—EOI and CC—may be influenced by separate factors early in the course of psychosis. In the study of Stirling et al. [49], CC was found to be related to pre-morbid characteristics, such as less acute onset of index episode, greater elapsed time since first signs of illness, and poor adjustment in the realm of work/study. A significant association between EE rating at 18 months and psychiatric status emerged [50]. Patients whose relatives were rated as high-EE at 18-month follow-up were reported to have had a longer period of pre-admission disturbance than those from low-EE households. Also,

follow-up CC correlated significantly with DUI prior to index hospitalization and negatively with acuteness of onset. Moreover, Huguélet et al. [42] found at intake that the patients presenting more pre-morbid features lived in high-EE households.

Gonzalez-Blanch et al. [60] showed that EOI, but not CC, was correlated to both subjective and objective FB. In the study of Alvarez-Jimenez et al. [58], baseline EOI was more strongly correlated with family stress compared with CC, whereas CC yielded a stronger association with DUP than EOI. Carers' CC at follow-up was not significantly predicted by either baseline family stress, burden of care or patient-related variables. Conversely, baseline EOI predicted both family stress and burden of care at 7-month follow-up. Patterson et al. [47, 63] found that high EOI and low CC were associated with relatives' higher levels of perceived loss. Patients' and relatives' appraisals of loss were strongly correlated, particularly in high EOI relationships, and longer DUP was associated with high CC. In the study of McNab et al. [44], relatives reported low levels of control over patients' symptoms, and CC was found to be associated with higher levels of patient-centered control attributions. Finally, Cotton et al. [59] demonstrated that high EOI was related to patients' poor quality of life (QoL), especially in terms of social relationships QoL.

*EE and relapse* Two studies found no correlation between EE and relapse [49, 50], whereas three studies conformed a positive association [39, 42, 43]. Stirling et al. [49, 50] reported the absence of association between EE and relapse in a group of 33 FEP patients during the 12- and the 18-month follow-up period. A significant relationship between EE and relapse for a cohort of 36 FEP patients was reported by Barrelet et al. [39], although when their analysis was restricted to patients who live with their families during follow-up ( $n = 30$ ), the association failed to reach significance. At 9-month follow-up, the relapse rate for the high-EE group was significantly higher than for the low-EE group, and only CCs were found to be principally responsible for the prognostic validity. Huguélet et al. [42], in their study of 44 FEP patients, found that EE was predictive of outcome over a 5 year period. After the third year, patients living with high-EE relatives were significantly more mal-adjusted and relapsed more than those living with low-EE relatives. Very recently, Lee et al. [43], in their study of 65 FEP patients, found that higher EE warmth predicted a lower likelihood of relapse after six and 12 months.

*Stability of EE* Patterson et al. [47, 63], examining a sample of 50 FEP patients and their relatives, found a considerable change in overall EE status over the 9-month follow-up period, with 28 % of the relatives obtaining a different EE rating from the initial measure and this

occurred predominantly among the high-EE group, and 42 % of the initially high-EE relatives resolving to low-EE as well. The developmental pathways of components of EE-CC and EOI—were independent despite having a similar effect on outcome for patients. Initially, high EOI levels were reduced by follow-up, with 37 % resolving into high CC. Similarly, Stirling et al. [49, 50] have previously found that a very large proportion of their high-EE group reached threshold in EOI (14/16) at index, but this was greatly reduced by follow-up.

*Differences between high- and low-EE environments* Rosenfarb et al. [48], examining a sample of 22 FEP patients and their families, found non-significant differences regarding the ways in which patients from high- and low-EE environments appraised and coped with a non-familial societal stressor. Patients from high-EE homes were likely to use emotion-based confrontational methods to cope with the crisis, in a manner similar to the way they had been observed coping with family conflict: they more readily expressed their anger and frustration than patients from low-EE households, who were likely to use avoidance and denial.

#### *Family burden*

*Prevalence of relatives' psychological distress and FB* Tennakoon et al. [55] found that only the 12 % of caregivers of 36 FEP patients presented with psychiatric morbidity which was comparable to the general population. Addington et al. [51], demonstrated that the 26 % of relatives of 238 FEP patients experienced severe distress and the 21 % moderate distress, whereas FB was also high. Wong et al. [57] assessed FB in a sample of 12 FEP patients. As for objective burden, the researchers found that the pressure to assist the patient in activities of daily living was high, but there was little need to supervise or control behaviors reported, while impact on daily routine was intermediate. As for subjective burden, worry was as high as previously reported for more chronic patients; however, there was a relative absence of displeasure/anger. In a recent study, high levels of distress and negative caregiving experiences were reported by a total of 124 caregivers of FEP patients by Boydell et al. [52]. On the contrary, findings from the study of Gonzalez-Blanch et al. [60] suggested no severe FB among 23 key relatives of FEP patients.

*Factors related to relatives' psychological distress and FB* McCleery et al. [53] found that FB was the most significant predictor of psychological distress in relatives of 113 FEP patients, whereas patients' severity of symptoms or impaired functioning was not linked to psychological distress. These results are congruent with those

obtained by the study of Addington et al. [51]. Even though increased levels of distress were associated with younger patients and a younger age of onset, interestingly, it was the families' appraisal of the impact of the illness rather than the severity of the symptoms that had the greatest impact on their psychological well being. Furthermore, the difficult experiences of being a caregiver were associated with patient's negative and positive symptoms and poor social functioning.

In the study of Tennakoon et al. [55], caregivers of 40 FEP patients had to cope with a wide range of problems, of which the most concerning were patients' difficult behaviors and negative symptoms, and used both emotional and practical coping strategies to handle the patients' illness. Women caregivers reported higher distress than men, especially regarding the effects of the illness on family, and caregivers living with the patient had more frequent visits to their general practitioner. Also, divorced caregivers and caregivers in the professional social class reported higher distress than married caregivers and those in the skilled working class, respectively. Moller-Leimkuhler [61], who examined a sample of 83 key relatives of first-episode patients with schizophrenia and depression, found no association between relatives' psychological distress and patients' severity of illness, kind of symptoms and psychosocial functioning. FB was significantly associated with several psychosocial resources and dispositions of the relatives, including EE, the extent of their illness-related emotion-focused coping and their generalized negative stress response. In the 2-year follow-up [62], a cohort of 60 key relatives was re-assessed, and the results indicated that EE, neuroticism, generalized negative stress response and life stressors were the best predictors of burden. The analysis of the relationship between the components of FB and EE in the study of Gonzalez-Blanch et al. [60] showed that both subjective and objective FB were highly correlated with EOI, but not with CC. Similarly, Alvarez-Jimenez et al. [58] found that burden reported by 48 relatives of FEP patients at follow-up was a function of baseline EOI and patients' depressive symptoms. These findings replicated previous results of Patterson et al. [47, 63] which demonstrated that burden was a strong feature mainly of the high EOI relationship, and subjective burden of carers was linked to loss, but not to EE status.

Wolthaus et al. [56] examined the contribution of patients' personality traits and symptom severity in FB in a cohort of 138 patients with a first or second psychotic episode and 103 relatives. Focused on the five symptom dimensions (positive, negative, depression, agitation excitement, and disorganization), the researchers found that disorganization symptoms contribute significantly to FB, while the agitation excitement symptoms only predicted worrying. On the contrary, patients' personality

traits have not been shown to play a modifying role in FB. Ryder et al. [54], who compared 18 Chinese Canadian and 36 Euro-Canadian FEP patients and their relatives, found that Chinese caregivers, who had a more negative conceptualization of mental illness, thus were more affected by the stigma, were experiencing more objective and subjective burden as compared with Euro-Canadian caregivers. Cotton et al. [59] demonstrated that FB was associated with a reduction in patients' QoL. Boydell et al. [52] noted that higher levels of burden were reported by male caregivers and those of older age, whereas caregivers' reports of psychological distress and burden did not differ depending on ethnicity or social class. Caregivers who had someone to confide in reported significantly more positive caregiving experiences, but interestingly did not report lower levels of burden. Caregivers of compulsorily admitted patients were significantly more likely to report burden in terms of having "problems with services", and this effect was more pronounced in the Black Caribbean group of caregivers.

**Stability of FB** In the study of McCleery et al. [53], FB improved significantly over the 2-year follow-up period. Families of FEP patients rated highest on developmental burden with the least severe scores on social and emotional burden, and significant reduction over time was noted on total scores. Most of the improvement on time-dependence burden occurred in the first 6 months. Any improvement in developmental burden occurred in the first 6 months, but this dimension continued to be rated higher over the rest of the time. Physical burden took 2 years to improve. Moller-Leimkuhler and Obermeier [62], who assessed a cohort of 60 key relatives in a 2-year follow-up period, found that FB improved significantly, mainly due to the improvement of the patients' psychosocial functioning. This decrease in burden occurred during the first year and remained stable during the second year. Nevertheless, caregivers' scores on actual well being and self-rated symptoms, especially depressive symptoms, continued to remain elevated indicating ongoing psychological strain.

## Discussion

Today, families of mental health patients are actively participating in the care of their relative. Families can and do play a significant role in the recovery efforts of FEP patients and relatives may be encouraged to be therapeutic agents in the process of patients' psychosocial rehabilitation. To the best of our knowledge, this is the first systematic review of family functioning in FEP. The results of our study indicated that the effect of FEP on both the patients and their families constitutes an issue of great importance.

## Expressed emotion

The stressful family environment has been extensively studied in FEP using the concept of EE. The majority of the studies aimed to estimate the prevalence of caregiver's EE, explore its relationship to patients' relapse and define the impact of specific patients' and caregivers' characteristics on EE. The findings indicated a high prevalence of high-EE in caregivers of FEP patients [38, 39, 41, 42, 44, 47, 60], whereas most studies on chronic patients with psychosis found a comparable distribution [65, 66]. There are multiple perspectives leading to an understanding of the similarity of first-episode and chronic patients' relatives regarding their EE status. FEP patients may be at the start of a chronic disease process, and patterns of communication within families and disease course may be comparable to those of chronic patients. However, although relatives' EE is a robust predictor of relapse in chronic schizophrenia [23], in studies of FEP patients this relationship is unclear, partially due to the fact that relatives' attitudes toward the patient were not contaminated by the experience of repeated relapses [38].

Relatives' high-EE status appeared to be independent of the patient's illness-related characteristics [38, 41, 45, 61, 64], but dependent of relatives' attributions [60, 63, 64]. Two main explanatory models have been proposed to account for the nature of EE in relatives of FEP patients. It has been argued that EE is a coping strategy that reduces the perceived stress and burden [64, 67], while alternatively EE may be understood as an adaptive reaction to grief and perceived loss [63]. Kuipers et al. [68], in their cognitive model of caregiving described three common caring styles (positive, emotionally over-involved, and critical and hostile), and suggest that each one needs a targeted package of support. The researchers propose that interventions aimed at modifying the specific maintenance factors involved in the different styles of relationships will optimize therapeutic change both for patients with psychosis and their caregivers [68].

## Family burden

Few studies have focused on FB and relatives' psychological distress in FEP. The majority of the studies distinguished between objective and subjective burden [53, 54, 57, 60–62]. Contrary to assumptions that in the initial period caregivers are at risk of being overwhelmed by the burden of care [69], most research findings indicating low levels to absence of FB and distress [55, 60]. This low prevalence of distress is considered to be comparable to the percentage in the general population, whereas higher rates have been reported among chronic samples [70]. In addition, early in the illness, families report helping patients

and worrying about them, but their lives are not yet disrupted describing only moderate impact on their own daily routine [57]. A possible explanation of these findings may be that in these early stages, characterized with less symptom severity and chronicity, family involvement is not associated with significant disruption in their lives. However, more recent findings suggested high levels of burden and psychological distress among caregivers of FEP patients soon after the onset of the illness [51, 52]. The inconsistency between findings may be due to small samples used by the first three studies, whereas the two latter studies recruited a large community sample.

In theoretical models for FB in chronic psychosis, the amount of burden is explained by a number of patient stressors and caregiver resource variables [71]; however, these data may not be extrapolated easily to FEP populations. The influence of various socio-demographic factors was investigated in relation to relatives' FB and psychological distress. Higher levels of distress have been linked to women caregivers, divorced caregivers, caregivers living with the patient and those came from the professional social class [55], as well as male caregivers and those of older age [52]. Also, increased levels of distress were associated with younger patients and a younger age of onset [51]. Studies included chronic patients have found a well-established trend for higher FB with greater symptom severity and impaired psychosocial functioning [72, 73], but our review on FEP patients has yielded mixed findings, either confirmed [51, 55] or not [53, 61] this association. Furthermore, FB seems to be impacted by disorganization symptoms, which implies that the more manifest and observable behaviors contribute to increased FB [56]. The families' appraisal of the impact of the illness was demonstrated to have greater association with their level of psychological distress than illness-related characteristics [47, 51, 53, 58, 61, 62].

#### Methodological limitations of the studies reviewed

To the best of our knowledge, this is the first and largest, rigorous systematic review examining family functioning in FEP. Despite the strengths of the studies reviewed, several limitations should also be noted. First, the inclusion of only seven studies assessing FB limits generalizability of our conclusions; although reflective of the current state of the literature, additional research is clearly needed. Second, the limited critical evaluation of methodological issues of the studies reviewed should be taken into serious consideration. Cross-sectional design, small samples, and lack of comparison groups are important limitations in this field. Future studies may clarify changes in patient–family relationships in the context of the illness over time using prospective designs and large samples of FEP patients,

whereas the inclusion of comparison groups will allow researchers to eliminate and isolate confounding variables and bias.

A review of available FEP studies suggests marked variability in findings, frequently attributed to the presumed heterogeneity of the disorder, the time of the family's assessment, the family measures used and other methodological issues as mentioned above. Another cause may be variation in definitions and criteria used by the researchers for defining FEP. The term "first-episode psychosis" as used within clinical and research settings is misleading, because it is typically used to refer to individuals early in the course of a psychotic illness or treatment rather than individuals who are truly in the midst of a first "episode" of illness. Thus, the alternative of "recent-onset psychosis" with related definitions based on duration of psychosis is proposed [74]. In our review, the vast majority of the studies used clear and well-defined criteria for sampling FEP patients. Several studies recruited first-admitted patients, but without specifying the time of family assessment [39, 41, 42, 47, 49, 50, 63] with the exception of the Munich 5-year follow-up study [61, 62]. Some studies sampled patients who were experiencing a FEP and had not received more than 3 [51], 6 [44, 58, 59] or 12 [43] months of prior treatment with antipsychotic medication. Fewer studies included patients with onset of a psychotic disorder within 2 years [46, 48], or patients with first or second psychotic episode [56]. Finally, six studies did not use specified criteria for FEP [38, 45, 52, 60, 64]. A final limitation is that the research into EE has only examined beliefs about the illness held by the relatives. Only one study is identified that assessed both patients' and caregivers' perceptions of EE [46], while recent family literature has emphasized the importance of obtaining information from multiple sources.

#### Future research

From the research presented thus far it can generally be concluded that the diagnosis and the often poorly understood experience of psychosis increases family EE which may then contribute to an overall increase in FB and caregivers' psychological distress. The degree to which the family adapts affects both the family's well being and the recovery of the patient. Thus, it is important for the family to remain functional to support the patient and prevent further deterioration by providing a supportive and safe environment, especially in the first stages of the illness. These data suggest that early interventions to support and educate the family about the illness may be more successful compared to interventions at later stages of the illness. Family work with FEP families could address carers' individual needs and concerns in the very early stages, with the hope of attenuating those factors which generate

an adverse family atmosphere and thus promoting caregivers' psychological well being [75]. Also, family interventions that enhance the caregiving capacity of family members, reducing in this way the stress associated with their caregiving roles, have a clinically significant impact on the course of psychosis [76]. Future studies should test this hypothesis to delineate the impact of psychosocial interventions focusing on the care of FEP patients and their families in community settings.

Finally, instead of focusing on a single dimension, such as EE, an approach which embraces a broader view of family functioning would appear more useful. Evaluating family functioning in terms of cohesion and adaptability may provide a comprehensive picture of family interactions in FEP. In general, families of psychiatric patients are expected to experience higher levels of dysfunction (i.e., very high or very low levels of cohesion and adaptability) as compared to non-clinical families. The family system changes over the course of a few months following a FEP as family members adapt to the illness. Assessing families during the stressful period immediately after a member has had an exacerbation of, and hospitalization for, a psychiatric illness may highlight specific areas to target for family interventions.

**Conflict of interest** The authors have no conflicts of interest to declare.

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## 4.4. Paper 4

### Identifying the socio-demographic and clinical determinants of family functioning in Greek patients with psychosis\*

**Koutra, K.**, Triliva, S., Roumeliotaki, T., Lionis, C., & Vgontzas, A.N.

**Background:** Studies on determinants affecting family functioning of patients with psychosis are still limited in Greece. **Aim:** The aim of the present study was to describe the socio-demographic and clinical characteristics associated with family functioning in patients with schizophrenia and bipolar disorder in Crete, Greece. **Methods:** A total of 100 patients and their caregivers agreed to participate in the study. Family functioning was assessed in terms of cohesion, adaptability, communication and satisfaction dimensions (Family Adaptability and Cohesion Evaluation Scale IV Package), expressed emotion (Family Questionnaire), family burden (Family Burden Scale) and caregivers' psychological distress (General Health Questionnaire - 28). Multivariate linear regression models were implemented to examine the associations between each one of the family measures and different social and clinical characteristics. **Results:** With regard to the caregivers' characteristics, gender, employment status, origin, residence, financial status, relation to the patient, contact with the patient and family structure, were among the most significant determinants of family functioning. Also, patients' socio-demographic characteristics including age, education, origin, residence, and employment status, as well as illness-related factors, such as onset of mental illness, number of hospitalisations, last hospitalisation, longer hospitalisation and clinical diagnosis impacted intrafamilial relationships. **Conclusion:** The results of the present study suggest that a number of social and clinical factors contributed to the family environment of patients with psychosis. Identifying the determinants of family functioning in psychosis is instrumental in developing understandings regarding the factors which may contribute to the rehabilitation or relapse of the patient and the support required to strengthen positive family interactions.

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# Identifying the socio-demographic and clinical determinants of family functioning in Greek patients with psychosis

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## Abstract

**Background:** Studies on determinants affecting family functioning of patients with psychosis are still limited in Greece. **Aim:** The aim of this study was to describe the socio-demographic and clinical characteristics associated with family functioning in patients with schizophrenia and bipolar disorder in Crete, Greece.

**Methods:** A total of 100 patients and their caregivers agreed to participate in the study. Family functioning was assessed in terms of cohesion, adaptability, communication and satisfaction dimensions (Family Adaptability and Cohesion Evaluation Scale IV Package), expressed emotion (Family Questionnaire), family burden (Family Burden Scale) and caregivers' psychological distress (General Health Questionnaire-28). Multivariate linear regression models were implemented to examine the associations between each one of the family measures and different social and clinical characteristics.

**Results:** With regard to the caregivers' characteristics, gender, employment status, origin, residence, financial status, relation to the patient, contact with the patient and family structure were among the most significant determinants of family functioning. Also, patients' socio-demographic characteristics, including age, education, origin, residence and employment status, as well as illness-related factors, such as onset of mental illness, number of hospitalisations, last hospitalisation, longer hospitalisation and clinical diagnosis impacted intrafamilial relationships.

**Conclusion:** The results of this study suggest that a number of social and clinical factors contributed to the family environment of patients with psychosis. Identifying the determinants of family functioning in psychosis is instrumental in developing understandings regarding the factors which may contribute to the rehabilitation or relapse of the patient and the support required to strengthen positive family interactions.

## Keywords

Family functioning, expressed emotion, family burden, psychological distress, socio-demographic determinants, illness-related features

## Introduction

The study of family in relation to schizophrenia has changed dramatically over the last five decades. In the 1960s and 1970s, the family was implicated in the aetiology of schizophrenia (Goldstein, 1988), and certain family structures and communication patterns were considered to be contributing factors to the development and the maintenance of the disease (Lam, 1991). However, with the trend of deinstitutionalisation of psychiatric patients and the simultaneous growth of community mental health services, the onus for the patient's care has been transferred to family members (Bloch, Szmukler, Herrman, Benson, & Colussa, 1995), and the focus of both research and in-service provision moved towards the study of intrafamilial relationships and how the family context can best support and care for patients with psychosis.

Most of the research on family functioning of patients with psychosis examined certain aspects of intrafamilial transactions. Two attributes that have been studied extensively are the following: (1) the affective attitudes and

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behaviours expressed to the patient from his or her family members, usually characterised as expressed emotion (EE), and (2) the burden of care. EE has been extensively researched across psychiatric disorders as the strongest family factor that influences the course of an illness (Butzlaff & Hooley, 1998; Cechnicki, Bielańskab, Hanuszkiewicz, & Darenb, 2013; Hooley, 2007). EE constitutes the amount of relatives' critical comments (CCs), hostility (H) and/or emotional over-involvement (EOI) towards the patient (Brown, 1985). CCs express dislike or disapproval of the patient's behaviour, H reflects disapproval or rejection of the patient and EOI includes an exaggerated or overprotective attitude towards the patient, as demonstrated by an intrusive style of relating and the carer's evident emotional distress. Family burden (FB) refers to the negative impact of the individual's mental disorder on the entire family (Biegel & Schultz, 1999; Schene, 1990), and it is often the result of the addition of the caregiving role to already existing family roles (Schene, 1990). Burden is distinguished into two types: objective burden, which involves the disruption to the family/household due to the individual's illness (Szmukler, 1996), and subjective burden, which involves the psychological consequences of the individual's illness for the family (Schene, Tessler, & Gamache, 1994). It has long been established that families of patients with psychosis experience a great deal of FB (Bulger, Wandersman, & Goldman, 1993) in different life domains, including reduction of subjective health (Vaddadi, Soosai, Gilleard, & Adlard, 1997; Wittmund, Wilms, Mory, & Angermeyer, 2002), restrictions in leisure time, daily routine and social contacts, problems in working life, coping with the patients' symptoms and emotional problems (L. Kuipers, 1993; Provencher, 1996).

The contribution of social and clinical factors on family functioning of patients with psychosis has been the focus of limited research. Recent investigations suggest that a variety of both patients' and caregivers' socio-demographic characteristics, as well as clinical variables, may affect family environment. Specifically, socio-demographic characteristics, such as the caregiver's not being a spouse or being a father, unemployed and the patient's being young and unmarried, were found to be related to family EE (Heikkila et al., 2002; Mo, Chung, Wong, Chun, & Wong, 2008). Additionally, caregivers' female gender, age and educational level, financial status and hours spent per day on providing care, as well as patients' young age, male gender and marital status, were recognised as important predictors of FB (Caqueo-Urizar & Gutierrez-Maldonado, 2006; Li, Lambert, & Lambert, 2007; Roick et al., 2007; Schneider, Steele, Cadell, & Hemsworth, 2011). In a similar vein, the high level of caregivers' EE status was associated with increased number of patients' previous hospitalisations (Bertrando et al., 1992; Mavreas, Tomaras, Karydi, Economou, & Stefanis, 1992; Vaughan

et al., 1992), whereas clinical characteristics, such as symptom type and severity, impaired functioning and higher frequency of relapses, were found to predict FB (Grandon, Jenaro, & Lemos, 2008).

However, family functioning is a multifaceted concept which includes numerous constructs, such as family cohesion, flexibility and communication, as well as family members' satisfaction from the way their family functions. Within the Circumplex Model of Marital and Family Systems (Olson, Sprenkle, & Russell, 1979), family cohesion represents the balance between closeness and individuation (Olson, 1993), flexibility represents the balance between stability and change (Olson & Gorall, 2006), whereas communication is defined as the positive communication skills used by the family members (Olson & Gorall, 2006), and it is viewed as a facilitating dimension that helps families negotiate cohesion and flexibility issues (Olson, Gorall, & Tiesel, 2007). Research has shown that families of patients with psychosis may have deficits in family cohesion and adaptability as compared to non-clinical families (Friedmann et al., 1997; Sun & Cheung, 1997).

To the best of our knowledge, no study has explored in depth the effect of both caregivers' and patients' socio-demographic characteristics, as well as clinical features of the illness, in family functioning of patients with psychosis, as reflected through family cohesion and adaptability, whereas such research with regard to EE and FB is limited. Furthermore, studies on determinants affecting family functioning are limited in Greece, where family members are the major source of caregiving in psychosis. Recent studies which have been carried out in similar Southern European countries, for example, Italy (Carra, Cazzullo, & Clerici, 2012), have shown that clinical characteristics, such as the number of patient's previous hospitalisations or the duration of illness, were not associated with high levels of caregiver's EE; however, patient's previous psychosocial functioning, as measured by educational level, seemed to protect the caregivers from high-EE status.

The aim of this study is to describe the socio-demographic and illness-related characteristics associated with family functioning in psychosis and to identify the determinants of unhealthy family functioning in a sample of patients and their families in Heraklion, Crete, Greece. On the basis of the existing literature, it is predicted that both socio-demographic and illness-related factors would have an effect on unhealthy family functioning in psychosis. Understanding the nature and development of unhealthy family functioning is critical in formulating effective interventions. Instead of focusing on a single dimension, such as EE or FB, an approach which embraces a broader view of family functioning encompassing constructs, such as cohesion and adaptability, would appear more useful. Such knowledge may increase our understanding of the intrafamilial relationships of patients with psychosis, thereby

making it easier to identify patients and relatives who need intervention.

## Methods

### Participants

A total of 104 patients consecutively admitted to the Psychiatric Clinic of the University Hospital of Heraklion, Crete, Greece, and their family caregivers were contacted and informed about the purpose of this study during a 12-month period (October 2011–October 2012). Finally, 100 (response rate = 96.1%) patients and their family caregivers agreed to participate (50 patients with a first episode psychosis and 50 patients with chronic psychosis). The key caregiver was defined as the person who provides the most support devoting a substantial number of hours each day in taking care of the patient. To be eligible for inclusion in the study, the patients had to meet the following criteria: (1) to be between 17 and 40 years old, (2) to have a good understanding of the Greek language, (3) to have been out of hospital for at least 6 weeks and considered stabilised by their treating psychiatrist, (4) to be living with a close relative and (5) to have a diagnosis of schizophrenia or bipolar disorder according to *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text rev.; DSM-IV-TR) or International Classification of Disease (ICD-10) and with no evidence of organicity, significant intellectual handicap or primary diagnosis of substance abuse. Inclusion criteria for the caregivers were as follows: (1) to be between 18 and 75 years old, (2) to have a good understanding of the Greek language, (3) to have no diagnosed psychiatric illness and (4) to be either living with or directly involved in the care of the patient.

### Procedure

Caregivers were interviewed by the first author (K.K.) in individual sessions in the Psychiatric Clinic of the University Hospital of Heraklion, Crete, Greece, where participants were asked to take part in a study assessing family functioning of patients with schizophrenia and bipolar disorder. Caregivers were given an information sheet describing the aims of the study. The time needed to complete the interview was approximately 75–90 minutes. Patients' socio-demographic and clinical data were extracted from medical records and confirmed during the interview by the caregivers, whereas patients' symptoms and functioning were assessed by their treating psychiatrist within 2 weeks from the caregivers' assessment. All participants involved in this study were informed about the scope and the purpose of the study and provided written informed consent. The study was approved by the Ethical Committee of the University Hospital in Heraklion, Crete, Greece.

## Measures

**Socio-demographic characteristics.** Socio-demographic characteristics, such as caregiver's gender, age, education, marital status, employment status, origin and current residence, financial status, family structure, relation to the patient, contact with the patient and so on were collected through structured questionnaires administered by the researchers. The socio-demographic indicators of the patient included the characteristics mentioned previously and the following: clinical diagnosis, illness's onset, patient's age at illness's onset, hospitalisation to psychiatric clinic, longer and last hospitalisation and therapeutic interventions.

**Family Adaptability and Cohesion Evaluation Scales IV Package.** Family functioning was assessed by means of the Family Adaptability and Cohesion Evaluation Scales IV Package (FACES IV Package) (Olson et al., 2007). The FACES IV Package contains the six scales from FACES IV, as well as the Family Communication Scale (FCS) and the Family Satisfaction Scale (FSS), and includes 62 items in total. The scales are self-reports, and they can be completed by all family members over the age of 12 years.

FACES IV (Olson et al., 2007) measures family functioning in terms of family cohesion and flexibility. The instrument contains six scales comprised of seven items each, with a total of 42 items. Each family member rates his or her agreement or disagreement with how well each item describes his or her family by selecting among the five alternative responses: 1 = *strongly disagree*, 2 = *generally disagree*, 3 = *undecided*, 4 = *generally agree* and 5 = *strongly agree*. FACES IV displays a six-factor structure of family functioning. There are two balanced scales that assess Balanced Cohesion and Balanced Flexibility and four unbalanced scales assessing the high and low extremes of Cohesion and Flexibility – Disengaged and Enmeshed for cohesion, and Rigid and Chaotic for flexibility. These scales display high levels of reliability and validity (Gorall, Tiesel, & Olson, 2006). Higher scores on the balanced scales are indicative of healthier functioning, and the converse holds truth for the unbalanced scales. In addition, three additional ratio scores can be calculated with FACES IV (Cohesion, Flexibility and Total Circumplex). When each score of the Cohesion and Flexibility ratios is at one and higher, the family system has more balanced levels of Cohesion and Flexibility. When the Total Circumplex ratio is one or higher, the family system is viewed as more balanced and functional.

FCS (Olson & Barnes, 1996) is a 10-item scale which addresses many of the most important aspects of communication in a family system. The respondents are asked to state the degree of their agreement or disagreement with how well each item describes their families by selecting among the five alternative responses (1 = *strongly disagree*,

2 = *generally disagree*, 3 = *undecided*, 4 = *generally agree* and 5 = *strongly agree*). A higher score on the scale indicates more positive communication in family system.

FSS is, also, a 10-item scale that assesses the satisfaction of family members in regard to family cohesion, flexibility and communication (Olson, 1995). The respondents are asked to state how satisfied or dissatisfied are they for each item describing their families by selecting among the five alternative responses (1 = *very dissatisfied*, 2 = *somewhat dissatisfied*, 3 = *generally satisfied*, 4 = *very satisfied*, 5 = *extremely satisfied*). A higher score on the scale indicates greater satisfaction in family system.

The FACES IV Package has been translated and validated for the Greek population by Koutra, Triliva, Roumeliotaki, Lionis, and Vgontzas (2012) and has demonstrated good psychometric properties.

**Family Questionnaire.** EE was measured via the Family Questionnaire (FQ) (Wiedemann, Rayki, Feinstein, & Hahlweg, 2002). The FQ is a 20-item self-report questionnaire measuring the EE status of relatives of patients with schizophrenia in terms of EOI and CC. EOI includes unusually over-intrusive, self-sacrificing, overprotective or devoted behaviour, exaggerated emotional response and over-identification with the patient, whereas CC is defined as an unfavourable comment on the behaviour or the personality of the person to whom it refers (Leff & Vaughn, 1985). The measure consists of 10 items for each subscale. Responses range from 1 = *never/very rarely* to 4 = *very often* and a higher total score indicates higher EE. The developers provide a cut-off point of 23 as an indication of high CC and 27 for EOI. The FQ has excellent psychometric properties, including a clear factor structure, good internal consistency of subscales and inter-rater reliability in relation to the Camberwell Family Interview (CFI) (Leff & Vaughn, 1985) of EE. The FQ has been translated and validated for the Greek population by Koutra et al. (2014) and has demonstrated good psychometric properties.

**Family Burden Scale.** The Family Burden Scale (FBS; Madianos et al., 2004) was used to measure FB. The FBS consists of 23 items. The four FBS dimensions are defined as follows: (A) impact on daily activities/social life (eight items) – defined in terms of burden experienced regarding disruption of daily/social activities; (B) aggressiveness (four items) – captures the presence of episodes of hostility, violence and serious damages at home; (C) impact on health (six items) – shows signs and psychopathological symptoms reported by the family caregiver; and (D) economic burden (five items) – defined in terms of financial problems created by the patient's illness. Factors A, B and D items tap objective burden, whereas C items underlie subjective burden. The scale has been originally developed and standardised for the Greek population and has demonstrated good psychometric properties. The developers

provide a cut-off point of 24 (for the total scale score) to indicate high levels of burden.

**General Health Questionnaire.** The General Health Questionnaire-28 (GHQ-28) item version (Goldberg et al., 1997), a self-administered instrument that screens for non-psychotic psychopathology in clinical and non-clinical settings, was used to assess relatives' psychological distress. Its four subscales measure somatic symptoms, anxiety/insomnia, social dysfunction and severe depression. In this study, the Likert scoring procedure (0, 1, 2, 3) is applied providing a more acceptable distribution of scores and the total scale score ranges from 0 to 84. Higher scores on the scale are indicative of poorer psychological well-being. The cut-off score for identifying cases of psychiatric disorder is 23/24 for Likert scoring. The 28-item version of this instrument has been adapted for the Greek population by Garyfallos et al. (1991) and has demonstrated good psychometric properties.

### Statistical analysis

We decided to conduct first univariate analysis to examine crude associations between each one of the exposures and the family outcomes. Additionally, we run multivariate analyses to investigate the relationship between exposures and outcomes after controlling for the potential effect of several confounders.

Bivariate associations between normally distributed continuous dependent variables (family variables) and categorical independent variables (socio-demographic and clinical characteristics) were studied using either Student's *t*-test or analysis of variance (ANOVA). Bivariate associations between non-normally continuous dependent variables (family variables) and categorical independent variables (socio-demographic and clinical characteristics) were studied using non-parametric statistical methods (Mann-Whitney and Kruskal-Wallis tests). Pearson's *r* or Spearman's rho correlation coefficient was used to estimate the strength of the association between continuous dependent and independent variables. Multivariate linear regression models were implemented to examine the associations between family variables with socio-demographic and clinical characteristics, entered simultaneously in the models. Separate multivariate models were built having as an outcome each one of the subscales of FACES IV Package, FQ, FBS and GHQ-28. The determinants related to each specific scale with  $p < .05$  in the univariate analysis were included in each model. Estimated associations are described in terms of  $\beta$ -coefficients (beta) and their 95% confidence intervals (CIs). All hypothesis testings were conducted assuming a .05 significance level and a two-sided alternative hypothesis. All statistical analyses were performed using SPSS Statistics 19 software (IBM, Armonk, NY, USA).

## Results

### *Sample characteristics*

As far as caregivers' characteristics are concerned, our sample consisted of 15 males (15.0%) and 85 females (85.0%), ranging in age from 28 to 75 years with a mean age of 56.80 years (standard deviation (*SD*) = 9.98). The 64.0% had finished elementary or high school, and the vast majority of the sample (72.0%) were not working. The 82.0% were living in urban areas, and the 63.0% were married. Finally, 92.0% were parents, 81.0% were living with the patient and 95.0% had daily contact with the patient. In terms of family structure, the 64.0% of the families were two-parent families, while the 36.0% were one-parent families.

Regarding patients' socio-demographic and clinical characteristics, the sample consisted of 66 males (66.0%) and 34 females (34.0%), ranging in age from 17 to 40 years with a mean age of 31.09 years (*SD* = 5.75). The vast majority of the patients were single (85.0%), they came from urban areas (91.0%) and they were living in urban areas (86.0%). Half of the sample had finished lyceum or had some years in university. The 86.0% were not working at the time of the assessment, whereas almost half of the sample had no income. As far as diagnosis is concerned, 82.0% of the patients had a diagnosis of schizophrenia spectrum disorders and 18.0% had a diagnosis of bipolar disorder. The patients had an onset of illness between 15 and 39 years of age with a mean age of 24.03 years (*SD* = 5.48). Half of the patients had an onset of illness at 4 years or longer, 50.0% had one hospitalisation and 40.0% had 2–4 hospitalisations. The length of longer hospitalisation was up to 20 days for 65.0% of the sample, and more than 20 days for 35.0% of the sample.

### *Socio-demographic and clinical characteristics and family cohesion and adaptability, multivariate analysis*

Table 1 presents the results of the multivariate analysis. Spouses or siblings of patients tended to score lower in Balanced Cohesion and Cohesion Ratio, and higher in the Chaotic scale than parents. Caregivers who had contact with the patients 1–2 times/week scored lower in Balanced Cohesion, higher in the Disengaged and lower in the Enmeshed scales as compared to relatives who had daily contact with the patients. Single-parent families scored significantly higher in the Disengaged scale than two-parent families. Caregivers' financial status was related to the Enmeshed scale indicating that caregivers with income <€10,000 tended to score lower in the Enmeshed scale as compared to those with no individual income.

Regarding patients' characteristics, caregivers of medium-educated patients scored significantly lower in the Rigid scale and higher in Flexibility Ratio, while caregivers of highly educated patients had lower scores in the Rigid and Chaotic scales and higher in Flexibility Ratio as

compared with caregivers of low educated patients. Caregivers of patients who came from rural areas had higher scores in the Enmeshed scale. Increased number of patient's hospitalisations was related to lower levels of Balanced Cohesion, Balanced Flexibility and Flexibility Ratio. Caregivers of patients with bipolar disorder tended to have higher scores in the Rigid scale than caregivers of patients with schizophrenia. Caregivers of patients with an onset of mental illness of 1–4 years scored lower in Balanced Cohesion, whereas caregivers of patients with an onset of mental illness of 4 years or more scored higher in the Chaotic scale and lower in Cohesion Ratio and Flexibility Ratio than those of patients with an onset of illness of 12 months or less. Finally, caregivers of patients whose last hospitalisation was >1 year scored higher in Cohesion Ratio than those whose last hospitalisation was up to 6 months.

### *Socio-demographic and clinical characteristics and family communication and satisfaction, multivariate analysis*

As far as the two additional scales of FACES IV Package – communication and satisfaction – are concerned (Table 2), a negative association between relation to patient and satisfaction was observed contributing to almost an 11-point decrease in spouses or siblings' satisfaction as compared to parents. Caregivers of highly educated patients had significantly higher scores in both communication and satisfaction scales as compared to caregivers of patients with lower levels of education.

Caregivers of patients with an onset of mental illness of 1–4 years or 4 years or more scored significantly lower in satisfaction in comparison with those of patients with an onset of illness of 12 months or less. Finally, increased number of patient's hospitalisations was related to lower levels of satisfaction.

### *Socio-demographic and clinical characteristics and family EE, multivariate analysis*

Higher levels of EOI were reported by female caregivers, those who were living in rural areas and those who were not working. Increased number of patient's hospitalisations was found to be significantly correlated with higher levels of caregivers' EOI. One-parent families reported higher levels of CC as compared to two-parent families, while caregivers of patients who were living in rural areas were less critical as compared to those who were living in urban areas (Table 3).

### *Socio-demographic and clinical characteristics and FB, multivariate analysis*

Relatives caring for patients who were not working reported higher economic burden than those who were working. Patient's onset of mental illness of 4 years or

Table 1. Socio-demographic and clinical determinants of family cohesion and flexibility, multivariate analysis.

Family Adaptability and Cohesion Evaluation Scale IV									
	Balanced Cohesion <sup>a</sup>	Balanced Flexibility <sup>a</sup>	Disengaged <sup>a</sup>	Enmeshed <sup>a</sup>	Rigid <sup>a</sup>	Chaotic <sup>a</sup>	Cohesion Ratio <sup>a</sup>	Flexibility Ratio <sup>a</sup>	Total ratio <sup>a</sup>
	β (95% CI)	β (95% CI)	β (95% CI)	β (95% CI)	β (95% CI)	β (95% CI)	β (95% CI)	β (95% CI)	β (95% CI)
<b>Caregivers' characteristics</b>									
Residence									
Rural vs urban	-	-	-3.42 [-8.48, 1.63]	-	-	-	-	-	-
Marital status									
Married vs single	-	1.61 [-6.12, 9.33]	1.95 [-6.30, 10.19]	-	-	-	-	-	-
Divorced/widow vs single	-	3.07 [-3.43, 9.58]	-6.15 [-14.22, 1.92]	-	-	-	-	-	-
Financial status									
<€10,000 vs no income	-	-	-	-2.58 [-4.73, -0.42] <sup>b</sup>	-	-	-	-	-
Relation to patient									
Other vs parent	-5.91 [-10.38, -1.44] <sup>b</sup>	-	3.02 [-1.80, 7.85]	-	-	8.83 [4.29, 13.37] <sup>b</sup>	-0.82 [-1.33, -0.30] <sup>b</sup>	-	-
Contact with the patient									
1-2 times/week vs daily	-6.08 [-11.55, -0.61] <sup>b</sup>	-	8.40 [2.73, 14.08] <sup>b</sup>	-4.64 [-9.10, -0.18] <sup>b</sup>	-	-	-	-	-
Family structure									
One-parent vs two-parent family	-2.12 [-4.70, 0.45]	-3.47 [-10.28, 3.35]	9.36 [1.66, 17.06] <sup>b</sup>	-	-	-	-0.25 [-0.55, 0.05]	-0.19 [-0.42, 0.04]	-0.23 [-0.48, 0.03]
<b>Patients' characteristics</b>									
Age									
Years	-0.05 [-0.31, 0.20]	-0.07 [-0.29, 0.15]	-	-	-	-	-0.00 [-0.03, 0.03]	-0.00 [-0.03, 0.02]	-0.00 [-0.03, 0.02]
Education									
Medium vs low	-	2.13 [-0.14, 4.39]	-	-	-2.20 [-4.23, -0.17] <sup>b</sup>	-0.98 [-3.58, 1.62]	-	0.27 [0.04, 0.50] <sup>b</sup>	0.24 [-0.02, 0.50]
High vs low	-	3.91 [-0.19, 8.01]	-	-	-3.81 [-7.18, -0.44] <sup>b</sup>	-5.13 [-9.42, -0.84] <sup>b</sup>	-	0.61 [0.23, 1.00] <sup>b</sup>	0.42 [-0.01, 0.85]
Origin									
Rural vs urban	-	-	-	3.32 [-0.19, 6.83] <sup>b</sup>	-	-	-	-	-
Residence									
Rural vs urban	-	-	-0.43 [-5.99, 5.13]	-	-	-	-	-	-
Diagnosis									
Bipolar disorder vs schizophrenia	-	-	-	2.78 [0.23, 5.34]	3.88 [1.39, 6.36] <sup>b</sup>	-	-	-	-
Onset of mental illness									
1-4 years vs ≤12 months	-6.08 [-11.55, -0.61] <sup>b</sup>	-0.25 [-3.28, 2.78]	-	-	-	2.59 [-0.88, 6.08]	-0.26 [-0.66, 0.14]	-0.09 [-0.40, 0.22]	-0.14 [-0.49, 0.21]
>4 years vs ≤12 months	-2.12 [-4.70, 0.45]	-2.26 [-5.44, 0.92]	-	-	-	4.61 [1.31, 7.92] <sup>b</sup>	-0.46 [-0.88, -0.05] <sup>b</sup>	-0.33 [-0.65, -0.01] <sup>b</sup>	-0.35 [-0.71, 0.01]
Last hospitalisation									
7-12 months vs up to 6 months	-	-	-	-	-	-	-0.29 [-0.60, 0.02]	-	-
>1 year vs up to 6 months	-	-	-	-	-	-	1.01 [0.19, 1.83] <sup>b</sup>	-	-
Number of hospitalisations									
Hospitalisations	-0.29 [-1.22, -0.07] <sup>b</sup>	-0.71 [-1.23, -0.20] <sup>b</sup>	0.23 [-0.27, 0.72]	-	-	0.26 [-0.32, 0.85]	-0.06 [-0.13, 0.01]	-0.33 [-0.11, -0.00] <sup>b</sup>	-0.04 [-0.09, 0.02]

CI: confidence interval.

βi-coefficients and 95% CIs are retained from linear regression models and adjusted for all the variables that were significant in the univariate analysis. Variables indicated with a long dash (-) were not included in the respective model.

<sup>b</sup>p < .05.

**Table 2.** Socio-demographic and clinical determinants of family communication and satisfaction, multivariate analysis.

	Family Adaptability and Cohesion Evaluation Scale IV			
	Communication <sup>a</sup>		Satisfaction <sup>a</sup>	
	$\beta$	95% CI	$\beta$	95% CI
<b>Caregivers' characteristics</b>				
Relation to patient				
Other vs parent	–	–	–10.84	[–17.83, –3.85] <sup>b</sup>
<b>Family structure</b>				
One-parent family vs two-parent family	–3.58	[–7.41, 0.25]	–	–
<b>Patients' characteristics</b>				
<b>Age</b>				
Years	–0.07	[–0.45, 0.31]	–0.13	[–0.52, 0.26]
<b>Education</b>				
Medium vs low	3.80	[–0.05, 7.64]	2.69	[–1.34, 6.71]
High vs low	8.35	[1.98, 14.72] <sup>b</sup>	7.32	[0.76, 13.87] <sup>b</sup>
<b>Onset of mental illness</b>				
1–4 years vs $\leq$ 12 months	–1.02	[–6.16, 4.11]	–5.61	[–10.94, –0.28] <sup>b</sup>
>4 years vs $\leq$ 12 months	–2.81	[–8.11, 2.47]	–7.32	[–12.73, –1.91] <sup>b</sup>
<b>Number of hospitalisations</b>				
Hospitalisations	–0.86	[–1.73, 0.01]	–0.90	[–1.80, –0.01] <sup>b</sup>

CI: confidence interval.

<sup>a</sup> $\beta$ -coefficients and 95% CIs are retained from linear regression models and adjusted for all the variables that were significant in the univariate analysis. Variables indicated with a long dash (–) were not included in the respective model.

<sup>b</sup> $p < .05$ .

more was found to be significantly correlated with family's higher economic burden. Increased number of patient's hospitalisations was related to an adverse impact in family's daily activities and social life and higher levels of patients' aggressiveness. Patients' hospitalisation of 20 days and longer was related to an adverse impact in family's daily activities and social life. Only clinical variables, such as patient's onset of mental illness of 4 years or more and increased number of patient's hospitalisations, were related to caregivers' objective burden, whereas patient's onset of mental illness of 4 years or more was also related to total burden (Table 4).

#### *Socio-demographic and clinical characteristics and caregivers' psychological distress, multivariate analysis*

Caregivers living in rural areas reported less anxiety and insomnia symptoms than those living in urban areas. Increased levels of social dysfunction were reported by caregivers who were not working, as well as caregivers of older patients, and caregivers of patients who had been hospitalised for 20 days and longer. On the contrary, caregivers of patients who came from rural areas reported less social dysfunction (Table 5).

## **Discussion**

This study was carried out to provide insight into the family assessment of patients with psychosis by analysing the

socio-demographic and clinical determinants affecting family functioning in Crete, Greece. This is the first study evaluating simultaneously the effect of socio-demographic and illness-related characteristics on family cohesion and adaptability and is among the few similar studies evaluating several aspects of family functioning of mental health patients in Greece. Finally, our study replicated previous findings and provided some new evidence as well, regarding the effect of several socio-demographic and clinical factors on caregivers' EE, FB and psychological distress.

#### *The role of socio-demographic characteristics on family relationships*

Caregiver's relationship to and contact with the patient were found to significantly impact family cohesion and adaptability. Specifically, we found that spouses or siblings had lower scores on Balanced Cohesion and higher scores on the Chaotic scale (very high levels of flexibility) as compared to parents. These families presented less cohesion and lower levels of satisfaction. Caregivers who had contact with the patients 1–2 times/week reported lower levels of Balanced Cohesion and significantly higher and lower scores in the two unbalanced scales of cohesion – Disengaged (very low levels of cohesion) and Enmeshed (very high levels of cohesion) – respectively. One-parent families, most of whom were female-headed in our study, had also higher scores in the Disengaged scale. Also, caregivers with no income had higher levels in Enmeshed scale (very high levels of cohesion). The higher the

**Table 3.** Socio-demographic and clinical determinants of family expressed emotion, multivariate analysis.

	Family questionnaire			
	Emotional over-involvement <sup>a</sup>		Critical comments <sup>a</sup>	
	$\beta$	95% CI	$\beta$	95% CI
<b>Caregivers' characteristics</b>				
Age				
Years	0.01	[-0.12, 0.13]	-	-
Gender				
Female vs male	4.34	[1.22, 7.46] <sup>b</sup>	-	-
Origin				
Rural vs urban	2.25	[0.03, 4.47] <sup>b</sup>	-	-
Employment status				
Not working vs working	2.51	[0.01, 5.03] <sup>b</sup>	-	-
Contact with the patient				
1-2 times/week vs daily	-	-	5.48	[-1.25, 12.20]
Family structure				
One-parent vs two-parent family	-	-	2.95	[0.28, 6.17] <sup>b</sup>
Number of family members				
Family members	-	-	-0.71	[-1.90, 0.47]
<b>Patients' characteristics</b>				
Age				
Years	-	-	0.01	[-0.30, 0.31]
Residence				
Rural vs urban	-	-	-4.44	[-8.62, -0.26] <sup>b</sup>
Number of children				
Children	-1.34	[-2.85, 0.16]	-	-
Onset of mental illness				
1-4 years vs $\leq 12$ months	-	-	1.61	[-2.55, 5.77]
>4 years vs $\leq 12$ months	-	-	2.61	[-1.65, 6.88]
Number of hospitalisations				
Hospitalisations	0.62	[0.11, 1.12] <sup>b</sup>	0.53	[-0.17, 1.24]

CI: confidence interval.

<sup>a</sup> $\beta$ -coefficients and 95% CIs are retained from linear regression models and adjusted for all the variables that were significant in the univariate analysis. Variables indicated with a long dash (-) were not included in the respective model.

<sup>b</sup> $p < .05$ .

educational level of the patient, lower the scores in the two unbalanced scales of flexibility (Rigid and Chaotic) and the more balanced the levels of family flexibility, also, higher the scores in communication and satisfaction scales. Finally, patients' rural origin was found to be related to higher scores in Enmeshed scale indicating very high levels of cohesion.

Although research has demonstrated a variety of caregivers' and patients' socio-demographic characteristics which are related to EE, such as the caregiver's not being a spouse or being a father, being unemployed and the patient's being young and unmarried (Heikkila et al., 2002; Mo et al., 2008), as well as having low levels of education (Carra et al., 2012), our study did not support these results. We suggest that the two components of EE – EOI and CC – may be influenced by separate factors. Our findings showed that female caregivers presented higher EOI than males. Given the fact that in our sample the vast majority

of female caregivers were mothers, our findings are consistent with the results of previous research showing that mothers tend to be more over-involved and intrusive as compared to fathers (Bentsen et al., 1996). EOI has been found to be a dominant cultural feature of the behaviour of Greek families (Mavreas et al., 1992). This may be related to the mothers' parenting role, which tends to place them generally in a more nurturing role. Mothers might be more alarmed by their child's distress and be more willing to communicate EOI, whereas fathers might be more likely to support the normative values of the family and possibly more likely to express their concern by CC (King & Dixon, 1999). Furthermore, caregivers who came from rural areas and those who were not working tended to have higher EOI scores. The first might be explained by the fact that living in a rural area in Greece makes the already difficult task of caregiving even more of a struggle. One of the biggest challenges caregivers face in rural areas is the

Table 4. Socio-demographic and clinical determinants of family burden, multivariate analysis.

	Family Burden Scale																		
	Economic burden <sup>a</sup>			Impact on daily activities/ social life <sup>a</sup>			Aggressiveness <sup>a</sup>			Impact on health <sup>a</sup>			Objective burden <sup>a</sup>			Total burden <sup>a</sup>			
	β	95% CI	β	95% CI	β	95% CI	β	95% CI	β	95% CI	β	95% CI	β	95% CI	β	95% CI	β	95% CI	
<b>Caregivers' characteristics</b>																			
Origin	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rural vs urban																			
Living with the patient																			
Yes vs no	0.79	[-0.29, 1.87]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Patients' characteristics</b>																			
Age	-	-	-0.01	[-0.21, 0.20]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Years																			
Gender	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Female vs male																			
Residence	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rural vs urban																			
Education	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Medium vs low																			
High vs low	-	-	-1.43	[-3.57, 0.72]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Employment status	-	-	-3.16	[-6.69, 0.36]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Not working vs working																			
Number of children	3.53	[2.30, 4.76] <sup>b</sup>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Children																			
Diagnosis	-0.23	[-0.81, 0.34]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bipolar disorder vs schizophrenia																			
Onset of mental illness	-	-	2.71	[0.10, 5.32] <sup>b</sup>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-4 years vs ≤12 months																			
>4 years vs ≤12 months	0.98	[-0.24, 2.19]	1.53	[-1.31, 4.37]	0.26	[-1.26, 1.79]	1.72	[-0.69, 4.13]	3.50	[-1.18, 8.17]	4.66	[-1.61, 10.95]							
Number of hospitalisations	1.43	[0.28, 2.58] <sup>b</sup>	2.65	[-0.28, 5.59]	0.61	[-0.86, 2.08]	2.24	[-0.17, 4.65]	5.72	[1.26, 10.18] <sup>b</sup>	7.92	[1.62, 14.22] <sup>b</sup>							
Hospitalisations																			
Longer hospitalisation	0.06	[-0.14, 0.27]	0.71	[0.22, 1.19] <sup>b</sup>	0.27	[0.01, 0.52] <sup>b</sup>	0.06	[-0.34, 0.47]	1.00	[0.21, 1.79] <sup>b</sup>	1.05	[0.00, 2.11]							
20+ days vs up to 20 days																			
	-	-	2.23	[0.16, 4.31] <sup>b</sup>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

CI: confidence interval.

<sup>b</sup>p-coefficients and 95% CIs are retained from linear regression models and adjusted for all the variables that were significant in the univariate analysis. Variables indicated with a long dash (—) were not included in the respective model.

<sup>a</sup>p < .05.

**Table 5.** Socio-demographic and clinical determinants of caregivers' psychological distress, multivariate analysis.

	General Health Questionnaire									
	Somatic symptoms <sup>a</sup>		Anxiety and insomnia <sup>a</sup>		Social dysfunction <sup>a</sup>		Severe depression <sup>a</sup>		General health index <sup>a</sup>	
	$\beta$	95% CI	$\beta$	95% CI	$\beta$	95% CI	$\beta$	95% CI	$\beta$	95% CI
Caregivers' characteristics										
Age										
Years	-	-	-	-	0.01	[-0.05, 0.07]	-	-	0.13	[-0.25, 0.50]
Gender										
Female vs male	2.27	[-0.16, 4.71]	-	-	-	-	-	-	5.96	[-1.65, 13.58]
Origin										
Rural vs urban	-	-	-	-	1.36	[0.26, 2.45]	-	-	-	-
Residence										
Rural vs urban	-	-	-2.97	[-5.86, -0.08] <sup>b</sup>	-	-	-	-	-	-
Marital status										
Married vs single	4.59	[-0.72, 9.91]	-	-	-	-	-	-	-	-
Divorced/widow vs single	4.72	[-0.77, 10.22]	-	-	-	-	-	-	-	-
Employment status										
Not working vs working	-	-	-	-	1.16	[0.04, 2.36] <sup>b</sup>	-	-	-	-
Relation to patient										
Other vs parent	-1.40	[-4.81, 2.01]	-	-	-	-	-	-	-2.35	[-15.31, 10.61]
Patients' characteristics										
Age										
Years	-	-	0.14	[-0.09, 0.37]	0.13	[0.03, 0.23] <sup>b</sup>	-	-	0.31	[-0.32, 0.94]
Origin										
Rural vs urban	-	-	-	-	-2.36	[-4.29, -0.43] <sup>b</sup>	-2.58	[-5.62, 0.45]	-6.77	[-16.48, 2.94]
Employment status										
Not working vs working	-	-	-	-	-	-	1.93	[-0.57, 4.43]	-	-
Onset of mental illness										
1-4 years vs $\leq 12$ months	1.19	[-1.32, 3.70]	2.56	[-0.63, 5.75]	-	-	-	-	4.24	[-3.74, 12.21]
> 4 years vs $\leq 12$ months	1.93	[-0.53, 4.39]	3.16	[-0.09, 6.40]	-	-	-	-	6.22	[-1.84, 14.28]
Number of hospitalisations										
Hospitalisations	0.14	[-0.26, 0.55]	0.34	[-0.20, 0.89]	0.17	[-0.08, 0.42]	-	-	0.33	[-0.98, 1.65]
Longer hospitalisation										
20+ days vs up to 20 days	-	-	-	-	1.47	[0.36, 2.58] <sup>b</sup>	-	-	3.94	[-1.72, 9.61]

CI: confidence interval.

<sup>a</sup> $\beta$ -coefficients and 95% CIs are retained from linear regression models and adjusted for all the variables that were significant in the univariate analysis. Variables indicated with a long dash (-) were not included in the respective model.<sup>b</sup> $p < .05$ .

complete absence of mental health services. The lack of professional help may sometimes increase caregivers' worries and often places the onus of care and monitoring solely on them. This may lead to a more intrusive manner of engaging with the patient. Regarding the second finding, we assume that non-working caregivers, who spend almost all day at home, are those who spend a great deal of time with the patient and who exclusively take care of him or her, thus presenting overprotective behaviour towards the patient.

Our results indicated that higher levels of CC were reported by one-parent families, most of whom were female-headed in our study. A possible explanation with regard to this finding would be that in one-parent families, the full responsibility of earning a living, coping with the patient's illness and caregiving that falls on one parent contributes to a more critical attitude towards the patient. In one-parent families, there is often no one to share responsibilities and decision-making rendering parenting a

stressful experience. This can have negative consequences for both the parent and the patient. Interestingly, our findings indicated that caregivers of patients who were living in rural areas were less critical towards the patient as compared to those of patients who were living in urban areas. This finding could be explained as patients who are unable to work or who do not participate in household tasks are criticised for being lazy and selfish; unfortunately, in this context, the caregivers fail to understand that these could be potential manifestations of negative symptoms. Patients living in rural areas are more likely to spend hours outside of house farming the family land and participating in village activities. Hence, they are more functional within the household and community when compared to patients living in urban areas.

Although research has demonstrated that male and female caregivers may experience burden differently with women having higher scores in caregiving, depression and burden as compared to men (Schneider et al., 2011), our

results did not support these findings. The same applies to a variety of caregivers' characteristics, such as age and educational level (Li et al., 2007), financial status (Tsang, Tam, Chan, & Cheung, 2003), and hours spent/day on providing care (Li et al., 2007; Roick et al., 2007), which research have shown to be important predictors of FB. In addition, our results did not support the correlation between patients' socio-demographic characteristics, such as young age (Caqueo-Urizar & Gutierrez-Maldonado, 2006; Li et al., 2007), male gender, marital status (Roick et al., 2007) and FB, although a positive relationship was confirmed between patients' unemployment and caregivers' FB. Previous research has shown that there is less burden for caregivers when patients are employed (Pickett, Greenley & Greenberg, 1995; Roick et al., 2007). We found that caring for patients who are not working, and who spend most of the day and nearly every day confined at home is related to higher economic burden for the family. Since most patients with major psychiatric disorders are not able to work on a regular basis, and consequently earn income that is substantially below that of the general population, they are often supported for a lifetime by their family. Furthermore, due to the difficult economic conditions in Greece, there are limited opportunities for mental health patients to work in subsidised employment, while few of the patients receive public welfare benefits.

Caregivers' and patients' socio-demographic characteristics were not associated with caregivers' psychological distress, with the exception of caregivers' residence and employment status and patients' age and origin. Specifically, our results indicated that non-working caregivers reported higher levels of social dysfunction as compared to working ones, which is in line with the results of a previous study (Provencher, Perreault, St-Onge, & Rousseau, 2003). Caregivers who do not work and probably have lower incomes may experience more distress because they may have fewer resources to meet care demands. A second finding of our study was that caregivers living in rural areas reported less anxiety and insomnia symptoms than those living in urban areas. Furthermore, although research has shown that increased levels of caregivers' psychological distress were associated with caring for younger patients (Addington, Coldham, Jones, Ko, & Addington, 2003), we found that increased levels of social dysfunction were reported by those taking care of older patients. Finally, we found that decreased levels of social dysfunction were reported by caregivers of patients who came from rural areas.

#### *The role of illness-related features on family relationships*

The longer duration of illness was found to be a risk factor for impaired family functioning, indicating unbalanced levels of cohesion, flexibility and satisfaction for families of patients with an onset of mental illness of 4 years or

more compared to those of patients with an onset of illness of 12 months or less. Lower scores in Balanced Cohesion for families of patients with an onset of illness of 1–4 years and higher in chaotic (very high levels of flexibility) scale for families of patients with an onset of mental illness of 4 years or more were indicative of the way these families function. Higher number of patient's hospitalisations was negatively associated with Balanced Cohesion, Balanced Flexibility and satisfaction scales, as well as the Flexibility Ratio indicating that families of patients with frequent admissions to hospital presented unbalanced levels of flexibility. Families of patients with bipolar disorder were more rigid than those of patients with schizophrenia. Finally, the longer the time since patient's last hospitalisation (over a year vs up to 6 months), more balanced the levels of family cohesion.

A number of illness-related factors, including clinical diagnosis, mental illness onset, patient's age at illness onset and number of hospitalisations, were examined in relation to family EE, and contrary to our hypothesis, no associations were found. This finding is consistent with the results of previous studies, which indicated that high EE was not associated with pre-morbid characteristics, symptom type and severity, age of onset, illness length and diagnosis (Carra et al., 2012; Raune, Kuipers, & Bebbington, 2004). However, we found that increased number of patient's hospitalisations was significantly correlated with higher levels of caregivers' EOI. According to the results of previous studies, a high level of caregivers' EE status was associated with a larger number of previous hospitalisations (Bertrando et al., 1992; Mavreas et al., 1992; Vaughan et al., 1992). Although these results do not pertain specifically to EOI, most of these studies lend support to our findings. Increases in the number of hospitalisations have been previously found to be related to hostility (Bentsen et al., 1998), indicating that numerous hospitalisations, usually under constraint, strain family relationships, bring shame to the family and make the relatives feel helpless, perhaps leading them to adopt a hostile attitude towards the patient. We found exactly the opposite in our sample. A possible explanation for this is that caregivers present more intrusive, overprotective, excessively self-sacrificing or devoted behaviour to patients with impaired functioning who are often in need of hospitalisation.

Data also indicated that the longer duration of illness caused greater burden for the family even though previous research has not confirmed this association (McDonnell, Short, Berry, & Dyck, 2003). Our results indicated that FB was more extensive if patients had an onset of mental illness of 4 years or more, a clinical characteristic which was, also, found to be significantly correlated with caregivers' objective burden, and more specifically with higher economic burden for the family. In addition, the number of previous hospitalisations was found to adversely impact family's daily activities and social life, increase

caregiver's perception about patient's aggressiveness and thus cause greater objective burden for the family. Also, the diagnosis of bipolar disorder as compared to schizophrenia, as well as patient's hospitalisation of 20 days and longer seemed to cause an adverse impact on the family's daily activities and social life. Several stressors, such as patient's negative symptoms, disruptive symptoms (i.e. psychotic and aggressive symptoms), frequent psychiatric hospitalisations and short illness duration, have been linked to increased burden in caregivers of persons with schizophrenia (Lowyck, de Hert, Peeters, Gillis, & Peuskens, 2001). Although there is little consensus on which factors are associated with the extent and/or pattern of FB (Lowyck et al., 2001), patients who are symptomatic, have many hospitalisations and have a short illness duration may be the most burdensome for caregivers (McDonnell et al., 2003).

Clinical features of patient's illness were not associated with caregiver's psychological distress, with the exception of patient's longer hospitalisation. Specifically, we found that patients' hospitalisations for 20 days and longer were found to increase caregivers' levels of social dysfunction. This finding is in line with the results of a very recent study indicating that the psychological burden experienced by primary caregivers is partly explained by the cumulative effects of chronic psychotic symptomatology, which over the years poses challenges to caregivers' coping abilities (Mitsonis et al., 2012).

### *Strengths and limitations*

The strengths of this study include its large sample size, the assessment of various aspects of family functioning by using standardised tools and the high participation rate (96.1%). Additionally, it is one of the very few studies to explore a variety of socio-demographic and clinical determinants of family functioning in psychosis, involving at the same time family outcomes such as family cohesion, adaptability, communication and satisfaction dimensions, apart from EE, FB and caregivers' psychological distress. Nevertheless, there are some methodological limitations in our study. A possible limitation is that the population of patients and caregivers were from one catchment area, and hence, generalisability may be limited. Future research should include larger and representative samples and should collect data from different diagnostic groups. A second limitation is that due to the cross-sectional data, no causal relationships between variables could be drawn. Finally, even though patients' symptom severity and psychosocial functioning were assessed by means of the Brief Psychiatric Rating Scale (BPRS; Overall & Gorham, 1962) and the Global Assessment Scale (GAS; Endicott, Spitzer, Fleiss, & Cohen, 1976), respectively, these measures were not included in this analysis, and these findings will be published in an upcoming report.

### **Conclusion**

The findings of our study are in line with those of other studies, which suggest that both social and illness-related risk factors tend to become important determinants of family functioning in psychosis. With regard to the caregivers' socio-demographic characteristics, gender, employment status, origin, residence, financial status, relation to the patient, contact with the patient and family structure were among the most significant determinants of family functioning. Concerning patients' socio-demographic characteristics, age, education, origin, residence and employment status were found to significantly affect family functioning. In addition, in this first report from a Greek population, illness-related factors, such as onset of mental illness, number of hospitalisations, last hospitalisation, longer hospitalisation and clinical diagnosis, were found to impact on intrafamilial relationships. Our study provides two important contributions to the literature on family functioning of patients with psychosis. First, it documents both caregivers' and patients' socio-demographic determinants of family functioning, and second, it explores more closely how they are related to specific domains of family functioning.

Based on the concept of psychosocial rehabilitation, families of individuals with psychosis are actively participating in the care of their relatives nowadays. The family has thus become an important agent tending to the patients' mental functioning and aiding the course of their recovery (Heikkila et al., 2006). Identifying the aspects of family functioning in psychosis helps in developing understandings regarding the factors which may contribute to the rehabilitation or relapse of the patients and the support required to strengthen positive family interactions as they take on the burdens of care. In this respect, the results of our study underline the need for more research aiming at explaining the interactions between social and clinical factors and their contribution to family functioning.

Furthermore, family psychoeducational interventions should be implemented from the early stages of psychosis in order to promote caregivers' knowledge about the patient's illness and improve dysfunctional interactions and communication patterns within the family (Carra, Montomoli, Clerici, & Cazzullo, 2007; E. Kuipers, Lam, & Leff, 2002; Pharoah, Mari, Rathbone, & Wong, 2010). Special attention should be given to the specific cultural and socio-demographic characteristics of the caregivers, such as, female gender, employment status, rural residence and the patients, such as, young age, low educational level, unemployment and other, which were found to adversely impact intrafamilial relationships in psychosis. Additionally, psychoeducational interventions should be primarily targeted to the caregivers of patients with increased number and length of hospitalisations, as well as longer duration of mental illness to reduce relapse rates.

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### Conflict of interest

The authors declare that there is no conflict of interest.

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## 4.5. Paper 5

### **Family functioning in families of first-episode psychosis patients as compared to chronic mentally ill patients and healthy controls\***

**Koutra, K.**, Triliva, S., Roumeliotaki, T., Stefanakis, Z., Basta, M., Lionis, C., & Vgontzas, A.N.

The present study aimed to investigate possible differences in family environment between patients experiencing their first episode of psychosis (FEP), chronic patients and controls. Family cohesion and flexibility (FACES-IV) and psychological distress (GHQ-28) were evaluated in families of 50 FEP and 50 chronic patients, as well as 50 controls, whereas expressed emotion (EQ) and family burden (FBS) were assessed in families of FEP and chronic patients. Multivariable linear regression analysis, adjusted for confounders, indicated impaired cohesion and flexibility for families of FEP patients compared to controls, and lower scores for families of chronic patients compared to those of FEP patients. Caregivers of chronic patients scored significantly higher in criticism, and reported higher burden and psychological distress than those of FEP patients. Our findings suggest that unbalanced levels of cohesion and flexibility, high criticism and burden appeared to be the outcome of psychosis and not risk factors triggering the onset of the illness. Furthermore, emotional over-involvement both in terms of positive (i.e. concern) and negative behaviours (i.e overprotection) is prevalent in Greek families. Psychoeducational interventions from the early stages of the illness should be considered to promote caregivers' awareness regarding the patients' illness, which in turn, may ameliorate dysfunctional family interactions.

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## Family functioning in families of first-episode psychosis patients as compared to chronic mentally ill patients and healthy controls



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### ABSTRACT

The present study aimed to investigate possible differences in family environment among patients experiencing their First Episode of Psychosis (FEP), chronic patients and controls. Family cohesion and flexibility (FACES-IV) and psychological distress (GHQ-28) were evaluated in families of 50 FEP and 50 chronic patients, as well as 50 controls, whereas expressed emotion (EQ) and family burden (FBS) were assessed in families of FEP and chronic patients. Multivariable linear regression analysis, adjusted for confounders, indicated impaired cohesion and flexibility for families of FEP patients compared to controls, and lower scores for families of chronic patients compared to those of FEP patients. Caregivers of chronic patients scored significantly higher in criticism, and reported higher burden and psychological distress than those of FEP patients. Our findings suggest that unbalanced levels of cohesion and flexibility, high criticism and burden appeared to be the outcome of psychosis and not risk factors triggering the onset of the illness. Furthermore, emotional over-involvement both in terms of positive (i.e. concern) and negative behaviors (i.e. overprotection) is prevalent in Greek families. Psychoeducational interventions from the early stages of the illness should be considered to promote caregivers' awareness regarding the patients' illness, which in turn, may ameliorate dysfunctional family interactions.

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### 1. Introduction

With the advent of deinstitutionalization of psychiatric patients and the simultaneous growth of community mental health care services, the responsibility for patient care has to a great extent been transferred to family members who act as the frontline caregivers (Bloch et al., 1995). The study of family interactions is especially important in the early stages of psychiatric illness when most of the changes in family dynamics are observed (Birchwood and Macmillan, 1993). First Episode Psychosis (FEP), or so called early psychosis, refers to the first time someone experiences a psychotic episode. FEP may lead to a broad range of clinical diagnoses including schizophrenia and bipolar disorder. From a family systems perspective, dysfunction or illness in one family member affects other family members, because a family unit functions as an interconnected whole (Friedman et al., 2003). Thus, relationships and roles have to be adjusted to accommodate

the illness and a new equilibrium has to be achieved in order for the family unit to continue functioning.

The link between family functioning and mental illness has mainly been researched in terms of family factors influencing patient relapse and illness course and outcome (Leff and Vaughn, 1985). Family members' attitudes toward the patient, as measured by the level of expressed emotion (EE) and family burden (FB) associated with the caring role, have received a great deal of attention (Awad and Voruganti, 2008; Wearden et al., 2000). Several decades of research has established EE as a highly reliable psychosocial predictor of psychiatric relapse in schizophrenia (Butzlaff and Hooley, 1998; Cechnicki et al., 2013; Hooley, 2007). A high level of EE has been found both in patients with chronic psychosis (Marom et al., 2005; Mavreas et al., 1992) and in those having a first psychotic episode (Bachmann et al., 2002; Barrelet et al., 1990; Gonzalez-Blanch et al., 2010; Heikkila et al., 2002; Huguelet et al., 1995; McNab et al., 2007; Patterson et al., 2000). Furthermore, numerous studies have consistently documented that caregivers of patients with chronic psychosis experience high levels of burden which adversely impacts their health and quality of life (Caqueo-Urizar and Gutierrez-Maldonado, 2006; Gutierrez-Maldonado et al., 2005). In addition, recent findings suggest high

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levels of burden and psychological distress among caregivers of FEP patients soon after the onset of illness (Boydell et al., 2014; McCann et al., 2011).

Family functioning, which refers to the quality of interactions among family members, is a broad concept and is often used as an umbrella term encompassing numerous constructs, including family's sentimental cohesion and adaptability to change. Effective family functioning can be facilitated or prevented depending on level of cohesion and adaptability of the family (Minuchin et al., 1978). Olson et al. developed the Circumplex Model of Marital and Family Systems, describing the family's level of functioning (Olson et al., 1979). The Circumplex Model represents one of the most extensively used models of family functioning, both in clinical and research settings. The Model is particularly useful as a "relational diagnosis", because it focuses on the relational system and it is comprised of three key concepts for understanding family functioning: family cohesion, flexibility, and communication (Olson, 2000). Family cohesion is defined as the emotional bonding that family members have toward one another (Olson, 1993), whereas family flexibility is defined as the quality and expression of leadership and organization, role relationship, and relationship rules and negotiations (Olson and Gorall, 2006). Communication is defined as the positive skills in conveying information used by the family members (Olson and Gorall, 2006) and it is viewed as a facilitating dimension that helps families negotiate cohesion and flexibility (Olson et al., 2007).

Studies assessing family cohesion and adaptability in psychosis have yielded mixed findings, perhaps due to the application of different instruments in evaluating family functioning [i.e. Family Adaptability and Cohesion Evaluation Scales-III (Olson et al., 1985), Family Assessment Device (Epstein et al., 1983)]. Miller et al. (1986) found that family functioning of patients with schizophrenia and bipolar disorder did not differ significantly from control families. However, more recent studies have shown that families of patients with schizophrenia and bipolar disorder may have deficits in family functioning as compared to control families (Chang et al., 2001; Friedmann et al., 1997; Phillips et al., 1998; Romero et al., 2005; Sun and Cheung, 1997). Regardless of specific diagnosis, having a family member in the acute phase of a psychiatric disorder appeared to be a risk factor for poor family functioning (Friedmann et al., 1997).

Although the influential role of the family in the outcome of chronic mental illness is well documented, there has been relatively little research on the intrafamilial relationships during the early stages of the illness, which examined certain aspects of intrafamilial transactions, such as EE and FB (see review by Koutra et al. (2014a)). To date, there are virtually no empirical data regarding family cohesion and adaptability in the context of FEP. In Greece, the vast majority of patients diagnosed with psychosis return to reside with their families in the community (Basta et al., 2013; Madianos et al., 1997) after discharge from hospital and depend on the assistance and continued involvement of their families. Although the Greek family is seemingly a nuclear family (Georgas, 1999; Katakis, 1998; Papadiotis and Softas-Nall, 2006; Softas-Nall, 2003), in reality it functions as an extended one (Georgas, 1999, 2000). Greek families are characterized by cohesiveness and tight knit bonds and interactions. In Greece the family is considered a pillar of society, and thus, problems are expected to be solved by the whole family. This type of family has been called "extended urban family" (Georgas, 2000). In this regard, illness in one family member may affect family dynamics and result in substantial burden for the entire family.

Given the dearth of research on family functioning and FEP and the particularities of Greek families, the present study has a twofold purpose: (i) to provide a comprehensive assessment of intrafamilial relationships in a Greek sample of FEP and chronic

patients with a diagnosis of schizophrenia and bipolar disorder by examining a variety of family life aspects; and (ii) to examine possible differences in family functioning of FEP patients in comparison with chronic patients and healthy controls. Since family dynamics play a role in the recovery–relapse and early relapse after the first episode is detrimental to the course of the disease, developing understanding of the family dynamics early on can improve intervention and preventive strategies. Moreover, to our knowledge, thus far no study has compared FEP and chronic patients with psychosis regarding a variety of family variables. Our first hypothesis was that families of FEP patients would show unbalanced levels of cohesion and flexibility as compared to control families and more balanced levels of cohesion and flexibility than families of chronic patients. Our second hypothesis was that chronicity would adversely affect EE, FB and caregivers' psychological well-being.

## 2. Methods

### 2.1. Participants

Sample size estimation was based on medium expected effect sizes, according to Cohen's criteria (Cohen, 1988), for power 0.80 and confidence level 0.05. Hence, 50 FEP patients and 50 chronic patients (Response Rate 96.1%) – both randomly selected – were recruited from the Psychiatric Clinic of the University Hospital of Heraklion, Crete, Greece, and their key caregivers were contacted and informed about the purpose of the present study during a 12-month period (October 2011–October 2012). The key caregiver was defined as the person who provides the most support devoting a substantial number of hours each day in taking care of the patient. For the purposes of this study, FEP patients were recruited upon first hospitalization whereas chronic patients had two or more hospitalizations. To be eligible for inclusion in the study, the patients had to meet the following criteria: (i) to be between 17 and 40 years old, (ii) to have a good understanding of the Greek language, (iii) to have been out of hospital for at least 6 weeks and considered stabilised by their treating psychiatrist, (iv) to be living with a close relative, and (v) to have a diagnosis of schizophrenia or bipolar disorder according to Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) or International Classification of Disease (ICD-10) and with no evidence of organicity, significant intellectual handicap, or primary diagnosis of substance abuse. Inclusion criteria for the caregivers were: (i) to be between 18 and 75 years old, (ii) to have a good understanding of the Greek language, (iii) to have no diagnosed psychiatric illness, and (iv) to be either living with, or directly involved in the care of the patient.

The sample of 50 control families was drawn from several sources including a random sample of individuals recruited from community cultural associations and community care centers of the Municipality of Heraklion. Controls were age and gender-matched with the initial sample of 50 caregivers of FEP patients. At the time of participation in the study, control families reported no history of psychiatric illness in the family.

### 2.2. Procedure

Caregivers were interviewed by the first author in individual sessions in the Psychiatric Clinic of the University Hospital of Heraklion, Crete, Greece, where participants were asked to take part in a study assessing family functioning of patients with schizophrenia and bipolar disorder. Caregivers were given an information sheet describing the aims of the study. The time needed to complete the interview was approximately 75–90 min. Patients' socio-demographic and clinical data were extracted from medical records and confirmed during the interview by the caregivers, whereas patients' symptom severity and functioning were assessed by their treating psychiatrist within two weeks from the caregivers' assessment. All participants involved in the present study were informed about the scope and the purpose of the study and provided written informed consent. The study was approved by the Ethical Committee of the University Hospital in Heraklion, Crete, Greece. Family functioning in terms of cohesion and flexibility, as well as psychological well-being, was evaluated in families of FEP and chronic patients, as well as controls, whereas EE and FB were assessed in families of FEP and chronic patients.

### 2.3. Measures

#### 2.3.1. Socio-demographic characteristics

Socio-demographic characteristics, such as relative's gender, age, education, marital status, employment status, origin and current residence, financial status,

family structure, relation to the patient, contact with the patient, etc. were collected through structured questionnaires administered by the researchers. The socio-demographic indicators of the patient included the characteristics mentioned previously and the following: clinical diagnosis, illness onset, patient's age at illness onset, hospitalization to psychiatric clinic, longer and last hospitalization, as well as therapeutic interventions.

### 2.3.2. Family Adaptability and Cohesion Evaluation Scales IV Package

Family functioning was assessed by means of the Family Adaptability and Cohesion Evaluation Scales IV Package (FACES IV Package) (Olson et al., 2007). The FACES IV Package contains the six scales from FACES IV, as well as the Family Communication Scale (FCS) and the Family Satisfaction Scale (FSS), and includes 62 items in total. The scales are self-report and they can be completed by all family members over the age of 12 years.

FACES IV (Olson et al., 2007) measures family functioning in terms of family cohesion and family flexibility. The instrument contains six scales comprised of seven items each, with a total of 42 items. Each family member rates his/her agreement or disagreement with how well each item describes his/her family by selecting among the five alternative responses (1=strongly disagree, 2=generally disagree, 3=undecided, 4=generally agree, and 5=strongly agree). FACES IV displays a six-factor structure of family functioning. There are two balanced scales that assess Balanced Cohesion and Balanced Flexibility and four unbalanced scales assessing the high and low extremes of cohesion and flexibility – Disengaged and Enmeshed for cohesion, Rigid and Chaotic for flexibility. These scales have very good levels of reliability and validity. The Cronbach's alpha coefficients measuring internal consistency of the six FACES IV scales are as follows: Balanced Cohesion=0.89, Balanced Flexibility=0.80, Disengaged=0.87, Enmeshed=0.77, Rigid=0.83, and Chaotic=0.85 (Gorall et al., 2006). Higher scores on the balanced scales are indicative of healthier functioning, and the converse holds truth for the unbalanced scales. In addition, three additional ratio scores can be calculated with FACES IV (Cohesion, Flexibility, and Total Circumplex). When each score of the Cohesion and Flexibility ratios is at one and higher, the family system has more balanced levels of cohesion and flexibility. When the Total Circumplex ratio is one or higher, the family system is viewed as more balanced and functional.

Family Communication Scale (FCS) (Olson and Barnes, 1996) is a 10-item scale which addresses many of the most important aspects of communication in a family system. The respondents are asked to state the degree of their agreement or disagreement with how well each item describes their families by selecting among the five alternative responses (1=strongly disagree, 2=generally disagree, 3=undecided, 4=generally agree, and 5=strongly agree). A higher score on the scale indicates more positive communication in family system. The internal consistency reliability of the scale as measured by the Cronbach's alpha coefficient is 0.90 and test–retest reliability is 0.86.

Family Satisfaction Scale (FSS) is, also, a 10-item scale that assesses the satisfaction of family members in regard to family cohesion, flexibility and communication (Olson, 1995). The respondents are asked to state how much satisfied or dissatisfied they are for each item describing their families by selecting among the five alternative responses (1=very dissatisfied, 2=somewhat dissatisfied, 3=generally satisfied, 4=very satisfied, and 5=extremely satisfied). A higher score on the scale indicates greater satisfaction in family system. Cronbach's alpha reliability for the scale is 0.92 and test–retest reliability is 0.85.

The FACES IV Package has been translated and validated for the Greek population by Koutra et al. (2012), and has demonstrated good psychometric properties.

### 2.3.3. Family Questionnaire

EE was measured via the Family Questionnaire (FQ) (Wiedemann et al., 2002). The FQ is a 20-item self-report questionnaire measuring the EE status of relatives of patients with schizophrenia in terms of emotional over-involvement (EOI) and critical comments (CC). EOI includes unusually over-intrusive, self-sacrificing, overprotective, or devoted behavior, exaggerated emotional response, and over-identification with the patient, whereas CC is defined as an unfavorable comment on the behavior or the personality of the person to whom it refers (Leff and Vaughn, 1985). The measure consists of 10 items for each subscale. Responses range from 1 "never/very rarely" to 4 "very often" and a higher total score indicates higher EE. The developers provide a cut-off point of 23 as an indication of high CC, and 27 for EOI. The FQ has excellent psychometric properties including a clear factor structure, good internal consistency of subscales (Cronbach's alpha coefficient ranging from 0.78 to 0.80 for EOI and from 0.91 to 0.92 for CC) and good inter-rater reliability in relation to the Camberwell Family Interview (CFI) (Vaughn and Leff, 1976) of EE. In addition, the FQ has displayed a similar level of accuracy and substantially higher sensitivity compared to the Five-Minute Speech Scale (FMSS) (Magana et al., 1986). The FQ has been translated and validated for the Greek population by Koutra et al. (2014b), and has demonstrated good psychometric properties.

### 2.3.4. Family Burden Scale

The Family Burden Scale (FBS) (Madianos et al., 2004) was used to measure FB. The FBS consists of 23 items. The four FBS dimensions are defined as follows: (A) impact on daily activities/social life (eight items); defined in terms of burden

experienced regarding disruption of daily/social activities; (B) aggressiveness (four items); captures the presence of episodes of hostility, violence and destruction of property; (C) impact on health (six items); assesses signs and symptoms of psychopathology reported by the family caregiver; and (D) economic burden (five items); defined in terms of financial problems created by the patient's illness. Factors A, B, and D items tap objective burden, whereas C items underlie subjective burden. The scale has been originally developed and standardized in the Greek population. The internal consistency reliability of the four FBS dimensions as measured by the Cronbach's alpha coefficient ranges from 0.68 to 0.85 and test–retest reliability as measured by Pearson's *r* correlation coefficient range from 0.88 to 0.95. The developers provide a cut-off point of 24 (for the total scale score) to produce the best values of sensitivity (78%) and specificity (85%).

### 2.3.5. General Health Questionnaire

The General Health Questionnaire-28 item version (GHQ-28) (Goldberg et al., 1997), a self-administered instrument that screens for non-psychotic psychopathology in clinical and non-clinical settings, was used to assess relatives' psychological distress. Its four subscales measure somatic symptoms, anxiety/insomnia, social dysfunction and severe depression. In the GHQ-28 the respondent is asked to compare his recent psychological state with his usual state on a four-point scale (0=not at all, 1=no more than usual, 2=rather more than usual, and 3=much more than usual). In the present study the Likert scoring procedure (0, 1, 2, 3) is applied providing a more acceptable distribution of scores and the total scale score ranges from 0 to 84. Higher scores on the scale are indicative of poorer psychological well-being. The cut-off score for identifying cases of psychiatric disorder is 23/24 for Likert scoring. The internal consistency reliability of the four GHQ-28 factors as measured by the Cronbach's alpha coefficient ranges from 0.76 to 0.87. The 28-item version of this instrument has been adapted for the Greek population by Garyfallos et al. (1991), and has demonstrated good psychometric properties.

## 2.4. Potential confounders

Potential confounders included caregivers and patients characteristics that have an established or potential association with chronicity of mental illness and family functioning variables. Caregivers' characteristics included relative's age, marital status (single, married, divorced/widowed), financial status (no individual income, < 10,000€, 10,000€–20,000€), family structure (two-parent family vs. one-parent family), and number of children in the family. Patients' characteristics included patient's age, residence (urban vs. rural), financial status (no individual income, < 10,000€, 10,000€–20,000€), onset of mental illness ( $\leq 12$  months, 1–4 years, > 4 years), age at illness onset, number of hospitalizations, last hospitalization (up to 6 months, 7–12 months, > 1 year), longer hospitalization (up to 20 days vs. 20+ days), symptom's severity (Brief Psychiatric Rating Scale – BPRS; Overall and Gorham, 1962) and patient's functioning (Global Assessment Scale–GAS; Endicott et al., 1976).

## 2.5. Statistical analysis

Descriptive statistics were used to summarize the baseline characteristics of participants. In the main sample of 150 families, the primary exposure of interest was the family type (FEP, chronic, and control families) and the main outcome variables were family cohesion and flexibility, and relative's psychological well-being. In the sub-sample of 100 families, the primary exposure of interest was the family type (FEP and chronic families) and the main outcome variables were EE and FB.

Bivariate associations between normally distributed continuous dependent variables (family variables) and categorical independent variables (type of family) were studied using either Student's *t*-test or ANOVA. Bivariate associations between non-normally continuous dependent variables (family variables) and categorical independent variables (type of family) were studied using non-parametric statistical methods (Mann–Whitney and Kruskal–Wallis tests). Bivariate associations between categorical independent (type of family) and dependent variables (family variables using cut-off scores) were studied using Pearson's  $\chi^2$  test. Pearson's *r* or Spearman's rho correlation coefficient was used to estimate the strength of the association between continuous dependent and independent variables. Multivariable linear regression models were fitted to estimate the associations among FEP, chronic and control families and family variables after adjusting for confounders, as well. Potential confounders related with both the outcomes and the exposure of interest in the bivariate associations with a *p* value < 0.2 were included in the multivariable models. Separate multivariable models were built having as an outcome each one of family measures. Estimated associations are described in terms of  $\beta$ -coefficients (beta) and their 95% confidence intervals (CIs). All hypothesis testing was conducted assuming a 0.05 significance level and a two-sided alternative hypothesis. All statistical analyses were performed using SPSS Statistics 20 software (IBM, Armonk, NY, USA).

**Table 1**  
Socio-demographic characteristics of the families participating in the study.

	FEP families (n=50)		Chronic families (n=50)		Control families (n=50)		p-value <sup>a</sup>
	M	S.D.	M	S.D.	M	S.D.	
Age	54.62	10.02	58.98	9.55	56.04	10.39	0.087
Children in the family	2.66	1.08	2.94	1.18	2.28	0.64	<b>0.005</b>
Number of family members	4.60	1.12	4.58	1.39	4.36	1.12	0.362
<b>Gender</b>	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>	
Male	7	14.0	8	16.0	8	16.0	0.950
Female	43	86.0	42	84.0	42	84.0	
<b>Education</b>							
Elementary/high school	32	64.0	32	64.0	29	58.0	0.912
Lyceum/some years in university	16	32.0	15	30.0	17	34.0	
University degree	2	4.0	3	6.0	4	8.0	
<b>Employment status</b>							
Working	14	28.0	14	28.0	20	40.0	0.332
Not working	36	72.0	36	72.0	30	60.0	
<b>Origin</b>							
Urban	27	54.0	31	62.0	24	48.0	0.370
Rural	23	46.0	19	38.0	26	52.0	
<b>Residence</b>							
Urban	39	78.0	43	86.0	41	82.0	0.582
Rural	11	22.0	7	14.0	9	18.0	
<b>Marital status</b>							
Single	2	4.0	1	2.0	0	0.0	0.078
Married	36	72.0	27	54.0	38	76.0	
Divorced/widowed	12	24.0	22	44.0	12	24.0	
<b>Financial status</b>							
No individual income	17	34.0	13	26.0	17	34.0	0.251
< 10,000€	22	44.0	16	32.0	20	40.0	
10,000€ – 20,000€	11	22.0	21	42.0	13	26.0	
<b>Family structure</b>							
Two-parent family	36	72.0	28	66.0	42	84.0	<b>0.009</b>
One-parent family	14	28.0	22	44.0	8	16.0	
<b>Living with the patient</b>							
No	9	18.0	10	20.0	–	–	0.799
Yes	41	82.0	40	80.0	–	–	
<b>Relation to patient</b>							
Parent	45	90.0	47	94.0	–	–	0.461
Other	5	10.0	3	6.0	–	–	
<b>Contact with the patient</b>							
Daily	48	96.0	47	94.0	–	–	0.646
1–2 times/week	2	4.0	3	6.0	–	–	

Abbreviations: FEP: First-Episode Psychosis.

<sup>a</sup> p-values from ANOVA or Kruskal–Wallis test for continuous variables and  $\chi^2$  test for categorical variables.

### 3. Results

#### 3.1. Sample characteristics

Table 1 presents the socio-demographic characteristics of caregivers of FEP and chronic patients, and controls participated in the study. Statistically significant differences were found in terms of family structure and number of children in the family among the three groups. Families of chronic patients were more frequently one-parent families (44.0%) as compared to those of FEP patients (28.0%) and controls (16.0%). Furthermore, families of chronic patients had more children ( $M=2.94$ ,  $S.D.=1.18$ ) than those of FEP patients ( $M=2.66$ ,  $S.D.=1.08$ ) and controls ( $M=2.28$ ,  $S.D.=0.64$ ).

Patients' socio-demographic and clinical characteristics are presented in Table 2. As expected, statistically significant differences were found in terms of patient's age, onset of mental illness, patient's age at illness onset, and number of hospitalizations. Chronic patients were older ( $M=32.94$ ,  $S.D.=5.14$ ) than FEP

patients ( $M=29.24$ ,  $S.D.=5.78$ ). The vast majority of chronic patients (74.0%) had an onset of illness at 4 years or longer and more frequent hospitalizations ( $M=3.88$ ,  $S.D.=2.45$ ), whereas 40.0% of FEP patients had an onset of illness of 12 months or less and only one hospitalization. The median age at illness's onset was  $22.62 \pm 4.68$  years for chronic patients and  $25.44 \pm 5.89$  for FEP patients. Moreover, the two groups of patients were significantly different in terms of symptom severity and psychosocial functioning, indicating more severe symptoms for chronic patients ( $M=46.26$ ,  $S.D.=14.28$ ) as compared to FEP patients ( $M=39.78$ ,  $S.D.=15.44$ ), whereas chronic patients were less functional ( $M=52.84$ ,  $S.D.=13.56$ ) than FEP patients ( $M=60.52$ ,  $S.D.=16.52$ ).

#### 3.2. Family cohesion and flexibility among FEP, chronic and control families, univariate and multivariable analyses

In the univariate analysis, significant differences between families of FEP and chronic patients, as well as controls, were found in all scales of FACES-IV package (Table 3). Multivariable

**Table 2**  
Socio-demographic, family and clinical characteristics of the patients participating in the study.

	FEP patients (n=50)		Chronic patients (n=50)		p-value <sup>a</sup>
	M	S.D.	M	S.D.	
Age	29.24	5.78	32.94	5.14	< 0.001
Number of hospitalizations	1.00	0.00	3.88	2.45	< 0.001
Age at illness onset	25.44	5.89	22.62	4.68	0.009
Symptom severity (BPRS)	39.78	15.44	46.26	14.28	0.032
Functioning (GAS)	60.52	16.52	52.84	13.56	0.011
<b>Gender</b>	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>	
Male	30	60.0	36	72.0	0.205
Female	20	40.0	14	28.0	
<b>Education</b>					
Elementary/high school	16	32.0	22	44.0	0.269
Lyceum/some years in university	27	54.0	25	50.0	
University degree	7	14.0	3	6.0	
<b>Employment status</b>					
Working	7	86.0	7	86.0	1.000
Not working	43	14.0	43	14.0	
<b>Origin</b>					
Urban	45	90.0	46	92.0	0.727
Rural	5	10.0	4	8.0	
<b>Residence</b>					
Urban	40	80.0	46	92.0	0.084
Rural	10	20.0	4	8.0	
<b>Marital status</b>					
Single	41	82.0	44	88.0	0.643
Married	4	8.0	2	4.0	
Divorced/widowed	5	10.0	4	8.0	
<b>Financial status</b>					
No individual income	30	60.0	19	38.0	0.075
< 10,000€	19	38.0	28	56.0	
10,000€–20,000€	1	2.0	3	6.0	
<b>Diagnosis</b>					
Schizophrenia	43	86.0	39	78.0	0.298
Bipolar disorder	7	14.0	11	22.0	
<b>Onset of mental illness</b>					
≤ 12 months	20	40.0	2	4.0	< 0.001
1–4 years	17	34.0	11	22.0	
> 4 years	13	26.0	37	74.0	
<b>Longer hospitalization</b>					
Up to 20 days	36	72.0	29	58.0	0.142
20+ days	14	28.0	21	42.0	
<b>Last hospitalization</b>					
Up to 6 months	15	30.0	17	34.0	0.173
7–12 months	35	70.0	30	60.0	
> 1 year	0	0.0	3	6.0	

Abbreviations: FEP: First-Episode Psychosis; BPRS: Brief Psychiatric Rating Scale; GAS: Global Assessment Scale.

<sup>a</sup> p-values from *t*-test or Mann–Whitney test for continuous variables and  $\chi^2$  test for categorical variables.

linear regression analysis adjusted for relative's age, marital status, family structure and number of children in the family revealed that families of FEP patients scored significantly lower in Balanced Flexibility ( $\beta$  coefficient  $-4.26$ , 95% CI:  $-6.16$ ,  $-2.37$ ), higher in Enmeshed ( $\beta$  coefficient  $2.50$ , 95% CI:  $0.66$ ,  $4.34$ ) and Rigid ( $\beta$  coefficient  $3.22$ , 95% CI:  $1.38$ ,  $5.07$ ) scales, and lower in Communication ( $\beta$  coefficient  $-4.53$ , 95% CI:  $-7.71$ ,  $-1.35$ ) than controls. In addition, families of FEP patients had lower scores in Cohesion ratio ( $\beta$  coefficient  $-0.47$ , 95% CI:  $-0.74$ ,  $-0.21$ ), Flexibility ratio ( $\beta$  coefficient  $-0.70$ , 95% CI:  $-0.92$ ,  $-0.48$ ), and Total Circumplex ratio ( $\beta$  coefficient  $-0.59$ , 95% CI:  $-0.81$ ,  $-0.37$ )

as compared to controls. Moreover, significant differences between families of chronic patients and controls were found in all scales of FACES-IV package. In a similar vein, families of chronic patients scored significantly lower in Balanced Flexibility ( $\beta$  coefficient  $-3.97$ , 95% CI:  $-6.71$ ,  $-1.23$ ) and higher in Enmeshed ( $\beta$  coefficient  $2.98$ , 95% CI:  $0.26$ ,  $5.71$ ) and Rigid ( $\beta$  coefficient  $3.78$ , 95% CI:  $0.90$ ,  $6.65$ ) scales than those of FEP patients. Also, they had lower scores in Cohesion ratio ( $\beta$  coefficient  $-0.45$ , 95% CI:  $-0.81$ ,  $-0.09$ ), Flexibility ratio ( $\beta$  coefficient  $-0.47$ , 95% CI:  $-0.75$ ,  $-0.20$ ), and Total Circumplex ratio ( $\beta$  coefficient  $-0.46$ , 95% CI:  $-0.75$ ,  $-0.17$ ). These differences were significant after adjusting for several confounding variables including relative's age, marital status, financial status, family structure, patient's age, residence, financial status, onset of mental illness, age at illness onset, number of hospitalizations and last hospitalization, symptoms' severity, and patients' functioning (Table 4).

### 3.3. Family expressed emotion in families of FEP and chronic patients, univariate and multivariable analyses

Higher levels of both CC and EOI were present in families of chronic patients as compared to those of FEP patients. Specifically, 76.0% ( $n=38$ ) of the caregivers of chronic patients had high levels of CC as compared with the 24.0% ( $n=12$ ) of FEP patients. About 78.0% ( $n=39$ ) of the caregivers of chronic patients had high levels of EOI as opposed to 46.0% ( $n=23$ ) of FEP patients. In the univariate analysis, significant differences between families of FEP and chronic patients were found in both CC and EOI scales of FQ (Table 3). Multivariable analysis adjusting for family structure, patient's residence, onset of mental illness and number of hospitalizations, symptoms' severity, and patients' functioning indicated that caregivers of chronic patients scored significantly higher in CC ( $\beta$  coefficient  $6.95$ , 95% CI:  $3.30$ ,  $10.60$ ) than those of FEP patients, whereas non-significant differences were found in terms of EOI between the two groups (Table 4).

### 3.4. Family burden in families of FEP and chronic patients, univariate and multivariable analyses

High levels of burden (cut-off score  $> 24$ ) were found in 34 (68.0%) families of chronic patients and 6 (12.0%) families of FEP patients. In the univariate analysis, significant differences between families of FEP and chronic patients were found in all scales of FBS (Table 3). In the multivariable analysis, families of chronic patients reported higher levels of total burden ( $\beta$  coefficient  $11.28$ , 95% CI:  $6.60$ ,  $15.96$ ) as compared to those of FEP patients. Caring for a chronic patient was associated with an adverse impact on family's daily activities and social life ( $\beta$  coefficient  $5.34$ , 95% CI:  $3.14$ ,  $7.54$ ), higher levels of patient's aggressiveness ( $\beta$  coefficient  $1.99$ , 95% CI:  $0.62$ ,  $3.36$ ), higher levels of subjective (impact on health) ( $\beta$  coefficient  $3.05$ , 95% CI:  $0.93$ ,  $5.17$ ) and objective burden ( $\beta$  coefficient  $8.54$ , 95% CI:  $5.02$ ,  $12.05$ ). These associations were significant after adjusting for patient's age, residence, onset of mental illness, age at illness onset, number of hospitalizations and longer hospitalization, symptoms' severity, and patients' functioning (Table 4).

### 3.5. Relative's psychological well-being among FEP, chronic and control families, univariate and multivariable analyses

The GHQ-28 scores of control families were found within the normal range of healthy individuals, since the cut-off 23/24 which is indicated for the Likert method is far above the group's mean values ( $12.96 \pm 5.17$ ). The mean GHQ scores for families of FEP patients were  $18.56 \pm 10.92$  and for families of chronic patients were  $29.66 \pm 14.75$ . About 62.0% of relatives caring for a chronic

**Table 3**  
Family functioning, expressed emotion, burden and psychological distress between relatives of first-episode and chronic patients, as well as healthy families, univariate analysis.

	FEP families (n=50)		Chronic families (n=50)		Control families (n=50)		p-value <sup>a</sup>
	M	S.D.	M	S.D.	M	S.D.	
<b>FACES-IV</b>							
Balanced Cohesion	29.58	(5.65)	24.92	(6.61)	32.06	(2.99)	< 0.001
Balanced Flexibility	22.14	(5.19)	16.18	(5.14)	27.10	(3.78)	< 0.001
Disengaged	13.76	(5.33)	17.06	(6.61)	11.32	(2.71)	< 0.001
Enmeshed	15.04	(4.09)	17.12	(6.16)	12.70	(2.82)	< 0.001
Rigid	16.84	(4.22)	19.40	(5.59)	13.46	(3.44)	< 0.001
Chaotic	12.76	(5.42)	17.08	(7.07)	10.16	(3.01)	< 0.001
Cohesion ratio	2.19	(0.68)	1.63	(0.75)	2.76	(0.58)	< 0.001
Flexibility ratio	1.62	(0.59)	0.96	(0.45)	2.40	(0.59)	< 0.001
Total Circumplex ratio	1.91	(0.59)	1.29	(0.57)	2.58	(0.53)	< 0.001
Communication	39.02	(8.22)	31.76	(9.75)	44.00	(4.54)	< 0.001
Satisfaction	36.86	(10.02)	28.76	(9.25)	43.42	(5.66)	< 0.001
<b>FQ</b>							
Critical Comments	19.42	(7.03)	27.00	(6.74)	–	–	0.001
Emotional Over-Involvement	26.96	(5.57)	30.90	(6.05)	–	–	< 0.001
<b>FBS</b>							
Economic burden	3.62	(2.12)	5.24	(2.68)	–	–	0.001
Impact on daily activities/social life	3.88	(3.93)	10.80	(4.82)	–	–	< 0.001
Aggressiveness	1.04	(2.01)	3.40	(2.95)	–	–	< 0.001
Impact on health	5.14	(4.08)	8.52	(3.95)	–	–	< 0.001
Objective burden	8.54	(6.58)	19.44	(7.87)	–	–	< 0.001
Burden total	12.60	(8.91)	26.54	(10.37)	–	–	< 0.001
<b>GHQ-28</b>							
Somatic symptoms	4.44	(3.67)	7.40	(4.58)	2.98	(2.08)	< 0.001
Anxiety and insomnia	4.82	(4.77)	9.70	(6.06)	2.88	(2.54)	< 0.001
Social dysfunction	7.58	(2.40)	9.26	(3.39)	6.52	(1.03)	< 0.001
Severe depression	1.72	(3.54)	3.30	(5.11)	0.58	(1.16)	< 0.001
General health index	18.56	(10.92)	29.66	(14.75)	12.96	(5.17)	< 0.001

Abbreviations: FEP: First-Episode Psychosis; FACES: Family Adaptability and Cohesion Evaluation Scales; FQ: Family Questionnaire; FBS: Family Burden Scale; and GHQ: General Health Questionnaire.

<sup>a</sup> *t*-test and ANOVA are used for differences between continuous normally distributed variables; Mann-Whitney and Kruskal-Wallis tests are used for differences between continuous non-normally distributed variables.

patient and 30.0% of those caring for a FEP patient were found to have scores above the cut-off point (GHQ-28 scores  $\geq 24$ ), indicating poor mental health and probable psychiatric problems, whereas only 2.0% of control families scored 24 or above on GHQ-28.

In the univariate analysis, significant differences between caregivers of FEP and chronic patients, as well as controls, were found in all scales of GHQ-28 (Table 3). Multivariable analysis adjusted for relative's age, marital status, family structure and number of children in the family revealed that caregivers of FEP patients reported more somatic symptoms ( $\beta$  coefficient 2.00, 95% CI: 0.55, 3.45), more social dysfunction ( $\beta$  coefficient 1.38, 95% CI: 0.39, 2.37) and higher levels of psychological distress ( $\beta$  coefficient 6.45, 95% CI: 1.93, 10.97) than those of controls. Also, caregivers of chronic patients had significantly higher scores in all scales of GHQ-28 compared to controls. Caregivers of chronic patients reported more anxiety and insomnia symptoms ( $\beta$  coefficient 3.19, 95% CI: 0.25, 6.14) and higher levels of psychological distress ( $\beta$  coefficient 7.49, 95% CI: 0.80, 14.17) than those of FEP patients. These associations were significant after adjusting for relative's age, patient's age, onset of mental illness, number of hospitalizations and longer hospitalization, symptoms' severity, and patients' functioning (Table 4).

### 3.6. Sensitivity analysis

In the second stage, we repeated the analysis in a subsample consisting of patients with a diagnosis of schizophrenia ( $n=43$  and  $n=39$ , for the groups of FEP and chronic patients, respectively).

Our aim was to examine whether the combination of patients with a diagnosis of schizophrenia and bipolar disorder in a single experimental group had affected our initial findings. This sensitivity analysis resulted in similar findings to our original analysis (data not shown).

## 4. Discussion

While many studies have been conducted examining the role of family functioning on the course of illness of chronically mentally ill patients, a few investigators have considered the role of family functioning on FEP focusing mainly at two attributes, EE and FB. To our knowledge, this is the first study that assessed family cohesion and adaptability along with other aspects of family functioning, such as EE, FB and caregiver's psychological well-being, in families of FEP patients. To obtain a clear picture of intrafamilial relationships during the early stages of the illness, we included in this analysis as comparison groups families of chronic patients and healthy controls. Our results indicated clear differences between families of psychiatric patients and controls, as well as differences between families of FEP and chronic patients in a variety of family functioning dimensions assessed.

### 4.1. Interpreting the study findings under the light of literature

In accordance to our first hypothesis, we found that families of FEP patients presented significantly lower levels of cohesion and flexibility, thus experienced higher levels of dysfunction, as

Table 4

Family functioning, expressed emotion, burden and psychological distress between relatives of first-episode and chronic patients, as well as healthy families, multivariable analysis.

	Family type								
	FEP vs. control families			Chronic vs. control families			Chronic vs. FEP families		
	$\beta$ -coeff	(95% CI)	p-value	$\beta$ -coeff	(95% CI)	p-value	$\beta$ -coeff	(95% CI)	p-value
<b>FACES-IV<sup>†</sup></b>									
Balanced Cohesion	-1.71	(-3.81, 0.39) <sup>a</sup>	0.110	-6.50	(-8.68, -4.32) <sup>a</sup>	< 0.001	-2.55	(-5.81, 0.71) <sup>b</sup>	0.123
Balanced Flexibility	-4.26	(-6.16, -2.37) <sup>a</sup>	< 0.001	-9.65	(-11.61, -7.68) <sup>a</sup>	< 0.001	-3.97	(-6.71, -1.23) <sup>b</sup>	0.005
Disengaged	1.27	(-0.74, 3.29) <sup>a</sup>	0.215	4.51	(2.42, 6.61) <sup>a</sup>	< 0.001	2.95	(-0.26, 6.16) <sup>b</sup>	0.071
Enmeshed	2.50	(0.66, 4.34) <sup>a</sup>	0.008	5.21	(3.30, 7.12) <sup>a</sup>	< 0.001	2.98	(0.26, 5.71) <sup>b</sup>	0.032
Rigid	3.22	(1.38, 5.07) <sup>a</sup>	0.001	5.96	(4.05, 7.88) <sup>a</sup>	< 0.001	3.78	(0.90, 6.65) <sup>b</sup>	0.011
Chaotic	1.72	(-0.42, 3.85) <sup>a</sup>	0.114	6.56	(4.35, 8.78) <sup>a</sup>	< 0.001	2.78	(-0.43, 5.99) <sup>b</sup>	0.089
Cohesion ratio	-0.47	(-0.74, -0.21) <sup>a</sup>	0.001	-1.08	(-1.36, -0.80) <sup>a</sup>	< 0.001	-0.45	(-0.81, -0.09) <sup>b</sup>	0.016
Flexibility ratio	-0.70	(-0.92, -0.48) <sup>a</sup>	< 0.001	-1.34	(-1.57, -1.11) <sup>a</sup>	< 0.001	-0.47	(-0.75, -0.20) <sup>b</sup>	0.001
Total Circumplex ratio	-0.59	(-0.81, -0.37) <sup>a</sup>	< 0.001	-1.21	(-1.45, -0.98) <sup>a</sup>	< 0.001	-0.46	(-0.75, -0.17) <sup>b</sup>	0.002
Communication	-4.53	(-7.71, -1.35) <sup>a</sup>	0.006	-11.72	(-15.02, -8.41) <sup>a</sup>	< 0.001	-3.73	(-8.80, 1.35) <sup>b</sup>	0.148
Satisfaction	-1.71	(-3.81, 0.39) <sup>a</sup>	0.110	-6.50	(-8.68, -4.32) <sup>a</sup>	< 0.001	-3.45	(-8.63, 1.73) <sup>b</sup>	0.189
<b>FQ<sup>†</sup></b>									
Critical Comments	-	-	-	-	-	-	6.95	(3.30, 10.60) <sup>c</sup>	< 0.001
Emotional Over-Involvement	-	-	-	-	-	-	2.86	(-0.52, 6.24) <sup>c</sup>	0.096
<b>FBS<sup>†</sup></b>									
Economic burden	-	-	-	-	-	-	1.20	(-0.08, 2.49) <sup>d</sup>	0.067
Impact on daily activities/social life	-	-	-	-	-	-	5.34	(3.14, 7.54) <sup>d</sup>	< 0.001
Aggressiveness	-	-	-	-	-	-	1.99	(0.62, 3.36) <sup>d</sup>	0.005
Impact on health	-	-	-	-	-	-	3.05	(0.93, 5.17) <sup>d</sup>	0.005
Objective burden	-	-	-	-	-	-	8.54	(5.02, 12.05) <sup>d</sup>	< 0.001
Burden total	-	-	-	-	-	-	11.28	(6.60, 15.96) <sup>d</sup>	< 0.001
<b>GHQ<sup>†</sup></b>									
Somatic symptoms	2.00	(0.55, 3.45) <sup>a</sup>	0.007	4.83	(3.32, 6.33) <sup>a</sup>	< 0.001	1.59	(-0.35, 3.54) <sup>e</sup>	0.107
Anxiety and insomnia	1.89	(-0.05, 3.83) <sup>a</sup>	0.056	6.36	(4.35, 8.37) <sup>a</sup>	< 0.001	3.19	(0.25, 6.14) <sup>e</sup>	0.034
Social dysfunction	1.38	(0.39, 2.37) <sup>a</sup>	0.007	2.94	(1.91, 3.97) <sup>a</sup>	< 0.001	0.40	(-1.12, 1.91) <sup>e</sup>	0.606
Severe depression	1.18	(-0.33, 2.69) <sup>a</sup>	0.124	2.59	(1.03, 4.16) <sup>a</sup>	< 0.001	1.50	(-0.86, 3.87) <sup>e</sup>	0.210
General health index	6.45	(1.93, 10.97) <sup>a</sup>	0.005	7.04	(12.03, 21.42) <sup>a</sup>	< 0.001	7.49	(0.80, 14.17) <sup>e</sup>	0.029

Abbreviations: FEP: First-Episode Psychosis; FACES: Family Adaptability and Cohesion Evaluation Scales; FQ: Family Questionnaire; FBS: Family Burden Scale; GHQ: General Health Questionnaire.

<sup>†</sup>  $\beta$ -coefficients and 95% CI of  $\beta$  are retained from linear regression. "FEP" and "Chronic" groups simultaneously in the model. Reference: control group.

<sup>a</sup> Adjusted for relative's age, marital status, family structure and number of children in the family.

<sup>b</sup> Adjusted for relative's age, marital status, financial status, family structure, patient's age, residence, financial status, onset of mental illness, age at illness onset, number of hospitalizations and last hospitalization, symptoms' severity, and patients' functioning.

<sup>c</sup> Adjusted for family structure, patient's residence, onset of mental illness and number of hospitalizations, symptoms' severity, and patients' functioning.

<sup>d</sup> Adjusted for patient's age, residence, onset of mental illness, age at illness onset, number of hospitalizations and longer hospitalization, symptoms' severity, and patients' functioning.

<sup>e</sup> Adjusted for relative's age, patient's age, onset of mental illness, number of hospitalizations and longer hospitalization, symptoms' severity, and patients' functioning.

compared to control families; also, they presented higher levels of cohesion and flexibility, thus the family system was viewed as more balanced and functional, as compared to chronic families. A possible explanation for this finding would be that levels of cohesion and flexibility decrease as a result of the chronicity of the illness. Apart from the ratio scores for cohesion, flexibility and Total Circumplex, significant differences were, also, found in specific scales of FACES IV which were worth discussing. Having significantly lower levels on Balanced Flexibility, FEP families were found to have less egalitarian leadership than control families. In addition, when cohesion levels were very high (Enmeshed systems) excessive consensus was evident and corresponded with inadequate independence. Whereas, when flexibility levels were very low (Rigid systems), one individual was in charge and was highly controlling. Furthermore, lower levels of communication were reported in FEP families compared to those of controls. More specifically, family members reported inability to make their ideas, thoughts and feelings known among the other members of a family unit. The comparison between families of FEP and chronic patients revealed difficulties in chronic families' ability to change when appropriate, intense emotional closeness with family

members being very dependent on each other and reactive to one another, limited negotiations between family members with most decisions imposed by the leader, strictly defined roles, and difficulty in changing rules as compared to FEP families. Within the Circumplex Model (Olson et al., 1979), cohesion is how systems balance their separateness vs. togetherness and flexibility is on how systems balance stability vs. change. From this point of view, our findings indicated that families of psychiatric patients experienced significant difficulties in achieving a balanced level of cohesion and flexibility; thus they experienced higher levels of dysfunction, as compared to control families. This finding is consistent with the results of previous studies which underscore that caring for a psychiatric patient can be a source of risk for unhealthy family functioning (Chang et al., 2001; Friedmann et al., 1997; Phillips et al., 1998; Romero et al., 2005; Sun and Cheung, 1997).

According to our second hypothesis, chronicity would adversely affect caregivers EE and FB towards the patient, as well as caregivers psychological distress. As far as caregivers EE is concerned, our results indicated that almost half of the families of FEP patients (46%) showed high EOI towards the patient. This rate is double the

prevalence rate reported in previous studies (Heikkilä et al., 2002; McNab et al., 2007; Meneghelli et al., 2011; Raune et al., 2004), whereas almost one-fourth of the families (24%) have high levels of CC, a rate consistent with the existing literature on FEP patients (Heikkilä et al., 2002; McNab et al., 2007; Meneghelli et al., 2011; Raune et al., 2004). This low percentage of CC found in our sample of FEP patients is at odds with a high prevalence of CC, hostility and rejection consistently reported over the past 40 years in samples of chronically ill patients (Bebbington and Kuipers, 1994; Hooley, 2007). We, also, found a high prevalence of high EE in families of chronic patients with almost similar prevalence rates for CC (76%) and EOI (78%), similarly with previous findings (Marom et al., 2005; Mavreas et al., 1992). In order to understand these differences EE should not be seen in isolation of intermediary factors such as the role of kinship, attitudes of the family to mental illness and family and cultural dynamics (Bhugra and McKenzie, 2003). There are considerable differences in terms of family ties between Northern and Southern European countries with the latter being characterized as “strong family ties countries” and contrasted with the “weak family ties countries” of Northern Europe and North America (Reher, 1998).

Our results supported the effect of chronicity in caregivers EE. This finding is consistent with the study of Vaughn et al. (1984) which indicates that EE is likely to be a function of chronicity, but inconsistent with the study of Bachmann et al. (2002) which compared FEP and chronic patients and did not detect this effect. In our study, CC were rarely reported by caregivers of FEP patients as opposed to those of chronic patients indicating that rejection and CC emerged, on average, after chronicity developed and perhaps as family members begin to both lose hope and found themselves increasingly frustrated and unable to help the psychiatrically challenged member of the family (McFarlane and Cook, 2007). It might be inferred that a lack of hope that arises from the continuous cycle of relapse and recurring episodes could, over time, translate into less helpful reactions on part of the family (Meneghelli et al., 2011). On the contrary, non-significant differences were found between FEP and chronic families in terms of EOI. The high levels of EOI compared with CC in the designation of EE could be interpreted as indicating that in the early stages of illness, caregivers more frequently expressed their feelings about their newly ill relatives in terms of over-concern and protection (which in exaggerated form becomes EOI), rather than irritation. Moreover, given the high prevalence of EOI found in both FEP and chronic families in our study it can be surmised, consistently with previous studies (Mavreas et al., 1992), that EOI is a dominant cultural feature of the behavior of Greek families. EOI behaviors indicating concern, commitment to patient's care and behaviors that contribute to patients' motivation may have a positive effect on the patient, while intrusive and overprotective behaviors by caregivers (i.e. excessive control of money and cigarettes) are probably bothersome to patients. It can be considered that caregivers' lack of knowledge about the illness leads to the negative aspects of EOI.

According to our findings, chronicity adversely impacted FB. Overall burden was more severe for caregivers of chronic patients who reported high levels of burden at a prevalence rate of 68%, almost six times larger than caregivers of FEP patients (12%). Our results indicated that caregivers of chronic patients reported significantly higher levels of both objective and subjective burden as compared to those of FEP patients. As for objective burden, we found that caring for a chronic patient has been associated with disruption on caregivers' daily activities and social life, as well as higher levels of patient's aggressiveness. Regarding subjective burden, caregivers of chronic patients reported a higher impact of patient's illness on their health and behavior than those of FEP patients. Therefore, inconsistently with studies which have found high levels of burden from the early stages of the illness among

caregivers indicating that they were clearly experiencing many difficulties in coping with the illness (Addington et al., 2003; Boydell et al., 2014; Wong et al., 2008), our findings support those of recent studies implicating no severe family burden among key relatives of FEP patients (Gonzalez-Blanch et al., 2010). This finding could be explained as those early illness stages, which are characterized by less symptom severity, i.e. negative symptoms and chronicity, and may require family involvement without incurring significant disruption in caregivers' lives. It may, also, be associated with the Greek temperament characterized by a more dramatic/highly expressive initial reaction that normalizes later on.

Finally, our findings indicated that a high percentage of relatives (62%) caring for a chronic patient experienced high levels of psychological distress. We, also, found a relatively high prevalence of psychological distress among relatives caring for a FEP patient (30%) which is inconsistent with Tennakoon et al. (2000) who found that only 12% of caregivers of 36 FEP patients presented high levels of distress and that this percentage was comparable to the general population. However, Addington et al. (2003) demonstrated that 26% of relatives of FEP patients presented severe distress and 21% moderate distress. The comparison between the two groups of families of psychiatric patients with controls revealed that caregivers of both FEP and chronic patients were significantly more likely to report mental health problems and poor mental health, whereas the comparison between caregivers of FEP and chronic patients indicated greater psychological distress for caregivers of chronic patients. These findings suggest that even in the early stages of the illness caregivers experience psychological distress related with the caring role; this effect becomes stronger as patients' illness follows a chronic and recurring course.

#### 4.2. Strengths and limitations

The strengths of the present study include its large sample size, the assessment of various aspects of family functioning by using standardized tools and the high participation rate (96.1%). Furthermore, patients participated in the present study consist a rather homogenous group, since they all live in a specific region of Crete, and are treated in the same department where similar therapeutic interventions take place. It should be noted that the Psychiatric Clinic of the University Hospital of Heraklion is the only public inpatient unit in the East part of the island of Crete, covering a population of more than 350,000 inhabitants. Moreover, the inclusion of a control group for comparison with the two groups of families of psychiatric patients allowed us to eliminate and isolate confounding variables and bias.

Nevertheless, there are some methodological limitations of our study. A possible limitation is that the population of patients and caregivers was from one catchment area and hence, generalizability in the Greek population may be limited. Future research should include larger and representative samples and by collecting data from different diagnostic groups. A second limitation is that due to the cross-sectional design of our study, no causal relationships between variables could be drawn. Thus, the examination of the exact mechanisms and mediators leading to the development of unhealthy family functioning was precluded; such a “mechanism hypothesis” would require a longitudinal design. Finally, another possible limitation would be the definition of “chronicity”, which was set in our study as “two or more hospitalizations”. Clinical work with families of patients with psychosis shows that the second and subsequent hospitalization are associated with a particular intensity of stress associated with the fact that there was a recurrence of the disease and the family must then “say goodbye to hope” that their relative's illness was of incidental

nature. At such a time, a strong negative emotional response may be elicited within the family. As time passes families display “a gradual adaptation to psychosis”. Therefore, the relationship between the analyzed phenomena can clearly change with the long-term course of the disease. Such important differences may be missed when chronicity is defined in such wide terms. In addition, chronicity defined by the number of hospitalizations raises doubts, because their number may be connected to the social context and the development of the system of care.

#### 4.3. Conclusions and impact of the study on research and health care services

In summary, even at the early stages of the illness, the family system appears to be more dysfunctional experiencing low levels of cohesion and flexibility as compared to control families. Moreover, unbalanced family functioning in terms of cohesion and flexibility, elevated levels of CC towards the patient, high levels of objective and subjective burden, as well as severe psychological distress reported by caregivers were found to be strongly associated with chronic and enduring psychosis. EOI seemed to be a dominant cultural feature of the behavior of Greek families with caregivers being overly involved in patients' lives from the early stages of the illness. Contrary to assumptions that FEP has a great impact on the family, low levels of FB among family members of FEP patients were observed, whereas caring for a psychiatric patient, either FEP or chronic, was linked to poor mental health. Reanalysis of the data including only patients with schizophrenia resulted in similar findings to our original analysis.

The findings of the present study further highlight the need to conduct a comprehensive family assessment so as to identify, gather and weigh factors that affect the family environment of people with severe psychiatric disorders. Instead of focusing on a single dimension, such as EE, an approach which embraces a broader view of family functioning in terms of cohesion and adaptability may provide a comprehensive picture of family interactions. The assessment of family functioning is a critical step to gain a better understanding of family dynamics and guide decisions regarding the appropriate intervention strategies. Furthermore, having a better understanding of family functioning from the early stages of the illness can result in strengthening the family as a unit, so as to provide better care to the patient through psychoeducation initiatives which coincide with specific family needs and circumstances gleaned from such comprehensive assessments.

Extended research over the past several decades has shown markedly high reductions in relapse and rehospitalization rates and improvement in psychosocial functioning among patients whose families received psychoeducation (Cassidy et al., 2001; Dixon et al., 2001; Falloon, 2003; McWilliams et al., 2010; Murray-Swank and Dixon, 2004; Pekkala and Merinder, 2002; Pharoah et al., 2010), with differences ranging from 20% to 50% over 2 years (McFarlane et al., 2003; Pitschel-Walz et al., 2001). Improved caregiver knowledge, including specific improvements in knowledge about medication, is the mechanism through which outcome may be improved for FEP patients with improved adherence and reduced relapse rates (McWilliams et al., 2010).

Furthermore, such ‘individualizing’ of family interventions based on the international best-practice guidelines for early psychosis (International Early Psychosis Association Writing Group, 2005) should be offered early on in order to maximize the family's adaptive functioning to the illness by educating caregivers about the nature and the course of patient's illness; improving communication patterns within the family; enhancing family's problem solving skills; improving family caregivers' coping strategies; and minimizing any disruption to family life caused

by the onset of psychosis. While psychoeducational interventions in the early stages of illness may prevent the onset and the negative impact of high EE, attention should also be directed toward the families of chronic patients. Such interventions can aim to ameliorate the negative effects of the illness and improve dysfunctional interactions in terms of increased levels of EE and FB with the hope of attenuating those factors which generate an adverse family atmosphere, and in this manner, promoting caregivers' psychological well-being (Kuipers et al., 2002; Pharoah et al., 2010). Given that the illness impacts family equilibrium from the early stages and chronicity influences the deterioration of family functioning, additional research seeking to replicate these findings can shed further light as to how to best implement interventions aiming to reinforce caregivers' positive behaviors i.e. concern and commitment and decrease negative behaviors i.e. intrusive and overprotective behaviors.

#### Conflicts of interest

The authors have no conflicts of interest to declare.

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## 4.6. Paper 6

### **Family functioning in first-episode and chronic psychosis: the role of patient's symptom severity and psychosocial functioning<sup>\*</sup>**

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## Abstract

The aim of the present study was to assess the relationship between illness-related characteristics, such as symptom severity and psychosocial functioning, and specific aspects of family functioning both in patients experiencing their first episode of psychosis (FEP) and chronically ill patients. A total of 50 FEP and 50 chronic patients and their family caregivers participated in the study. Family functioning was evaluated in terms of cohesion and adaptability (FACES IV Package), expressed emotion (EQ), family burden (FBS) and caregivers' psychological distress (GHQ-28). Patients' symptom severity (BPRS) and psychosocial functioning (GAS) were assessed by their treating psychiatrist within two weeks from the caregivers' assessment. Increased symptom severity was associated with greater dysfunction in terms of family cohesion and adaptability ( $\beta$  coefficient -0.13, 95% CI: -0.23, -0.03), increased caregivers' EE levels on the form of emotional overinvolvement ( $\beta$  coefficient 1.03, 95% CI: 0.02, 2.03), and psychological distress ( $\beta$  coefficient 3.37, 95% CI: 1.29, 5.45). Family burden was found to be significantly affected by both symptom severity ( $\beta$  coefficient 3.01, 95% CI: 1.50, 4.51) and patient's functioning ( $\beta$  coefficient -2.04, 95% CI: -3.55, -0.53). No significant interaction effect of chronicity was observed in the afore-mentioned associations. These findings indicate that severe psychopathology and patient's low psychosocial functioning are risk factors for poor family functioning. It appears that the effect for family function is significant from the early stages of the illness. Thus, early psychoeducational interventions should focus on patients with severe symptomatology and impaired functioning and their families.

**Keywords:** Symptom severity, psychosocial functioning, family functioning, expressed emotion, family burden, psychological distress.

## 1. Introduction

Families play a central role in providing long-term care and support to patients with psychosis. When a family member has been diagnosed with schizophrenia or related psychotic disorders, the whole family has to cope with the resulting medical appointments and hospital admissions and with a series of changes in family interactions. Since families have assumed a greater role in providing care for relatives with psychosis, understanding the determinants of dysfunctional family dynamics has become an important focus of research.

The study of family interactions is especially important in the early stages of the illness when most of the changes are observed (Birchwood & Macmillan, 1993). The past several decades have produced two important areas of inquiry involving families of patients experiencing their first episode of psychosis (FEP). One line of inquiry has focused on family communication patterns and interactions, usually characterised as expressed emotion (EE), and the other on family burden (FB) and experience of caring for an ill relative [see review by Koutra, Vgontzas, Lionis, & Triliva (2014)]. The symptoms of psychosis have been investigated in a variety of studies aiming to elucidate their impact on caregivers. Recent investigations that have included FEP patients suggest that patient's symptomatology and psychosocial functioning may have a limited effect on family relationships. A number of studies have shown no relation between symptom severity and impaired functioning in family EE (Heikkila et al., 2006; Heikkila et al., 2002; Meneghelli et al., 2011; Moller-Leimkuhler, 2005; Raune, Kuipers, & Bebbington, 2004), whereas only one study revealed that patients' symptoms were positively correlated with both the caregiver-rated and patient-rated EE (Mo, Chung, Wong, Chun, & Wong, 2008). In a similar vein, some studies have shown that symptom severity was not linked to FB (Moller-Leimkuhler, 2005) or caregivers' psychological distress (Addington, Coldham, Jones, Ko, & Addington, 2003; McCleery, Addington, & Addington, 2007), while others suggested that the level of FB was predicted by patient's symptomatology (Tennakoon et al., 2000; Wolthaus et al., 2002).

A variety of studies supported a strong association between illness-related variables and family environment of patients with chronic and enduring psychosis. Specifically, family EE was found to be influenced by patient's total symptom severity and negative symptoms (King, 2000). Also, caregivers' greater burden was predicted by patients' increased symptom severity (Grandon, Jenaro, & Lemos, 2008; Hjarthag, Helldin, Karilampi, & Norlander, 2010; Hou, Ke, Su, Lung, & Huang, 2008; Lowyck et al., 2004; Perlick et al., 2006; Provencher & Mueser, 1997; Roick et al., 2007; Schene, van Wijngaarden, & Koeter, 1998) and impaired functioning (Hjarthag et al., 2010; Tang, Leung, & Lam, 2008). Some studies examined the symptoms divided into positive and negative symptoms, and showed that higher burden was predicted by patients' both increased positive and negative symptoms (Lowyck et al., 2004; Perlick et al., 2006; Provencher & Mueser, 1997; Roick, et al., 2007; Schene, et al., 1998) or by positive symptoms alone (Grandon et al., 2008; Tang et al., 2008).

Deficits in psychosocial functioning can be observed in early stages of psychotic disorders, during acute exacerbations, and as part of the residual syndrome (Ballon, Kaur, Marks, & Cadenhead, 2007). Such impairments include poor social interaction, difficulties in maintaining relationships with family and friends, and/or inadequate performance in the workplace (Green, Kern, Braff, & Mintz, 2000). Moreover, the social difficulties and deficits that are apparent during the early stages of the illness resemble the difficulties and deficits that are characteristic of patients in the later stages of the illness (Hooley, 2000).

In Greece, the vast majority of patients diagnosed with psychosis return to their communities (Basta et al., 2013; Madianos, Papaghelis, Filippakis, Hatjiandreou, & Papageorgiou, 1997) after discharge from hospital and depend on the assistance and continued involvement of their families. While living with a patient with long-term psychosis, the majority of family members experience stigma-related phenomena which are associated with changes in social status, isolation and constant tension (Koukia & Madianos, 2005). Like other Mediterranean societies, Greek society does not easily tolerate deviant behaviour, although some changes in attitudes toward mental illness were observed over the last decades (Madianos, Economou, Hatjiandreou, Papageorgiou, & Rogakou, 1999). In addition, although the Greek family is seemingly a nuclear family (Georgas, 1999; Katakis, 1998; Papadiotis & Softas-Nall, 2006; Softas-Nall, 2003), in reality it functions as an extended one (Georgas, 1999; Georgas, 2000) characterised by cohesiveness and tight knit bonds and interactions. In this regard, illness in one family member may affect family dynamics and result in substantial burden for the entire family.

The aim of the present study is to examine the effect of patient's symptom severity and psychosocial functioning in a variety of aspects of family life in a Greek sample of FEP and chronic patients with a diagnosis of schizophrenia and bipolar disorder. To our knowledge, thus far no studies have been conducted in families of either FEP or chronic patients to ascertain patient's symptom severity and functioning on family cohesion and flexibility, whereas such research with regard to caregiver's EE status and FB is limited. Family functioning is a multifaceted concept which includes numerous constructs including family cohesion and flexibility and we suggest that many dimensions need to be assessed for a fuller understanding of such a complex entity as the family. In this paper, we tested the hypothesis that family dysfunction in terms of cohesion and flexibility, as well as high levels of relatives' EE, FB, and psychological distress would be related to patient's greater severity of illness and impaired functioning. And if dysfunctional interactions among family members are associated with patient's symptomatology and functional level, one would expect that these associations would differ in patients due to confounding variables, such as chronicity of the illness.

## **2. Methods**

### **2.1. Participants**

Sample size estimation was based on medium expected effect sizes, according to Cohen's criteria (Cohen, 1988), for power 0.80 and confidence level 0.05. Hence, 50 FEP patients and 50 chronic patients (Response Rate 96.1%) consecutively admitted in the Psychiatric Clinic of the University Hospital of Heraklion, Crete, Greece, and their key caregivers were recruited. The patients were contacted and informed about the purpose of the present study during a 12-month period (October 2011 – October 2012). The key caregiver was defined as the person who provides the most support devoting a substantial number of hours each day in taking care of the patient. For the purposes of this study, FEP patients were recruited upon first hospitalization whereas chronic patients had two or more hospitalizations.

To be eligible for inclusion in the study, the patients had to meet the following criteria: (i) to be between 17 and 40 years old, (ii) to have a good understanding of the Greek language, (iii) to have been out of hospital for at least 6 weeks and considered stabilised by their treating psychiatrist, (iv) to be living with a close relative, and (v) to have a diagnosis of schizophrenia or bipolar disorder according to Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) or International Classification of Disease (ICD-10) and with no evidence of organicity, significant intellectual handicap, or primary diagnosis of substance abuse. Inclusion criteria for the caregivers were: (i) to be between 18 and 75 years old, (ii) to have a good understanding of the Greek language, (iii) to have no diagnosed psychiatric illness, and (iv) to be either living with, or directly involved in the care of the patient.

## 2.2. Procedure

Caregivers were interviewed by the first author in individual sessions in the Psychiatric Clinic of the University Hospital of Heraklion, Crete, Greece, where participants were asked to take part in a study assessing family functioning of patients with schizophrenia and bipolar disorder. Caregivers were given an information sheet describing the aims of the study. The time needed to complete the interview was approximately 75 to 90 minutes. Patients' socio-demographic and clinical data were extracted from medical records and confirmed during the interview by the caregivers, whereas patients' symptoms and functioning were assessed by their treating psychiatrist within two weeks from the caregivers' assessment. All participants involved in the present study provided written informed consent. The study was approved by the Ethical Committee of the University Hospital in Heraklion, Crete, Greece.

## 2.3. Measures

### 2.3.1. Patients' measures

#### 2.3.1.1. Brief Psychiatric Rating Scale

The Brief Psychiatric Rating Scale (BPRS) (Overall & Gorham, 1962) is a comprehensive 18-item symptom scale, which includes items that address somatic concern, anxiety, emotional

withdrawal, conceptual disorganization, guilt feelings, tension, mannerisms and posturing, grandiosity, depressive mood, hostility, suspiciousness, hallucinatory behaviours, motor retardation, uncooperativeness, unusual thought content, blunted affect, excitement, and disorientation. The BPRS is used as part of a clinical interview in which the clinician makes observations among several symptomatic criteria and relies upon patient self-report for other criteria. The BPRS total score is used to assess global symptom change. The scale has been translated and standardized for the Greek population by Paneras and Crawford (Paneras & Crawford, 2004), and has demonstrated good psychometric properties.

#### 2.3.1.2. Global Assessment Scale

The Global Assessment Scale (GAS) (Endicott, Spitzer, Fleiss, & Cohen, 1976) is a rating scale for evaluating the overall functioning of a patient during a specified time period on a continuum from psychological or psychiatric illness to health. The scale ranges from 0 (inadequate information) to 100 (superior functioning). The scale is divided into ten equal intervals: 1 to 10, 11 to 20, and so on to 81 to 90 and 91 to 100. Particularly, 81-90 & 91-100 mean 'positive mental health' (superior functioning, a wide range of interests, social effectiveness, warmth, and integrity); 71-80: with no or only minimal psychopathology; 31-70: outpatients; 1-40: inpatients. The measure is designed for the use of clinicians. The data can be collected from patients, reliable informant, or a case record. The scale has been translated and standardized for the Greek population by Madianos (Madianos, 1987), and has demonstrated good psychometric properties.

#### 2.3.2. Caregivers' measures

##### 2.3.2.1. Family Adaptability and Cohesion Evaluation Scales IV Package

Family functioning was assessed by means of the Family Adaptability and Cohesion Evaluation Scales IV Package (FACES IV Package) (Olson, Gorall, & Tiesel, 2007) based on the Circumplex Model of Marital and Family Systems (Olson, Sprenkle, & Russell, 1979). The FACES IV Package contains the six scales from FACES IV, as well as the Family Communication Scale (FCS) and the Family Satisfaction Scale (FSS), and includes 62 items in total. The scales are self-report and they can be completed by all family members over the age of 12 years.

The FACES IV (Olson et al., 2007) measures family functioning in terms of cohesion and flexibility. The instrument contains a total of 42 items and displays a six-factor structure of family functioning including two balanced subscales assessing the intermediate range of cohesion and flexibility (Balanced Cohesion and Balanced Flexibility) and four unbalanced subscales assessing the high and low extremes of cohesion and flexibility (Disengaged and Enmeshed for cohesion, Rigid and Chaotic for flexibility). Responses range from 1 "strongly disagree" to 5 "strongly agree". Higher scores on the balanced scales are indicative of healthier functioning, and the converse holds truth for the unbalanced scales. These scales have very good levels of reliability and validity (Gorall, Tiesel, &

Olson, 2006). To determine the amount of balance versus unbalance in a family system, Cohesion, Flexibility, and Total Circumplex ratio scores can be calculated. When each score of the Cohesion and Flexibility ratios is at one and higher, the family system has more balanced levels of cohesion and flexibility. When the Total Circumplex ratio is one or higher, the family system is viewed as more balanced and functional.

Family Communication Scale (FCS) (Olson & Barnes, 1996) is a 10-item scale which addresses many of the most important aspects of communication in a family system. Responses range from 1 “strongly disagree” to 5 “strongly agree” and a higher score indicates more positive communication.

Family Satisfaction Scale (FSS) is, also, a 10-item scale that assesses the satisfaction of family members in regard to family cohesion, flexibility and communication (Olson, 1995). Responses range from 1 “very dissatisfied” to 5 “extremely satisfied” and a higher score on the scale indicates greater satisfaction in family system.

The FACES IV Package has been translated and validated for the Greek population by Koutra and colleagues (Koutra, Triliva, Roumeliotaki, Lionis, & Vgontzas, 2012), and has demonstrated good psychometric properties.

#### 2.3.2.2. Family Questionnaire

EE was measured via the Family Questionnaire (FQ) (Wiedemann, Rayki, Feinstein, & Hahlweg, 2002). The FQ is a 20-item self-report questionnaire measuring the EE status of relatives of patients with schizophrenia in terms of in terms of emotional overinvolvement (EOI) and critical comments (CC). EOI includes unusually over-intrusive, self-sacrificing, overprotective, or devoted behaviour, exaggerated emotional response, and over-identification with the patient, whereas CC is defined as an unfavourable comment on the behavior or the personality of the person to whom it refers (Leff & Vaughn, 1985). The measure consists of 10 items for each subscale. Responses range from 1 “never/very rarely” to 4 “very often” and a higher total score indicates higher EE. The developers provide a cut-off point of 23 as an indication of high CC, and 27 for EOI. The FQ has excellent psychometric properties including a clear factor structure, good internal consistency of subscales and good inter-rater reliability. The FQ has been translated and validated for the Greek population by Koutra and colleagues (Koutra, Economou, et al., 2014), and has demonstrated good psychometric properties.

#### 2.3.2.3. Family Burden Scale

The Family Burden Scale (FBS) (Madianos et al., 2004) was used to measure FB. The FBS consists of 23 items. The four FBS dimensions are defined as follows: A) Impact on daily activities/social life (eight items): defined in terms of burden experienced regarding disruption of daily/social activities; B) Aggressiveness (four items): captures the presence of episodes of hostility,

violence and destruction of property; C) Impact on health (six items): assesses signs and symptoms of psychopathology reported by the family caregiver; D) Economic burden (five items): defined in terms of financial problems created by the patient's illness. Factor A, B, and D items tap objective burden; whereas C items underlie subjective burden. The developers provide a cut-off point of 24 (for the total scale score) to produce the best values of sensitivity and specificity. The scale has been originally developed and standardized in the Greek population by Madianos and colleagues (Madianos et al., 2004), and has demonstrated good psychometric properties.

#### 2.3.2.4. General Health Questionnaire

The General Health Questionnaire-28 item version (GHQ-28) (Goldberg et al., 1997), a self-administered instrument that screens for non-psychotic psychopathology in clinical and non-clinical settings, was used to assess relatives' psychological distress. Its four subscales measure somatic symptoms, anxiety/insomnia, social dysfunction and severe depression. In the GHQ-28 the respondent is asked to compare his recent psychological state with his usual state on a four-point scale (0-not at all, 1-no more than usual, 2-rather more than usual, 3-much more than usual). In the present study the Likert scoring procedure (0,1,2,3) is applied providing a more acceptable distribution of scores and the total scale score ranges from 0 to 84. Higher scores on the scale are indicative of poorer psychological well-being. The cut-off score for identifying cases of psychiatric disorder is 23/24 for Likert scoring. The scale has very good levels of reliability and validity. The 28-item version of this instrument has been adapted for the Greek population by Garyfallos and colleagues (Garyfallos et al., 1991), and has demonstrated good psychometric properties.

#### 2.4. Potential confounders

Potential confounders evaluated included caregivers' and patients' characteristics that have an established or potential association with patients' symptoms and overall functioning, as well as with family functioning variables. Caregivers' characteristics included relative's age, education (low level:  $\leq 9$  years of school, medium level:  $\leq 12$  years of school and  $>9$  years of school, high level: some years in university or university degree), origin (urban vs. rural), family structure (two-parent family vs. one-parent family), and number of family members. Patients' characteristics included patient's gender (male vs. female), education (low level:  $\leq 9$  years of school, medium level:  $\leq 12$  years of school and  $>9$  years of school, high level: some years in university or university degree), working status (working vs. not working), diagnosis (schizophrenia vs. bipolar disorder), chronicity of the illness (FEP vs. chronic patients), and onset of mental illness ( $\leq 12$  months, 1-4 years,  $>4$  years).

#### 2.5. Statistical analysis

Descriptive statistics were used to summarize the baseline characteristics of the participants. The characteristics of FEP patients were compared with those of chronic patients depending on the

distribution of the variables: chi square tests for categorical data, independent sample t tests for the comparison of normally distributed variables and the Mann–Whitney U test for non-normally distributed data. The primary exposures of interest were patient’s symptom severity (BPRS) and psychosocial functioning (GAS) and the main outcome variables were family cohesion and flexibility (FACES IV), EE (FQ), FB (FBS) and caregivers’ psychological well-being (GHQ-28). Multivariable linear regression models were fit to estimate the associations between severity of patient’s symptoms (a per 10 unit increase in BPRS) and functioning (a per 10 unit increase in GAS) and family variables after adjusting for confounders, as well. Potential confounders related with both the outcomes and the exposure of interest in the bivariate associations with a p value <0.2 were included in the multivariable models. Separate multivariable models were built having as an outcome each one of the family measures. Effect modification by illness’s chronicity was evaluated using the likelihood ratio test through inclusion of the interaction terms in the models (statistically significant effect modification if p-value <0.05). Estimated associations are described in terms of  $\beta$ -coefficients (beta) and their 95% confidence intervals (CI). All hypothesis testing was conducted assuming a 0.05 significance level and a two-sided alternative hypothesis. All statistical analyses were performed using SPSS Statistics 19 software (IBM, Armonk, NY, USA).

### **3. Results**

#### **3.1. Sample characteristics**

Table 1 presents the descriptive characteristics of family caregivers participated in the study. The sample consisted of 15 males (15.0%) and 85 females (85.0%), ranging in age from 28 to 75 years with a mean age of 56.80 years (SD=9.98). The 64.0% had finished elementary or high school and the vast majority of the sample (72.0%) were not currently working. The 82.0% were living in urban areas and the 63.0% were married. Finally, the 92.0% were parents, the 81.0% were living with the patient, and the 95.0% had daily contact with the patient. In terms of family structure, the 64.0% of the families were two-parent families while the 36.0% were one-parent families.

Patients’ socio-demographic and clinical characteristics are presented in Table 2. The sample consisted of 66 males (66.0%) and 34 females (34.0%), ranging in age from 17 to 40 years with a mean age of 31.09±5.75 years (x±SD). The vast majority of the patients were single (85.0%), they came from urban areas (91.0%), and they were living in urban areas (86.0%). Half of the sample had finished lyceum or had some years in university. The 86.0% were not working at the time of the assessment, whereas almost half of the sample had no income. As far as diagnosis, 82.0% had schizophrenia, while 18.0% had bipolar disorder. The patients had an onset of illness between 15 and 39 years of age with a mean age of 24.03±5.48 years (x±SD). Half of the patients had an onset of illness at 4 years or longer. The 50.0% of the sample were FEP (they had one hospitalization) and the 50.0% were chronic patients (they had two or more hospitalizations). The length of longer hospitalisation was up to 20 days for the 65.0% of the sample, and more than 20 days for the 35.0%.

All patients were under pharmacotherapy, whereas only a limited proportion of patients were additionally under psychotherapy (4.0%) or underwent a psychosocial rehabilitation programme (2.0%).

### 3.2. Associations of patients' symptom severity and psychosocial functioning with socio-demographic and clinical characteristics

The two exposure variables, BPRS and GAS, were highly correlated to each other ( $\rho = -0.79$ ,  $p < 0.001$ ). In our sample, patient's symptom severity and overall functioning were significantly related to patient's gender and chronicity of the illness, indicating more severe symptoms and impaired functioning for males as compared to females, as well as for chronic patients compared to FEP patients. Also, patient's overall functioning was positively associated with patient's educational level and working status, indicating that highly educated and working patients were more functional than non-working and less educated patients (Table 2).

### 3.3. Associations between symptom severity with family outcomes, multivariate analysis

Multivariable analysis adjusted for confounding variables revealed that greater symptom severity, as measured by the BPRS scale, was significantly associated with lower scores in Cohesion Ratio ( $\beta$  coefficient -0.14, 95% CI: -0.26, -0.01), Flexibility Ratio ( $\beta$  coefficient -0.12, 95% CI: -0.22, -0.03), and Total Circumplex Ratio ( $\beta$  coefficient -0.13, 95% CI: -0.23, -0.03) of FACES-IV Package. Regarding caregivers' EE status, a per 10 unit increase in the BPRS scale was associated with 1.03 units increase in the EOI subscale of the FQ ( $\beta$  coefficient 1.03, 95% CI: 0.02, 2.03). Symptom severity was also associated to both objective and subjective burden (total burden increase: 3.01, 95% CI: 1.50, 4.51), as well as caregiver's psychological distress (total increase in general health index: 3.37, 95% CI: 1.29, 5.45). No significant interaction between BPRS scale and illness's chronicity was observed ( $p > 0.05$ ) (Table 3).

### 3.4. Associations between symptom patient's psychosocial functioning and family outcomes, multivariate analysis

Patient's improved overall functioning was significantly associated with reduced caregiver's burden (total burden reduction: -2.04, 95% CI: -3.55, -0.53). More specifically, a per 10 unit increase in the GAS score was associated with 1.37 and 0.82 unit decrease in objective ( $\beta$  coefficient -1.37, 95% CI: -2.49, -0.24) and subjective ( $\beta$  coefficient -0.82, 95% CI: -1.50, -0.15) burden, respectively. Finally, a per 10 unit increase in the GAS score was related to 0.77 unit decrease in severe depression subscale ( $\beta$  coefficient -0.77, 95% CI: -1.52, -0.03) of the GHQ. No significant interaction between GAS score and illness's chronicity was observed ( $p > 0.05$ ) (Table 3).

## 4. Discussion

In the present study we investigated how different aspects of family functioning in families of patients with psychosis are affected by illness-related characteristics, such as symptom severity and patient's psychosocial functioning. Of the two clinical variables investigated in this study, our results demonstrated that symptom severity rather than the functional status of the patient had the most significant impact on family cohesion and flexibility, as well as caregiver's EE status in terms of EOI, and psychological distress; both symptom severity and patient's functioning were found to impact on FB, proving a close connection of these two dimensions in the long-term treatment of psychosis. Furthermore, even though chronicity of the illness (FEP vs. chronic patients) was estimated to be the stronger confounder in the relationship between symptom severity, as well as patient's psychosocial functioning and family outcomes, our findings indicated no significant interaction effect of chronicity in the afore-mentioned associations.

In this paper, we tested the hypothesis that unhealthy family functioning in terms of cohesion and flexibility is associated with patient's greater severity of illness and impaired psychosocial functioning. Within the Circumplex Model (Olson et al., 1979), cohesion is how systems balance their separateness versus togetherness and flexibility is on how systems balance stability versus change. Our results indicated that as patient's symptom severity increased family caregivers of either FEP or chronic patients experienced greater unbalanced levels of cohesion and flexibility in the family. In light of this, the family system was viewed as less balanced and functional and thus families experienced higher levels of dysfunction. Since previous research has not investigated this aspect, we found the results interesting as well as reasonable. According to our findings, no significant effect of patients' psychosocial functioning on family cohesion and flexibility was found. Interestingly, contrary to our assumptions, neither symptom severity nor functioning was found to impact family communication, which is considered facilitating of cohesion and flexibility, as well as family satisfaction.

In line with prior research, we hypothesized that the poorer psychiatric status of the patient would lead to higher levels of EE, FB and caregiver's psychological distress. As far as caregivers' EE is concerned, our findings indicated that increased symptom severity was linked to elevated levels of caregiver's EOI. Although previous research on FEP patients has shown no impact of patient's symptom severity and impaired functioning on either caregivers' EOI or CC (Heikkila et al., 2006; Heikkila, et al., 2002; Meneghelli, et al., 2011; Moller-Leimkuhler, 2005; Raune, et al., 2004), in the study of King (King, 2000), both EOI and CC were influenced by patient's total symptom severity and especially by negative symptoms. Furthermore, in a previous Greek study (Mavreas, Tomaras, Karydi, Economou, & Stefanis, 1992), high EE in the form of EOI was related to both negative and positive symptoms, indicating that high EOI might reflect efforts on the part of the relatives to cope with the difficulties of living with a patient experiencing higher levels of negative symptoms. Our results indicated that high levels of EOI might be a reaction to increased symptom severity, independently of the patient being either in the early stages of the illness or later on. EOI has been found to be a

dominant cultural feature of the behaviour of Greek families (Mavreas et al., 1992). Thus, the more ill the patient, the more likely the caregivers would express their concern in terms of over-concern and protection (which in exaggerated form becomes EOI), rather than irritation, dislike or disapproval of the patient's behaviour.

We, also, found that increased symptomatology and a low functional level of either FEP or chronic patients contributes to greater burden for their caregivers. Earlier studies on FEP (Tennakoon et al., 2000; Wolthaus et al., 2002) or chronic patients (Grandon et al., 2008; Hjarthag et al., 2010; Hou et al., 2008; Lowyck et al., 2004; Perlick et al., 2006; Provencher & Mueser 1997; Roick, Heider, Toumi, & Angermeyer, 2006; Schene et al., 1998; Tang et al., 2008) point in the same direction. There are multiple perspectives leading to an understanding of the similarity of FEP and chronic patients' caregivers regarding their burden status. Psychotic symptoms are associated with impaired everyday functioning which influence the patient's behaviour and capacity to carry out daily activities. Impaired competence and efficiency results in the patient's dependence on caregiver, thus increasing the level of his/her burden. In addition, the limited resources in community care in Greece makes the already difficult task of caregiving even more of a struggle. The lack of professional help, i.e. psychosocial rehabilitation groups, as well as inadequate family psychoeducation/support, may heighten caregivers' worries and often places the onus of care and monitoring solely on them. This may lead to a more intrusive manner of engaging with the patient resulting in vicious cycle of greater burden for all. Furthermore, due to the difficult economic conditions in Greece, there are limited opportunities for mental health patients to work on a regular basis or in subsidized employment. In our study, the 86% of the patients were not working. As a result, the majority of the patients spend most of the day and nearly every day confined home, whereas few of them receive public welfare benefits.

Finally, a strong association between symptom severity and caregivers' psychological distress was found indicating that the more severe the patient's symptoms the greater the distress for family caregivers. Although earlier research on FEP patients has shown no links between patient's symptomatology and caregivers' psychological distress (Addington et al., 2003; McCleery et al., 2007), this association proved remarkably robust in chronic patients (Mitsonis et al., 2012; Winefield & Harvey, 1993). Finally, while patient's level of functioning appeared to be unrelated to general health index of GHQ indicating no effect on caregivers' psychological distress in our study, it was significantly associated with a specific domain of distress, i.e. severe depression in caregivers of patients with psychosis.

In our sample, a significant negative correlation between patient's psychosocial functioning and symptom severity was found, similarly with previous findings (Schaub et al., 2011). Furthermore, consistently with the existing literature, symptom severity and functioning were significantly related to patient's gender, educational level, working status, and chronicity of the illness. Male patients were found to experience more severe symptoms (especially negative symptoms) than female ones (Cowell, Kostianovsky, Gur, Turetsky, & Gur, 1996; Gur, Petty, Turetsky, & Gur, 1996; Shtasel, Gur,

Gallacher, Heimberg, & Gur, 1992), whereas females were found to have a milder range of interpersonal problems and are characterized by better social functioning than males (Hass & Garratt, 1998; Sorgaard, et al., 2001). This can be attributed to the later illness's onset and the development of family dynamics (Sorgaard et al., 2001), i.e women are more likely to have been married, to be able to live independently, and to be employed, despite having similar symptom profiles with men (Andia et al., 1995). Also, patient's education and working status have been shown to be predictive of functional outcome, as non-working patients show significantly worse functional outcomes (Hoffmann, Kupper, Zbinden, & Hirsbrunner, 2003; Honkonen, Stengard, Virtanen, & Salokangas, 2007; Schennach-Wolff, et al., 2009). Finally, research suggests that patients with longer overall illness duration appeared to have less favourable functional outcomes (Haro, Novick, Suarez, Ochoa, & Roca, 2008; Schennach-Wolff, et al., 2009).

The strengths of the present study include its large sample size, the assessment of various aspects of family functioning by using standardized tools and the high participation rate (96.1%). Furthermore, patients who participated in the present study constitute a rather homogenous group, since they all live in a specific region in Crete, and are treated in the same department where similar therapeutic interventions take place. It should be noted that the Psychiatric Clinic of the University Hospital of Heraklion is the only public inpatient Unit in the East part of the island of Crete, covering a population of more than 350.000 inhabitants. Moreover, the inclusion of two groups of patients (FEP and chronic) for comparison allowed us to eliminate and isolate confounding variables and bias. Furthermore, all assessments were performed during a specific post-hospitalisation time period (patients had to have been out of hospital for at least 6 weeks). This selection criterion represents strength in our study, since it allows for some control of functioning difficulties related to adjustment to a recent diagnosis for FEP patients or a recent relapse for chronic patients.

However, there are several limitations in the present study that deserve acknowledgement. A possible limitation is that the population of patients and caregivers were from one catchment area and hence, generalizability may be limited. Future research should include larger and representative samples and data from different diagnostic groups. A second limitation is that, due to its cross-sectional design, our study limits the direct inference of causation. Although difficult to conduct, longitudinal investigations of family functioning are needed to permit the examination of the exact mechanisms and mediators leading to the development of unhealthy family functioning.

Notwithstanding these limitations, our study serves as an important step toward recognizing the effect of specific illness-related variables in family functioning of patients with psychosis. Clarification of the relationship between psychiatric status of the patient and the family environment is necessary in that understanding how psychiatric symptoms impact family interactions from the early stages of the illness could inform the development of more effective psychosocial interventions for both patients and their families. The results of our study are taken as an indication that dysfunctional levels of family cohesion and adaptability, high levels of caregivers' EOI and psychological distress

can be primarily tied to patient's increased symptom severity, whereas both symptom severity and patient functioning were found to be important contributing factors that affect caregivers' burden. Chronicity of the illness does not appear to be a moderating factor in the afore-mentioned relationships. These findings indicate that psychoeducational interventions from the early stages of the illness should focus on both the patient and his/her family aiming not only at reducing symptoms but also maximizing patient's psychosocial functioning, thus contributing to ameliorating family's level of dysfunction. A large number of positive effects of psychoeducation have been reported in patients with psychotic disorders, including high reductions in relapse and rehospitalization rates, better treatment adherence and improvement in psychosocial functioning (Cassidy, Hill, & O'Callaghan, 2001; Dixon et al., 2001; Falloon 2003; McWilliams et al., 2010; Murray-Swank & Dixon, 2004; Pekkala & Merinder, 2002; Pharoah, Mari, Rathbone, & Wong, 2010). Taking into serious consideration that patients who have achieved a lower symptom level and a better level of functioning seemed to live in less stressful family environments, we suggest that family dysfunction can be reduced by developing understandings of family dynamics and functioning. This entails that family psychoeducational interventions should be considered aiming at improving dysfunctional family interactions and thus minimizing disruption to family life (Kuipers, Lam, & Leff, 2002; Pharoah, et al., 2010).

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### **Conflicts of interest**

The authors have no conflicts of interest to declare.

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**Table 1.** Descriptive characteristics of the family caregivers participated in the study.

Caregivers' characteristics	BPRS				GAS			
	M	SD	r	p-value <sup>a</sup>	r	p-value <sup>a</sup>		
Age	56.80	9.98	0.182	0.069	0.117	0.246		
Children in the family	2.72	1.15	-0.056	0.578	0.098	0.333		
Number of family members	4.47	1.26	-0.052	0.608	0.082	0.420		
<b>Gender</b>	<b>N</b>	<b>%</b>	<b>M</b>	<b>SD</b>	<b>p-value<sup>a</sup></b>	<b>M</b>	<b>SD</b>	<b>p-value<sup>a</sup></b>
Male	15	15.0	43.67	12.13	0.859	57.87	18.01	0.981
Female	85	85.0	42.91	15.68		56.47	15.16	
<b>Education</b>								
Elementary/High school	64	64.0	41.33	14.14	0.070	57.11	13.99	0.646
Lyceum/Some years in university	31	31.0	47.81	16.68		55.13	17.95	
University degree	5	5.0	35.00	11.85		60.80	20.58	
<b>Employment status</b>								
Working	28	28.0	44.32	14.56	0.595	53.89	15.68	0.182
Not working	72	72.0	42.51	15.44		57.76	15.44	
<b>Origin</b>								
Urban	57	57.0	45.79	16.45	0.085	56.04	15.75	0.528
Rural	43	43.0	39.35	12.48		57.53	15.36	
<b>Residence</b>								
Urban	82	82.0	43.73	15.34	0.318	56.56	15.20	0.946
Rural	18	18.0	39.78	14.18		57.22	17.38	
<b>Marital status</b>								
Single	3	3.0	43.33	24.91	0.982	60.67	22.50	0.825
Married	63	63.0	42.79	14.88		57.41	16.04	
Divorced/Widow	34	34.0	43.41	15.32		54.97	14.26	
<b>Financial status</b>								
No individual income <10.000€	30	30.0	41.93	16.90	0.888	58.50	16.27	0.686
10.000€-20.000€	39	39.0	43.72	16.20		55.08	14.90	
	31	31.0	43.19	12.12		56.94	15.86	
<b>Living with the patient</b>								
No	19	19.0	38.63	13.95	0.162	58.58	14.99	0.436
Yes	81	81.0	44.05	15.32		56.23	15.70	
<b>Relation to patient</b>								
Parent	92	92.0	42.46	14.75	0.209	56.48	15.11	0.849
Other	8	8.0	49.50	19.09		59.00	20.83	
<b>Contact with the patient</b>								
Daily	95	95.0	42.92	15.22	0.766	56.83	15.51	0.824
1-2 times/week	5	5.0	45.00	15.12		53.80	17.41	
<b>Family structure</b>								
Two-parent family	64	64.0	42.59	14.84	0.710	57.94	16.15	0.398
One-parent family	36	36.0	43.78	15.86		54.44	14.30	

Abbreviations: FEP: First-Episode Psychosis; BPRS: Brief Psychiatric Rating Scale; GAS: Global Assessment Scale.

<sup>a</sup> t-test and ANOVA were used for differences between continuous normally distributed variables (BPRS); Mann-Whitney and Kruskal-Wallis tests were used for differences between continuous non-normally distributed variables (GAS).

**Table 2.** Descriptive characteristics of the patients participated in the study.

Patients' characteristics	BPRS				GAS			
	M	SD	r	p-value <sup>a</sup>	r	p-value <sup>a</sup>		
Age	31.09	5.75	-0.037	0.714	-0.005	0.960		
Children in the family	0.28	0.75	0.057	0.573	0.043	0.669		
Age at illness's onset	24.03	5.48	-0.001	0.992	0.015	0.884		
<b>Gender</b>	<b>N</b>	<b>%</b>						
Male	66	66.0	45.44	15.28	<b>0.025</b>	52.65	13.82	<b>&lt;0.001</b>
Female	34	34.0	38.32	13.93		64.50	15.86	
<b>Education</b>								
Elementary/High school	38	38.0	46.21	15.65	0.249	52.34	13.27	<b>0.013</b>
Lyceum/Some years in university	52	52.0	40.83	14.51		57.35	14.90	
University degree	10	10.0	42.30	15.94		69.70	19.99	
<b>Employment status</b>								
Working	14	14.0	36.43	13.69	0.079	68.36	15.69	<b>0.003</b>
Not working	86	86.0	44.09	15.18		54.78	14.73	
<b>Origin</b>								
Urban	91	91.0	43.15	15.02	0.780	56.24	15.44	0.402
Rural	9	9.0	41.67	17.40		61.11	16.67	
<b>Residence</b>								
Urban	86	86.0	43.58	15.03	0.361	56.37	15.34	0.567
Rural	14	14.0	39.57	15.75		58.57	17.07	
<b>Marital status</b>								
Single	85	85.0	43.20	15.04	0.793	56.07	14.87	0.490
Married	6	6.0	45.00	21.96		66.67	23.18	
Divorced/Widow	9	9.0	40.00	12.28		55.78	15.68	
<b>Financial status</b>								
No individual income	49	49.0	41.27	14.80	0.529	57.43	14.95	0.539
<10.000€	47	47.0	44.72	15.29		56.62	16.50	
10.000€-20.000€	4	4.0	44.50	19.60		48.25	9.95	
<b>Diagnosis</b>								
Schizophrenia	82	82.0	41.63	14.73	0.050	57.18	14.96	0.275
Bipolar disorder	18	18.0	49.33	15.87		54.39	18.16	
<b>Onset of mental illness</b>								
≤ 12 months	22	22.0	40.55	12.72	0.324	63.95	16.93	0.081
1-4 years	28	28.0	40.89	13.21		55.79	13.36	
>4 years	50	50.0	45.30	16.96		53.98	15.30	
<b>Type of patient</b>								
FEP	50	50.0	39.78	15.44	<b>0.032</b>	60.52	16.52	<b>0.011</b>
Chronic	50	50.0	46.26	14.28		52.84	13.56	
<b>Duration of longer hospitalisation</b>								
Up to 20 days	65	65.0	41.51	14.82	0.175	57.98	14.84	0.212
20+ days	35	35.0	45.83	15.57		54.26	16.67	
<b>Last hospitalisation</b>								
Within the last 6 months	32	32.0	43.84	13.94	0.609	54.63	13.46	0.691
7-12 months	65	65.0	43.00	15.88		57.51	16.40	
>1 year	3	3.0	34.67	12.90		60.67	20.03	

*Abbreviations:* FEP: First-Episode Psychosis; BPRS: Brief Psychiatric Rating Scale; GAS: Global Assessment Scale.

<sup>a</sup> t-test and ANOVA were used for differences between continuous normally distributed variables (BPRS); Mann-Whitney and Kruskal-Wallis tests were used for differences between continuous non-normally distributed variables (GAS).

**Table 3.** Associations of patients' symptom severity and functioning with family functioning, multivariable analyses.

	BPRS (per 10 unit increase)			GAS (per 10 unit increase)		
	$\beta$	(95% CI)	p-value	$\beta$	(95% CI)	p-value
<b>FACES-IV<sup>‡</sup></b>						
Cohesion_Ratio	<b>-0.14</b>	<b>(-0.26, -0.01)<sup>a</sup></b>	<b>0.031</b>	0.04	(-0.08, 0.16) <sup>b</sup>	0.495
Flexibility_Ratio	<b>-0.12</b>	<b>(-0.22, -0.03)<sup>a</sup></b>	<b>0.011</b>	0.04	(-0.04, 0.13) <sup>b</sup>	0.319
Total_Ratio	<b>-0.13</b>	<b>(-0.23, -0.03)<sup>a</sup></b>	<b>0.011</b>	0.04	(-0.05, 0.14) <sup>b</sup>	0.375
Communication Satisfaction	-0.93	(-2.54, 0.68) <sup>a</sup>	0.258	0.98	(-0.50, 2.46) <sup>b</sup>	0.194
	-1.47	(-3.15, 0.21) <sup>a</sup>	0.087	1.23	(-0.37, 2.82) <sup>b</sup>	0.132
<b>FQ<sup>‡</sup></b>						
Critical Comments	1.01	(-0.15, 2.18) <sup>c</sup>	0.089	-0.45	(-1.55, 0.65) <sup>d</sup>	0.422
Emotional Overinvolvement	<b>1.03</b>	<b>(0.02, 2.03)<sup>c</sup></b>	<b>0.046</b>	-0.24	(-1.24, 0.75) <sup>d</sup>	0.631
<b>FBS<sup>‡</sup></b>						
Economic burden	<b>0.39</b>	<b>(0.04, 0.75)<sup>e</sup></b>	<b>0.028</b>	-0.23	(-0.56, 0.11) <sup>f</sup>	0.185
Impact on daily activities/social life	<b>1.27</b>	<b>(0.56, 1.97)<sup>e</sup></b>	<b>&lt;0.001</b>	<b>-0.73</b>	<b>(-1.44, -0.03)<sup>f</sup></b>	<b>0.041</b>
Aggressiveness	<b>0.51</b>	<b>(0.06, 0.96)<sup>e</sup></b>	<b>0.026</b>	-0.41	(-0.85, 0.03) <sup>f</sup>	0.070
Subjective burden	<b>0.98</b>	<b>(0.27, 1.69)<sup>e</sup></b>	<b>0.007</b>	<b>-0.82</b>	<b>(-1.50, -0.15)<sup>f</sup></b>	<b>0.017</b>
Objective burden	<b>2.17</b>	<b>(1.07, 3.27)<sup>e</sup></b>	<b>&lt;0.001</b>	<b>-1.37</b>	<b>(-2.49, -0.24)<sup>f</sup></b>	<b>0.017</b>
Total burden	<b>3.01</b>	<b>(1.50, 4.51)<sup>e</sup></b>	<b>&lt;0.001</b>	<b>-2.04</b>	<b>(-3.55, -0.53)<sup>f</sup></b>	<b>0.008</b>
<b>GHQ<sup>‡</sup></b>						
Somatic symptoms	<b>0.74</b>	<b>(0.03, 1.45)<sup>g</sup></b>	<b>0.041</b>	-0.13	(-0.83, 0.57) <sup>h</sup>	0.090
Anxiety and insomnia	<b>1.12</b>	<b>(0.20, 2.04)<sup>g</sup></b>	<b>0.017</b>	-0.21	(-1.13, 0.71) <sup>h</sup>	0.071
Social dysfunction	<b>0.50</b>	<b>(0.01, 0.99)<sup>g</sup></b>	<b>0.045</b>	-0.20	(-0.71, 0.30) <sup>h</sup>	0.304
Severe depression	<b>1.02</b>	<b>(0.28, 1.76)<sup>g</sup></b>	<b>0.007</b>	<b>-0.77</b>	<b>(-1.52, -0.03)<sup>h</sup></b>	<b>0.021</b>
General Health Index	<b>3.37</b>	<b>(1.29, 5.45)<sup>g</sup></b>	<b>0.001</b>	-1.31	(-3.50, 0.87) <sup>h</sup>	0.019

Abbreviations: FEP: First-Episode Psychosis; BPRS: Brief Psychiatric Rating Scale; GAS: Global Assessment Scale; FACES: Family Adaptability and Cohesion Evaluation Scales; FQ: Family Questionnaire; FBS: Family Burden Scale; GHQ: General Health Questionnaire.

<sup>‡</sup>  $\beta$ -coefficients and 95%CI of  $\beta$  retained from linear regression. All models were adjusted for the interaction of chronicity of the illness with the exposure variable (BPRS or GAS). Bold font indicates statistically significant differences ( $p < 0.05$ ).

<sup>a</sup> Adjusted for relative's education and origin, patient's working status, diagnosis, onset of mental illness, and chronicity of the illness.

<sup>b</sup> Adjusted for family structure, patient's education, working status, diagnosis, onset of mental illness, and chronicity of the illness.

<sup>c</sup> Adjusted for relative's age, education, origin, patient's diagnosis, and chronicity of the illness.

<sup>d</sup> Adjusted for family structure, number of family members, onset of mental illness, and chronicity of the illness.

<sup>e</sup> Adjusted for relative's origin, patient's gender, working status, diagnosis, and chronicity of the illness.

<sup>f</sup> Adjusted for family structure, patient's gender, education, working status, onset of mental illness, and chronicity of the illness.

<sup>g</sup> Adjusted for relative's age, origin, patient's working status, onset of mental illness, and chronicity of the illness.

<sup>h</sup> Adjusted for family structure, number of family members, patient's working status, onset of mental illness, and chronicity of the illness.

## 4.7. Paper 7

### **Linking family cohesion and flexibility with expressed emotion, family burden and psychological distress in caregivers of patients with psychosis: a path analytic model \***

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## Abstract

**Background:** The present study aimed to evaluate the direct and indirect effects of family dynamics in terms of cohesion and flexibility on family burden and caregivers' psychological well-being in patients experiencing their first episode of psychosis (FEP) and chronic patients with psychosis.

**Methods:** A total of 100 patients (50 FEP and 50 chronic patients) recruited from the Psychiatric Clinic of the University Hospital of Heraklion, Crete, Greece, and their family caregivers participated in the study. Family functioning was assessed in terms of cohesion and adaptability (Family Adaptability and Cohesion Evaluation Scale-IV), expressed emotion (Family Questionnaire), family burden (Family Burden Scale) and caregivers' psychological distress (General Health Questionnaire - 28). Structural equation modelling was used to evaluate the influences of family dynamics on family burden and caregivers' psychological distress.

**Results:** The indexes of overall fit for the path model confirmed the a priori measurement model. Neither family cohesion nor family flexibility was found to have significant direct effects on caregivers' psychological distress. Instead, the effect of flexibility was mediated by caregivers' criticism and family burden indicating an indirect effect on caregivers' psychological distress.

**Conclusions:** Caregivers of patients with psychosis who experience higher levels of family dysfunction in terms of flexibility display higher levels of criticism towards the patient which, in turn, lead to greater burden and consequently, higher levels of psychological distress for themselves. Family psychoeducational interventions aiming to improve dysfunctional family interactions by promoting awareness of family dynamics may indeed reduce the burden and improve caregivers' emotional well-being.

**Keywords:** Family cohesion, flexibility, expressed emotion, burden, psychological distress, path analysis.

## 1. Introduction

Given the family's central position in patient care and psychosocial rehabilitation, research on psychosis within the context of the family is critical. From a systems perspective, which considers the family as a closely interconnected social unit, dysfunction or illness in one family member is bound to affect the other members [1]. Families both affect and are affected by a mentally ill member through a dynamic process impacting patterns of communication, interactional styles, family responsibilities, and family roles as the family adapts to the physical and psychological demands of managing the illness.

The majority of studies on family emotional climate of patients with schizophrenia have focused on the construct of expressed emotion (EE), which is considered an important measure of family environment and reflects the extent to which the patient's family members express critical comments (CCs), hostility (H), and/or emotional over-involvement (EOI) toward him/her. CCs convey dislike or disapproval of the patient's behavior; H reflects disapproval or rejection of the patient as a person; EOI entails an exaggerated or overprotective attitude towards the patient, as evidenced by intrusive behaviors and evident emotional distress of the carer. Although EE has been established as a highly reliable psychosocial predictor of relapse in psychosis [2-4], it remains unclear what accounts for high EE among families. Some studies have shown that high EE in family caregivers is associated with parental disengagement and reduced connectedness [5-6], as well as greater burden of care [7-8]. Thus, rather than a cause of relapse, parental attitudes toward the patient may be part of a more complex and dynamic phenomenon reflected in the family emotional environment.

Family burden (FB) refers to the negative impact of a member's mental disorder on the entire family [9-10] typically associated by the addition of caregiving responsibilities to existing family roles [10]. The origins of EE and FB have received little research attention, and their mutual interactions are not yet well understood. There is evidence that EE and FB are interacting phenomena such that, for instance, caregivers experience higher level of burden when they are more strongly emotionally involved [11-14]. Moreover, it has long been established that caregivers of patients with psychosis experience high levels of burden which adversely impacts their health and quality of life [15-16].

Family systems theory, as operationalized by the Circumplex Model of Marital and Family Systems [17], provides useful insights into the intrafamilial relationships of patients with psychosis. The Circumplex Model conceptualizes family cohesion, flexibility, and communication skills as three central variables that define family interactions [18]. Family cohesion is defined as the emotional bonding that family members have toward one another [19], whereas family flexibility relates to the quality and expression of leadership and organization, role relationship, and relationship rules and negotiations [20]. Communication encompasses the positive skills used by the family members to convey information [20] and it is viewed as a facilitating dimension that helps families negotiate cohesion and flexibility issues [21]. Within the Circumplex Model, cohesion may vary along a curvilinear continuum from disengaged (very low levels of cohesion) to enmeshed (very high levels of

cohesion). Similarly, flexibility ranges from rigid (very low levels of flexibility) to chaotic (very high levels of flexibility) [20]. Optimal functioning requires balanced levels of cohesion and flexibility (indicated by mid-range values), whereas family dysfunction is characterized by values at either end of the continuum [22].

Previous research has identified specific characteristics in Greek families that may influence the type of care they provide. Although the Greek family is seemingly a nuclear family [23-26], in reality it functions as an extended one [23,27] characterised by cohesiveness and tight knit bonds and interactions. Strong family values in Greek families contribute to the sense of concern and obligation that family members have to care for their identified patient. In Greece the family is considered a pillar of society, and thus, problems are expected to be solved by the whole family. This type of family has been called “extended urban family” [27]. In this regard, illness in one family member may affect family dynamics and result in substantial burden for the entire family.

The aim of the present study was to test a model accounting for caregivers’ psychological distress (PD) that takes into account perceived family cohesion and flexibility, emotionally charged behaviors toward the patient (EE), and caregiver’s sense of burden associated with the presence of mental illness in the family (FB). To our knowledge, this is the first systematic attempt in the literature to examine the interplay of family dynamics (indexed by cohesion and flexibility) with caregiver’s EE, FB, and PD in patients with psychosis. The study considers characteristic features of family functioning (cohesion and flexibility) as exerting direct effects on caregivers’ PD as well as indirect effects by affecting both their behaviour (EE) and perceived burden. We hypothesized that when caregivers view their family as functional their behaviour toward the patient will be positively affected (as indexed by low levels of EE). Conversely, when the family is viewed as dysfunctional their behaviour will be negatively affected resulting in high levels of EE. Furthermore, strong (negative) EE behaviors toward the patient, will likely be associated with stressful interpersonal interactions and conflict, enhancing the sense of burden. In addition, increased levels of EE are expected to further enhance the psychological burden of experienced by caregivers leading to higher levels of PD. This hypothetical multiple mediator relationship is depicted in Figure 1. Finally, in view of differences between families of first episode (FEP) and chronic patients reported by our group on a variety of family functioning dimensions [28], we examined whether the aforementioned model would fit the data regardless of disease duration.

## **Methods**

### **2.1. Participants**

Sample size estimation was based on medium expected effect sizes, according to Cohen’s criteria [29], for power 0.80 and confidence level 0.05. Hence, a total of 100 out of 104 patients (Response Rate 96.1%) consecutively admitted to the Psychiatric Clinic of the University Hospital of Heraklion, Crete, Greece, and their key caregivers were recruited. The sample consisted of 50 FEP

patients and 50 chronic patients diagnosed with schizophrenia and bipolar disorder. The patients and their key caregivers were contacted and informed about the purpose of the present study during a 12-month period (October 2011 – October 2012). The key caregiver was defined as the person who provides the most support devoting a substantial number of hours each day in taking care of the patient.

To be eligible for inclusion in the study, the patients had to meet the following criteria: (i) to be between 17 and 40 years old, (ii) to have a good understanding of the Greek language, (iii) to have been out of hospital for at least 6 weeks and considered stabilized by their treating psychiatrist, (iv) to be living with a close relative, and (v) to have a diagnosis of schizophrenia or bipolar disorder according to Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) or International Classification of Disease (ICD-10) and with no evidence of organicity, significant intellectual handicap, or primary diagnosis of substance abuse. Inclusion criteria for the caregivers were: (i) to be between 18 and 75 years old, (ii) to have a good understanding of the Greek language, (iii) to have no history of psychiatric illness, and (iv) to be either living with, or directly involved in the care of the patient.

## 2.2. Procedure

Caregivers were interviewed by the first author in individual sessions in the Psychiatric Clinic of the University Hospital of Heraklion, Crete, Greece, where participants were asked to take part in a study assessing family functioning of patients with schizophrenia and bipolar disorder. Caregivers were given an information sheet describing the aims of the study. The time needed to complete the interview was approximately 75 to 90 minutes. Patients' socio-demographic and clinical data were extracted from medical records and confirmed during the interview by the caregivers, whereas patients' symptoms and functioning were also assessed by their treating psychiatrist within two weeks from the caregivers' assessment. The study has followed the guidelines of the Declaration of Helsinki. Furthermore, the study was approved by the Ethics Committee of the University Hospital in Heraklion, Crete, Greece. All participants involved in the present study provided written informed consent.

## 2.3. Measures

### 2.3.1. Socio-demographic characteristics

Socio-demographic characteristics, such as relative's gender, age, education, marital status, employment status, origin and current residence, financial status, family structure, relation to the patient, contact with the patient, etc, were collected through structured interviews administered by the researchers. Patient socio-demographic characteristics included, in addition: clinical diagnosis, illness onset, patient age at illness onset, hospitalisation in the psychiatric clinic, longer and last hospitalisation, as well as history of therapeutic interventions.

### 2.3.2. Family Adaptability and Cohesion Evaluation Scales IV Package

Caregiver-perceived family functioning was assessed with the Family Adaptability and Cohesion Evaluation Scales IV (FACES IV) [21]. The FACES IV measures family functioning in terms of cohesion and flexibility. The instrument contains a total of 42 items and displays a six-factor structure including two balance subscales assessing the intermediate range of cohesion and flexibility (Balanced Cohesion and Balanced Flexibility) and four subscales assessing the high and low extremes of cohesion and flexibility (Disengaged and Enmeshed for cohesion, Rigid and Chaotic for flexibility). Responses range from 1 “strongly disagree” to 5 “strongly agree”. These scales have very good levels of reliability and validity [30]. To determine the balance level within the family system, Cohesion and Flexibility ratio scores were used. Scores  $\geq 1.0$  indicate the presence of balanced levels of cohesion and flexibility. The FACES IV Package has been translated and validated for the Greek population by Koutra and colleagues [31], and has demonstrated good psychometric properties.

### 2.3.3. Family Questionnaire

EE was measured via the Family Questionnaire (FQ) [32] administered to caregivers. The FQ is a self-report questionnaire measuring emotional responses and behaviors of relatives of patients with schizophrenia in terms of EOI and CC (with 10 items per subscale). EOI refers to unusually over-intrusive, self-sacrificing, overprotective or devoted behaviour, exaggerated emotional response, and over-identification with the patient, whereas CC concerns unfavourable comments on the behaviour or the personality of the patient by the caregiver [33]. Responses range from 1 “never/very rarely” to 4 “very often” and a higher total score indicates higher EE. The developers suggest a cut-off of 23 points as an indication of high CC, and 27 points as indicative of high EOI. The FQ has excellent psychometric properties including a clear factor structure, good internal consistency of subscales and good inter-rater reliability. The FQ has been translated and validated for the Greek population by Koutra and colleagues [34], and has demonstrated good psychometric properties.

### 2.3.4. Family Burden Scale

The Family Burden Scale (FBS) [35] consisting of 23 items was used to measure perceived burden of the presence of a psychiatric disorder in a family member. The four FBS dimensions are defined as follows: a) Impact on daily activities/social life: defined in terms of burden experienced regarding disruption of daily/social activities; b) Aggressiveness: captures the presence of episodes of hostility, violence and serious damages at home; c) Impact on health: shows signs and psychopathological symptoms reported by the family caregiver; d) Economic burden: defined in terms of financial problems created by the patient’s illness. Factor A, B, and D items tap objective burden; whereas factor C items concern subjective burden. The scale has been originally developed and standardized in the Greek population and has demonstrated good psychometric properties.

### 2.3.5. General Health Questionnaire

The General Health Questionnaire-28 item version (GHQ-28) [36], a self-administered instrument that screens for non-psychotic psychopathology in clinical and non-clinical settings, was used to assess caregivers' PD levels. Its four subscales measure somatic symptoms, anxiety/insomnia, social dysfunction and severe depression. In the present study the Likert scoring procedure (0,1,2,3) is applied providing a more acceptable distribution of scores with possible total scores ranging from 0 to 84. Higher scores on the scale are indicative of poorer psychological well-being. The instrument has been adapted for the Greek population by Garyfallos and colleagues [37], and has demonstrated good psychometric properties.

### 2.4. Potential confounders

Potential confounders included caregivers' and patients' characteristics that have an established or potential association with family cohesion and flexibility and EE. Caregivers' characteristics included relative's origin (urban vs. rural), education (low level:  $\leq 9$  years of school, medium level:  $\leq 12$  years of school and  $>9$  years of school, high level: some years in university or university degree), marital status (single, married, divorced/widowed), family structure (two-parent family vs. one-parent family), relation to patient (parent vs. other), and contact with the patient (daily vs. 1-2 times/week). Patient characteristics included patient's age, onset of mental illness ( $\leq 12$  months, 1-4 years,  $>4$  years), and number of hospitalizations.

### 2.5. Statistical analysis

The profile of bivariate associations between measured variables was explored through Pearson's correlation coefficients. Multivariate associations between measures of family functioning (cohesion and flexibility) and PD experienced by caregivers were assessed through path analysis which permitted estimation of direct as well as indirect effects. The latter were hypothesized to take place through two parallel mediators (EOI and CC as indices of emotional expression) and a third serial mediator variable (FB). Overall model goodness of fit was assessed through the chi-square test supplemented by comparative fit indices (normed fit index [NFI], comparative fit index [CFI] and absolute fit indices (goodness-of-fit index [GFI]), for which values of 0.90 or over reflect a good fit [38-39]. Additionally, the root mean square of approximation (RMSEA) was considered, for which values below 0.08 are considered acceptable (poor fit  $>0.10$ ; mediocre fit 0.08-0.10; reasonable fit 0.05-0.08). Estimated direct, indirect and total effects were described in terms of standardized regression coefficients and evaluated using both the Sobel test [40] and relative to corresponding bootstrapped 95% confidence intervals (CI). Invariance of regression coefficients (structural paths) across the two groups of patients (first episode, chronic) was assessed based on  $\Delta\chi^2$  and  $\Delta CFI$  indices (with a cutoff  $\leq 0.01$ ) [41].

Provided that significant effects of family functioning on emotional expression indices would be found, the independent contribution of each of the six FACES IV subscales on EOI and CC would be examined through multivariate, linear regression analyses. Potential confounders related with both the outcomes and the exposure of interest in the bivariate associations with a  $p$  value  $<0.2$  were included in the multivariable models. All statistical analyses were performed using SPSS Statistics 20 software (IBM, Armonk, NY, USA) and the IBM SPSS AMOS 20 (IBM, Armonk, NY, USA).

### 3. Results

#### 3.1. Socio-demographic characteristics

Table 1 presents the socio-demographic characteristics of family caregivers who participated in the study, showing a preponderance of women (85%), persons with elementary or middle school education (64%) who were not working (72%), married (63%) and resided in urban areas (82%). Importantly, nearly all caregivers were the patient's parents (92%) who had had daily contact with the patient (95%), with the majority living with the patient (81%). In terms of family structure, there was a significant percentage of one-parent families (36%).

Patients' socio-demographic and clinical characteristics are presented in Table 2. There was a preponderance of men (66%), ranging in age between 17 to 40 years. The vast majority of the patients were single (85%), unemployed (86%), and resided in urban areas (86%). Schizophrenia was the most common diagnosis (82%) with an age at illness onset between 15 and 39 years and average illness duration of 4.31 years ( $SD = 1.80$ ). Half of the patients had one hospitalization, whereas 40% of the patients had been admitted to the Psychiatric Clinic between two and four times, and 10 patients had five or more hospitalizations. The length of longer hospitalisation was up to 20 days for the majority of the sample (65%).

#### 3.2. Bivariate analysis

Table 3 reveals the expected pattern of intercorrelations between measures, featuring significant shared variance between the two measures of family functioning (cohesion and flexibility;  $r=0.74$ ,  $p<0.001$ ). The correlation between the two components of EE (EOI and CC) was in the moderate range ( $r=0.43$ ,  $p<0.001$ ). According to our predictions cohesion and flexibility were negatively correlated with each of the three hypothesized mediators: EOI ( $r = -0.28$ ,  $p<0.01$ ,  $r = -0.34$ ,  $p<0.01$ , respectively), CC ( $r = -0.55$ ,  $p<0.001$ ,  $r = -0.55$ ,  $p<0.001$ , respectively), and FB ( $r = -0.57$ ,  $p<0.001$ ,  $r = -0.64$ ,  $p<0.001$ , respectively) and the outcome variable (PD,  $r = -0.40$ ,  $p<0.001$ ,  $r = -0.38$ ,  $p<0.001$ , respectively). The two behavior-related, hypothesized mediators were moderately associated with the third mediator (FB:  $0.62 > r > 0.57$ ,  $p<0.001$ ) and the outcome variable (PD:  $0.57 > r > 0.47$ ,  $p<0.001$ ). Finally, FB was highly correlated with psychological distress ( $r = 0.71$ ,  $p<0.001$ ).

#### 3.3. Path analysis

Drawing on the hypothesized model and significant correlations from the bivariate analysis, the full model was tested first which included all direct and indirect paths between the six observed variables (COH, FLEX, EOI, CC, FB, and PD) as illustrated in Figure 2. Results indicated excellent fit to the data from the entire sample: Chi-square  $X^2(1) = 0.006$  ( $p = 0.94$ ), GFI = 1.00, AGFI = 1.00, NFI = 1.00, CFI = 1.00, RMSEA = 0.001.

As shown in Figure 2 and Table 4, neither family cohesion nor family flexibility were found to have significant direct effects on caregivers' PD. Instead, the impact of flexibility on caregivers' PD was mediated by caregivers' CC and FB as suggested by significant indirect effects. Contrary to our hypothesis, caregivers' EOI appeared to be unrelated to either cohesion or flexibility, whereas higher levels of CC were significantly associated with dysfunctional levels of both cohesion ( $\beta = -0.29$ , 95% CI: -0.54 to -0.04) and flexibility ( $\beta = -0.29$ , 95% CI: -0.57 to -0.08). Flexibility was found to affect FB both directly ( $\beta = -0.26$ , 95% CI: -0.46 to -0.04) and indirectly ( $\beta = -0.19$ , 95% CI: -0.33 to -0.04) through CC.

Furthermore, both components of EE were positively associated with FB (EOI:  $\beta = 0.30$ , 95% CI: 0.15 to 0.44 and CC:  $\beta = 0.30$ , 95% CI: 0.12 to 0.47). In addition, there was evidence of both a direct ( $\beta = 0.26$ , 95% CI: 0.09 to 0.41) and indirect effect of EOI on caregivers' PD ( $\beta = 0.17$ , 95% CI: 0.08 to 0.27) through FB. Conversely, only the indirect effect of CC on caregivers' psychological distress (through FB) reached significance ( $\beta = 0.17$ , 95% CI: 0.06 to 0.29). Finally, the effect of FB on PD remained substantial even after controlling for the direct and indirect effects of all the other variables in the model ( $\beta = 0.57$ , 95% CI: 0.37 to 0.76).

The importance of each of the four significant indirect effects listed in Table 4 was supported by the fact that the full model was superior to each of four alternative, nested models created by constraining one, two, or three parameters (paths) involved in each of the indirect effects. These models were associated with significant increases in  $X^2$  value:  $\Delta X^2_{(2)} = 8.01$ ,  $p = .025$  (constraining the FLEX  $\rightarrow$  FB indirect effect),  $\Delta X^2_{(3)} = 14.07$ ,  $p = .001$  (constraining the FLEX  $\rightarrow$  PD indirect effect),  $\Delta X^2_{(1)} = 17.45$ ,  $p = .001$  (constraining the EOI  $\rightarrow$  PD indirect effect),  $\Delta X^2_{(1)} = 12.78$ ,  $p = .001$  (constraining the CC  $\rightarrow$  PD indirect effect). Notably, the RMSEA associated with these constrained models indicated poor fit (RMSEA = .130, .159, .279, and .233, respectively).

Results of the multi-group analyses suggested that constraining all paths to be equal across groups did not result in significant worsening of fit to the data as indicated by a non-significant increase in  $X^2$  ( $X^2_{[15]} = 23.07$  vs.  $X^2_{[4]} = 10.51$ ,  $\Delta X^2_{[11]} = 12.56$ ,  $p = .32$ ) and an increase in CFI = .007

#### 3.4. Associations of balanced and unbalanced scales of cohesion and flexibility with EE.

Conceptually, the cohesion dimension contains Balanced Cohesion (central area) with Disengaged (low unbalanced) and Enmeshed (high unbalanced), and the flexibility dimension contains Balanced Flexibility (central area) with Rigid (low unbalanced) and Chaotic (high unbalanced). Multivariable analysis adjusting for confounding variables indicated that the two balanced scales of

FACES IV - Balanced Cohesion ( $\beta$  coefficient -0.37, 95% CI: -0.63, -0.12) and Balanced Flexibility ( $\beta$  coefficient -0.45, 95% CI: -0.72, -0.18) - were negatively associated with increased levels of family caregivers' CC. Moreover, two out of four unbalanced scales - Disengaged ( $\beta$  coefficient 0.51, 95% CI: 0.27, 0.75) and Chaotic ( $\beta$  coefficient 0.45, 95% CI: 0.21, 0.68) - were positively related to higher CC toward the patient. The findings demonstrated that the two unbalanced scales of FACES IV - Enmeshed ( $\beta$  coefficient 0.46, 95% CI: 0.22, 0.70) and Rigid ( $\beta$  coefficient 0.37, 95% CI: 0.13, 0.61) - were positively associated with higher EOI toward the patient. These associations were significant after adjusting for several confounding variables including caregivers' origin, education, marital status, family structure, relation to patient, contact with the patient, patient's age, onset of mental illness, and number of hospitalisations.

#### **4. Discussion**

The present study explored the impact of functional family characteristics (cohesion and flexibility) on the level of PD experienced by caregivers of patients with psychosis. It was hypothesized that the two concepts are significantly related, albeit indirectly: Features of family dysfunction appear to set the stage for emotionally charged behaviors toward the patient, worsening caregiver's perceived burden associated with caring for a mentally ill member, and further increasing the level of PD experienced by caregivers. As outlined in more detail below, the results supported this hypothetical model which appeared to be relatively independent of disease chronicity.

Inspection of Table 4 and Figure 2 suggests that the indirect effects of family characteristics on PD were exerted primarily through CC and FB. Two main paths can be identified. The first features direct, joint effects of flexibility and cohesion on CC, further impacting PD through FB. Thus, the more dysfunctional the levels of cohesion and flexibility in the family, the more likely for the caregivers to adopt a highly critical attitude toward the patient. There were also indirect effects linking CC with caregivers' PD through the mediating effect of FB. In a recent study, it was demonstrated that the more negative items family members endorsed on an experience of caregiving inventory (ECI; [42], the higher the levels of personal and PD among family members [43]. The second underlying path links family flexibility directly to perceived burden and, thereby indirectly, to PD. Caregivers who experience dysfunctional levels of flexibility are not able to adjust relationship patterns in response to changes (e.g., the recent diagnosis of a mental disorder) or stress (e.g. the family member becomes chronically ill). Thus, more unbalanced flexibility levels are associated with greater feelings of burden among caregivers, which are related to higher levels of PD. Within the Circumplex Model, too much or too little cohesion and flexibility in the family is unhealthy, while moderate levels are healthier (curvilinear hypothesis).

The main analyses presented above utilized composite indices of cohesion and flexibility by combining the two balanced (i.e., Balanced Cohesion and Balanced Flexibility) with the four unbalanced scales (i.e., Disengaged and Enmeshed for cohesion, Rigid and Chaotic for flexibility)

[21]. Path analysis results indicated that family dynamics, as conceptualized by the Circumplex Model, appeared to underlie caregivers' EE, even though a previous study [44] failed to support this association. In order to explore this effect further, multiple regression analyses revealed that caregivers' EOI was positively associated with enmeshed (very high levels of cohesion) and rigid (very low levels of flexibility) scales, whereas CC was negatively related to the two balanced scales of cohesion and flexibility, and positively related to disengaged (very low levels of cohesion) and chaotic (very high levels of flexibility). These results further suggest that unbalanced levels of cohesion and flexibility were differentially associated with the two components of EE. Specifically, very high levels of family cohesion (characteristic of enmeshed systems where family members do not see themselves as distinct individuals) and very low levels of flexibility (characteristic of rigid systems in which family members are heavily committed to maintaining the status quo and denying the need for change) seemed to contribute to the development of the intrusive behaviours that are reflected in EOI. Conversely, very low levels of family cohesion (indicative of disengaged systems in which family members are too distant from one another) and very high levels of flexibility (indicative of chaotic systems in which the family has no apparent rules) were found to contribute to a more critical attitude toward the patient. Although one would expect that very low levels of flexibility (rigid systems) may explain the propensity to criticize patient's behavior that disrupts established family routines, we found exactly the opposite in our sample. Finally, although having balanced levels of cohesion and flexibility was not associated with EOI, it was found to decrease caregivers' CC.

This exploratory study sheds some light on the relationship between two major characteristics of caregiving - EE and FB - in the context of psychosis. Our findings suggest that both components of EE - EOI and CC - were related to caregivers' burden. The present findings are partially in agreement with other studies which suggest that FB was related to higher levels of EOI, but not CC [11-13,45,14].

Apart from its large sample size, the assessment of various aspects of family functioning through standardized scales and the high participation rate (96.1%), the current study is unique in two respects. Firstly, to our knowledge, it is the first study of structural relationships between family dynamics, in terms of cohesion and flexibility, and family caregivers' experience of caregiving in psychosis. Family functioning, as conceptualized in the Circumplex Model, has not been previously evaluated in relation to EE, FB and caregivers' PD. Moreover, path analysis afforded the opportunity to assess both direct and indirect effects and highlight the potential role of significant mediators. In addition, participating families comprised a relatively homogenous group, originating from a specific region of Crete, and being treated in a single Psychiatry unit using similar therapeutic protocols.

There are also some limitations to this study, chief among which is the cross-sectional nature of the data, preventing estimation of the temporal evolution of the purported dynamic processes. In addition, the data analysed in the present study were collected from caregivers introducing potential bias in the estimation of behavioural measures (primarily EE). Furthermore, the population of patients

and caregivers were from a single catchment area and hence, generalizability of results may be limited. Finally, the population studied included the more severe cases requiring inpatient care and not those managed in an outpatient setting. Future research should include larger and representative samples and data from different diagnostic groups.

In conclusion, caregivers of patients with psychosis who experience higher levels of family dysfunction in terms of flexibility display higher levels of CC towards the patient which, in turn, lead to greater burden and consequently, higher levels of PD for themselves. Previous research has stressed that dysfunctional levels of cohesion and flexibility experienced at the early stages of the illness lead to significant deterioration of family functioning as the disease becomes chronic [28]. Given that caregivers' emotionally charged behaviors toward the patient can influence the course of psychosis [2-4], our findings introduce an additional level of complexity in this association, by highlighting the role of perceived family functioning in triggering negative comments and emotionally charged behaviors toward the patient. Such complex, dynamic associations require future longitudinal exploration setting the ground for the development and implementation of effective family treatment programs that address the needs of both patients and their caregivers. Family psychoeducational interventions based on the international best-practice guidelines for early psychosis [46] aiming to improve dysfunctional family interactions by promoting awareness of family dynamics may indeed reduce the burden and improve the emotional well-being of family caregivers. Furthermore, interventions that focus on how caregivers appraise burden related to the illness, thus minimizing disruption to family life, may also alleviate caregivers' PD [47-48].

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### **Conflicts of interest**

The authors have no conflicts of interest to declare.

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**Table 1.** Socio-demographic and family characteristics of participating caregivers.

	M	SD
<b>Age</b>	56.80	9.98
<b>No of children in the family</b>	2.72	1.15
<b>No of family members</b>	4.47	1.26
<b>Gender</b>		
		<b>N/%</b>
Male		15
Female		85
<b>Education</b>		
Elementary/Middle school		64
High School		31
University degree		5
<b>Employment status</b>		
Working		28
Not working		72
<b>Origin</b>		
Urban		57
Rural		43
<b>Residence</b>		
Urban		82
Rural		18
<b>Marital status</b>		
Single		3
Married		63
Divorced/Widowed		34
<b>Financial status</b>		
No personal income		30
<10.000€		39
10.000€-20.000€		31
<b>Living with the patient</b>		
No		19
Yes		81
<b>Relation to patient</b>		
Parent		92
Other		8
<b>Contact with the patient</b>		
Daily		95
1-2 times/week		5
<b>Family structure</b>		
Two-parent family		64
One-parent family		36

**Table 2.** Socio-demographic and clinical characteristics of participating patients.

<b>Age</b>	M= 31.09 (SD = 5.75)	<b>Age at illness onset</b>	M= 24.03 (SD = 5.48)
	<b>N/%</b>		<b>N/%</b>
<b>Gender</b>		<b>Diagnosis</b>	
Male	66	Schizophrenia	82
Female	34	Bipolar disorder	18
<b>Education</b>		<b>Illness duration</b>	
Elementary/Middle school	38	≤ 12 months	22
High school	52	1-4 years	28
University degree	10	>4 years	50
<b>Employment status</b>		<b>No of hospitalizations</b>	
Working	14	One	50
Not working	86	2-4	40
<b>Origin</b>		>4	10
Urban	91	<b>Duration of longer hospitalization</b>	
Rural	9	Up to 20 days	65
<b>Residence</b>		20+ days	35
Urban	86	<b>Last hospitalization</b>	
Rural	14	Within the last 6 months	32
<b>Marital status</b>		7-12 months	65
Single	85	>1 year	3
Married	6	<b>Pharmacotherapy</b>	
Divorced/Widowed	9	Yes	100
<b>Financial status</b>		No	0
No personal income	49	<b>Psychotherapy/psychosocial rehabilitation</b>	
<10.000€	47	Yes	6
10.000€-20.000€	4	No	94

**Table 3.** Means, standard deviations, and inter-correlations between the family variables.

	<b>M</b>	<b>SD</b>	<b>COH</b>	<b>FLEX</b>	<b>EOI</b>	<b>CC</b>	<b>FB</b>	<b>PD</b>
<b>COH</b>	1.91	0.77	1					
<b>FLEX</b>	1.29	0.62	0.74**	1				
<b>EOI</b>	28.93	6.11	-0.28*	-0.34*	1			
<b>CC</b>	23.21	7.84	-0.55**	-0.55**	0.43**	1		
<b>FB</b>	19.57	11.90	-0.57**	-0.64**	0.57**	0.62**	1	
<b>PD</b>	24.11	14.07	-0.40**	-0.38**	0.57**	0.47**	0.71**	1

*Abbreviations:* COH: Cohesion; FLEX: Flexibility; EOI: Emotional over-involvement; CC: Critical comments; FB: Family burden; PD: Psychological distress.

\*\*p<0.001 \*p<0.01

**Table 4.** Direct, indirect, and total effects of family dynamics on family burden and psychological distress.

	Direct effect <sup>a</sup>			Indirect effect <sup>a</sup>			Total effect <sup>a</sup>		
	$\beta$ -coeff	(95% CI)	p-value	$\beta$ -coeff	(95% CI)	p-value	$\beta$ -coeff	(95% CI)	p-value
COH → EOI	-0.06	(-0.36, 0.23)	0.647	-	-	-	-0.06	(-0.36, 0.23)	0.647
FLEX → EOI	-0.28	(-0.58, 0.03)	0.075	-	-	-	-0.28	(-0.58, 0.03)	0.075
COH → CC	-0.29	(-0.54, -0.04)	<b>0.023</b>	-	-	-	-0.29	(-0.54, -0.04)	<b>0.023</b>
FLEX → CC	-0.33	(-0.57, -0.08)	<b>0.012</b>	-	-	-	-0.33	(-0.57, -0.08)	<b>0.012</b>
COH → FB	-0.11	(-0.32, 0.10)	0.293	-0.10	(-0.26, -0.03)	0.121	-0.22	(-0.45, 0.02)	0.074
FLEX → FB	-0.26	(-0.46, -0.04)	<b>0.022</b>	-0.19	(-0.33, -0.04)	<b>0.009</b>	-0.44	(-0.66, -0.19)	<b>0.001</b>
COH → PD	-0.11	(-0.31, 0.11)	0.304	-0.15	(-0.27, 0.01)	0.141	-0.26	(-0.53, 0.15)	0.065
FLEX → PD	0.17	(-0.06, 0.39)	0.141	-0.34	(-0.55, -0.14)	<b>0.001</b>	-0.17	(-0.44, 0.12)	0.224
EOI → FB	0.30	(0.15, 0.44)	<b>0.001</b>	-	-	-	0.30	(0.15, 0.44)	<b>0.001</b>
CC → FB	0.30	(0.12, 0.47)	<b>0.002</b>	-	-	-	0.30	(0.12, 0.47)	<b>0.002</b>
EOI → PD	0.26	(0.09, 0.41)	<b>0.001</b>	0.17	(0.08, 0.27)	<b>0.001</b>	0.43	(0.25, 0.58)	<b>0.001</b>
CC → PD	0.05	(-0.13, 0.23)	0.547	0.17	(0.06, 0.29)	<b>0.002</b>	0.22	(0.03, 0.42)	<b>0.033</b>
FB → PD	0.57	(0.37, 0.76)	<b>0.001</b>	-	-	-	0.57	(0.37, 0.75)	<b>0.001</b>

*Abbreviations:* COH: Cohesion; FLEX: Flexibility; EOI: Emotional over-involvement; CC: Critical comments; FB: Family burden; PD: Psychological distress. Model fit indices: Chi-square  $\chi^2$  (1) = 0.006 ( $p = 0.94$ ), GFI = 1.00, AGFI = 1.00, NFI = 1.00, CFI = 1.00, RMSEA = 0.01. <sup>a</sup>Standardized regression coefficients. Bold font indicates statistically significant differences ( $p < 0.05$ ).

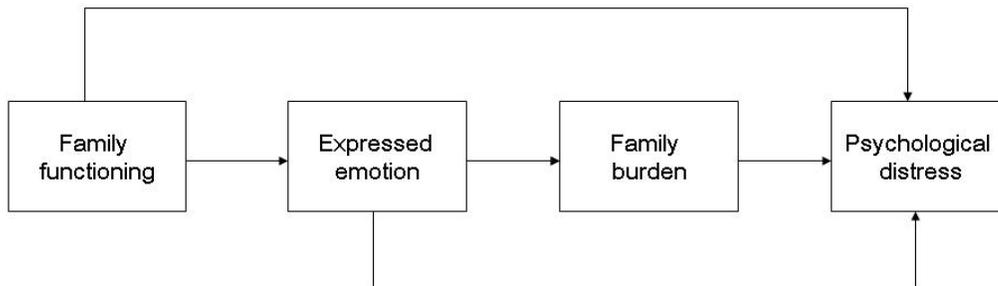
**Table 5.** Associations between family cohesion/flexibility and expressed emotion (multivariable analysis).

	FQ <sup>‡</sup>					
	CC			EOI		
	$\beta$ -coeff	95% CI	p-value	$\beta$ -coeff	95% CI	p-value
<b>FACES-IV<sup>‡</sup></b>						
Balanced Cohesion	-0.37	(-0.63, -0.12)	<b>0.005</b>	-0.08	(-0.31, 0.14)	0.453
Balanced Flexibility	-0.45	(-0.72, -0.18)	<b>0.001</b>	-0.19	(-0.43, 0.05)	0.120
Disengaged	0.51	(0.27, 0.75)	<b>&lt;0.001</b>	0.14	(-0.08, 0.36)	0.217
Enmeshed	0.11	(-0.19, 0.42)	0.462	0.46	(0.22, 0.70)	<b>&lt;0.001</b>
Rigid	0.25	(-0.04, 0.55)	0.092	0.37	(0.13, 0.61)	<b>0.003</b>
Chaotic	0.45	(0.21, 0.68)	<b>&lt;0.001</b>	0.19	(-0.02, 0.40)	0.077

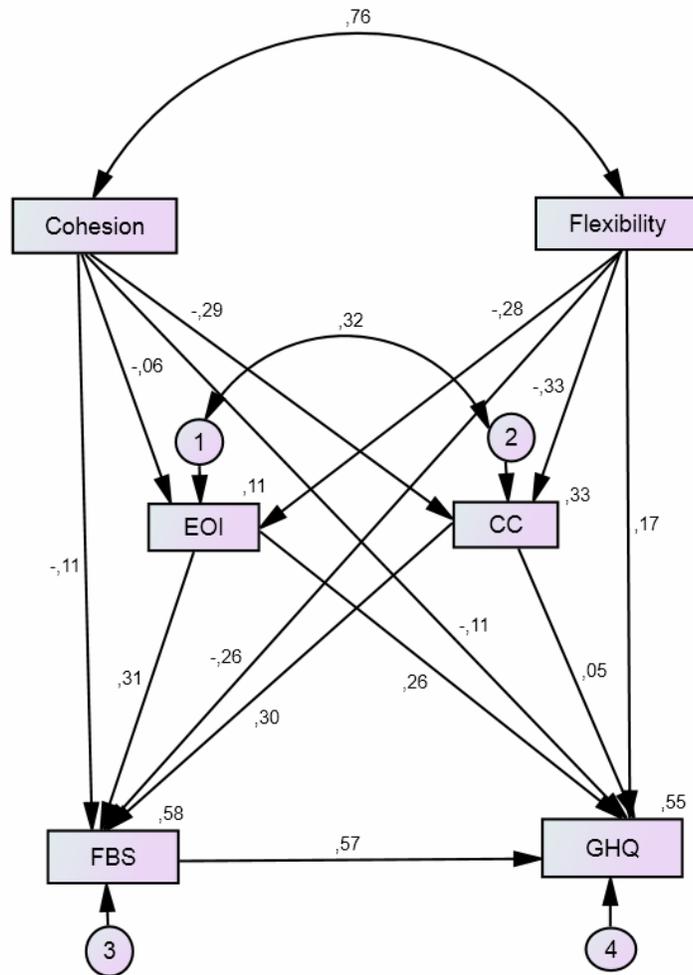
*Abbreviations:* FACES: Family Adaptability and Cohesion Evaluation Scales; FQ: Family Questionnaire.

<sup>‡</sup>  $\beta$ -coefficients and 95% CI of  $\beta$  retained from linear regression. All models adjusted for relative's origin, education, marital status, family structure, relation to patient, contact with the patient, patient's age, onset of mental illness, and number of hospitalizations. Bold font indicates statistically significant differences (p<0.05).

**Figure 1.** Proposed theoretical path model depicting the relationships between family functioning, expressed emotion, family burden and caregiver's psychological distress.



**Figure 2.** Direct, indirect, and total effects of family dynamics on family burden and psychological distress.



*Abbreviations:* EOI: Emotional over-involvement; CC: Critical comments; FBS: Family Burden Scale; GHQ: General Health Questionnaire.

## 4.8. Paper 8

### **Impaired family functioning in psychosis and its relevance to relapse: a two-year follow-up study\***

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## Abstract

**Background:** The aim of the present study was to investigate whether dysfunctional family functioning contributes to relapse over a two-year follow-up period in patients experiencing their first episode of psychosis (FEP) and chronic patients with psychosis. **Methods:** A total of 50 FEP and 50 chronic patients recruited from the Psychiatric Clinic of the University Hospital of Heraklion, Crete, Greece, and their family caregivers participated in the study. Family functioning was assessed in terms of cohesion and flexibility (FACES-IV), expressed emotion (EQ), family burden (FBS) and caregivers' psychological distress (GHQ-28). Relapse was defined as patient rehospitalisation due to acute psychotic exacerbation, while number, length, and type of hospitalisations were also evaluated. **Results:** Dysfunctional family functioning in terms of cohesion and flexibility was not found to be a significant risk factor for relapse in psychosis. High expressed emotion, as indexed primarily by increased levels of criticism rather than emotional over-involvement, was associated with increased risk of relapse and shorter time to relapse (HR=0.48, 95% CI: 0.24, 0.98, p=0.043). Similarly, high levels of family burden were related to shorter time to relapse (HR=0.47, 95% CI: 0.23, 0.95, p=0.037). No significant interaction effect of illness chronicity was observed in the aforementioned associations. **Conclusion:** These findings highlight caregivers' criticism and burden of care as long-term predictors of the course of psychosis from the early stages of the illness and later on. Family psychoeducational interventions focusing at ameliorating caregivers' negativity toward the patient, and easing the burden of care should be considered as means in reducing relapse.

## **Introduction**

With the advent of deinstitutionalization and the simultaneous growth of community mental health care services, relatives have become the primary caregivers for patients with psychosis (1-2). Despite recent attempts toward a more reciprocal view of intrafamilial relationships and family emotional atmosphere, negative family emotional climate continues to be regarded as a potential contributing factor to psychotic symptomatology. Given that the concept of psychosocial stress remains central in understanding the impact of the social environment on psychosis, ongoing and in-depth research on family interactions is considered essential.

The role of the family in the course of mental illness has been examined extensively since George Brown's seminal studies of families of patients with schizophrenia (3-4). These studies focused on the family factors influencing patient relapse and illness course and outcome (5). Family members' attitudes toward the patient, as measured by the level of Expressed Emotion (EE), have received most of the research attention (6-7). EE is a relational variable and a measure of the family environment reflecting high levels of criticism (CC), hostility (H), or emotional over-involvement (EOI) toward the patient. CC signifies dislike or disapproval of the patient's behaviour, H reflects disapproval or rejection of the patient, and EOI concerns intrusive or overprotective behaviours and attitudes toward the patient, as conveyed by an intrusive style of relating and the caregiver's evident emotional distress. Several studies have established EE as a highly reliable psychosocial predictor of psychiatric relapse in patients with schizophrenia in a variety of cultural and social contexts (8-10). Recently there has been some controversy about the predictive efficacy of EE in patients experiencing their first episode of psychosis (FEP) with some studies reporting either weak (11-13) or no effect of EE on patient relapse (14-15). Although the majority of studies treated EE as a unitary construct, some attempted to determine the differential predictive power of its two components – CC and EOI (11, 15-16). High EE is usually associated with high levels of CC, which has been found to make a greater contribution to relapse (3, 9, 16-20).

EE is best regarded as an index of a set of patient-relative relationship problems that possibly contribute to the relapse process (10). Even though EE is measured in one particular family caregiver, it is thought to reflect disturbances in the organization, emotional climate, and transactional patterns of the family system as a whole (21). Research supports a diathesis-stress model of psychosis in which environmental stressors, including stress within intrafamilial relationships, interact with biological factors, triggering the onset of the illness and a recurrence of symptoms (22). From this perspective, high levels of EE may be a natural response to the stress of prolonged caregiving and continued exposure to the social and behavioural disturbances of the patients themselves (22). Rather than being a parental trait, the EE measure is viewed as tapping an ongoing chain of interactions in the family. EE has been shown to correlate well with concurrent measures of conjoint family functioning, i.e. family cohesion and flexibility (Koutra et al., unpublished data), and family burden (FB) which has been found to be the best predictor of change from a high- to a low-EE household (18, 23).

Many alternative definitions of relapse in schizophrenia and related psychotic disorders have been proposed. The widely accepted one defines relapse as the re-emergence or aggravation of psychotic symptoms leading to rehospitalisation (24). Csernansky and colleagues (25) proposed a set of multifactorial criteria for defining relapse, including hospitalisation, and suggested that any single factor could be used as a clinical determinant of relapse. In their recent review, Olivares and colleagues (26) found that hospitalisation was the single, most commonly used factor to define relapse and represents a commonly used proxy for examining relapse. Relapses and rehospitalisations worsen the prognosis of patients with psychosis and impact both patients' and families' quality of life.

In psychosis, the first years of treatment define a critical period and are predictive of long-term outcome. Any relapse during this critical period increases the risk of further relapse and chronic course (27). Relapse rates in FEP patients are relatively low during the first year of the illness but substantially rise to rates of 53.7% and 74%-82% after two and five years, respectively (28-29). Given that family environment is related to the course of patient's illness and the risk of relapse, early assessment of family dynamics is necessary to identify patients and families in need of special attention. Studies exploring how the family environment affects patient outcomes are limited in Greece, where family members are the primary caregivers of patients with psychotic disorders. Moreover, there is a paucity of data in the existing literature regarding the effect of intrafamilial relationships in the course of the disorder for FEP as opposed to chronic patients. Although caregivers' EE is the most thoroughly investigated family factor in relation to patient relapse, there has been relatively little research on the contribution of global family functioning on patient outcome.

The aim of the present study is to determine whether dysfunctional family functioning contributes to patient relapse. Given that family functioning is a multifaceted concept, we assessed multiple dimensions of family life including emotional cohesion and flexibility to change, as conceptualised by the Circumplex Model of Marital and Family Systems (30), EE in terms of its two components (CC and EOI) as well as FB levels and caregivers' psychological distress aiming to provide a fuller understanding of family dynamics in psychosis. To the best of our knowledge, this is the first study examining the role of family functioning in terms of cohesion and flexibility conjoint with other aspects of the family emotional climate, such as EE, FB and caregiver's psychological distress, in relation to relapse of both FEP and chronic patients. For the purposes of the present study, relapse was defined as patient rehospitalisation due to acute psychotic exacerbation during a two-year follow-up period. Based on the existing literature, we hypothesised that dysfunctional family characteristics, as indexed by unbalanced levels of cohesion and flexibility, would be associated with increased risk of patient relapse. In a similar vein, patients living in family environments characterised by high levels of EE would be more likely to relapse over time than patients living in low-EE families. With respect to the two components of EE, we predicted that high levels of caregiver's CC would make a greater contribution to patient relapse than correspondingly high levels of EOI. Finally, high

levels of FB and caregivers' psychological distress were hypothesised to be associated to higher indexes of relapse.

## **Methods**

### **2.1. Design**

The present study employed a prospective, longitudinal design to evaluate the association of the family environment, measured at baseline, with relapse of psychosis over a two-year follow-up period.

### **2.2. Participants**

Sample size estimation was based on medium expected effect sizes, according to Cohen's criteria (31), for power 0.80 and confidence level 0.05. Hence, a total of 100 out of 104 patients (Response Rate 96.1%) consecutively admitted to the Psychiatric Clinic of the University Hospital of Heraklion, Crete, Greece, and their key caregivers were recruited. The sample consisted of 50 FEP patients and 50 chronic patients diagnosed with schizophrenia or bipolar disorder. The patients and their key caregivers were contacted and informed about the purpose of the study during a 12-month period (October 2011 – October 2012). The key caregiver was defined as the person who provides the most support devoting a substantial number of hours each day in taking care of the patient.

To be eligible for inclusion in the study, the patients had to meet the following criteria: (i) to be between 17 and 40 years old, (ii) to have a good understanding of the Greek language, (iii) to have been out of hospital for at least 6 weeks and considered as stabilised by their treating psychiatrist, (iv) to be living with a close relative, and (v) to have a diagnosis of schizophrenia or bipolar disorder according to the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) or International Classification of Disease (ICD-10) and with no evidence of organicity, significant intellectual handicap, or primary diagnosis of substance abuse. Inclusion criteria for the caregivers were: (i) to be between 18 and 75 years old, (ii) to have a good understanding of the Greek language, (iii) to have no diagnosed psychiatric illness, and (iv) to be either living with, or directly involved in the care of the patient.

Table 1 presents the sociodemographic characteristics of caregivers. The majority of caregivers in the study were patients' mothers who were either living with or had daily contact with the patient. As shown in Table 2 patients were predominantly men (66%), ranging in age from 17 to 40 years, who were single (85%), and living in urban areas (86%). Half of the sample had finished high school or had some years in university. Eighty-six percent were not working at the time of the assessment, whereas almost half of the sample had no income. Regarding diagnosis, 82% had schizophrenia and 18% had bipolar disorder. The patients had an onset of illness between 15 and 39 years of age with a mean age of 24.03 years (SD=5.48 years). All patients received pharmacotherapy, for 4% of the participants this was augmented by psychotherapy and for 2% by a psychosocial rehabilitation programme.

### 2.3. Procedure

Caregivers were interviewed by the first author in individual sessions at the Psychiatric Clinic, where participants were asked to take part in a study focusing on family functioning of patients with schizophrenia and bipolar disorder. Caregivers were given an information sheet describing the aims of the study. The time needed to complete the interview was approximately 75 to 90 minutes. Patients' socio-demographic and clinical data were extracted from medical records and confirmed during the interview by the caregivers, whereas patients' symptoms and functioning were also assessed by their treating psychiatrist within two weeks from the caregivers' assessment. Patients were followed-up for two years after the baseline family assessment, at 6, 12, 18, and 24 months. According to national hospitalisation regulations, readmissions, when necessary, were to the University Hospital of Heraklion, where readmission was determined by senior psychiatrists. All participants involved in the present study provided written informed consent. The study was approved by the Ethics Committee of the University Hospital.

### 2.4. Measures

#### 2.4.1. Sociodemographic characteristics

Sociodemographic characteristics, such as relative's gender, age, education, marital status, employment status, family origin and current residence, financial status, family structure, relation to the patient, contact with the patient, etc, were collected through structured questionnaires administered by the researchers. Similar information was recorded for each patient along with clinical diagnosis, onset of illness, age at onset, hospitalisation to psychiatric clinic, longer and last hospitalisation (prior to the study period), as well as therapeutic interventions received.

#### 2.4.2. Family Adaptability and Cohesion Evaluation Scales IV Package

Family functioning was assessed by means of the Family Adaptability and Cohesion Evaluation Scales IV (FACES IV) (32). The FACES IV measures family functioning in terms of cohesion and flexibility. The instrument consists of 42 items and displays a six-factor structure including two balanced subscales assessing the intermediate range of cohesion and flexibility (Balanced Cohesion and Balanced Flexibility) and four unbalanced subscales assessing the high and low extremes of cohesion and flexibility (Disengaged and Enmeshed for cohesion, Rigid and Chaotic for flexibility). Responses range from 1 "strongly disagree" to 5 "strongly agree". Higher scores on the balanced scales are indicative of healthier functioning, and the converse holds for the unbalanced scales. To determine the amount of balance versus unbalance in a family system, Cohesion, Flexibility, and Total Circumplex ratio scores were calculated. Scores  $\geq 1.0$  indicate the presence of balanced levels of cohesion and flexibility, as well as functional global family functioning. The Greek adaptation of FACES IV Package (33) demonstrated good internal consistency (Cronbach's  $\alpha$

coefficient ranges from 0.59 to 0.79 for the six scales) and high test-retest reliability (Intraclass correlation coefficient ranges between 0.94 and 0.97).

#### 2.4.3. Family Questionnaire

Family caregivers' EE was measured via the Family Questionnaire (FQ) (34), a self-report instrument measuring emotional responses and behaviours of relatives of patients with schizophrenia in terms of EOI and CC (with 10 items per subscale). EOI concerns unusually over-intrusive, self-sacrificing, overprotective or devoted behaviour, exaggerated emotional response, and over-identification with the patient, whereas CC refers to unfavourable comments on the behaviour or the personality of patient (5). Responses range from 1 "never/very rarely" to 4 "very often" with higher total scores indicating higher EE. The developers provide a cut-off point of 23 points as an indication of high CC, and 27 points for EOI. The Greek adaptation of FQ (35) demonstrates good psychometric properties including a clear factor structure, high internal consistency of subscales (Cronbach's  $\alpha$  coefficient = 0.90 for CC and 0.82 for EOI) and high test-retest reliability (Intraclass correlation coefficient = 0.99 for CC and 0.98 for EOI).

#### 2.4.4. Family Burden Scale

The Family Burden Scale (FBS) (36) was used to measure FB. The FBS consists of 23 items assessing four dimensions of caregiver burden: A) Impact on daily activities/social life in the form of burden associated by disruption of daily/social activities; B) Aggressiveness, capturing the presence of episodes of hostility, violence and serious damages at home; C) Impact on health, examining signs and symptoms of psychopathology experienced by the family caregiver; D) Economic burden: defined in terms of financial problems created by the patient's illness. Factor A, B, and D items tap objective burden; whereas C items measure subjective burden. The developers recommend the use of a cut-off total score of 24 points. The scale has been originally developed and standardized in the Greek population and has demonstrated good internal consistency (Cronbach's alpha coefficient ranges from 0.68 to 0.85 for the four FBS dimensions) and test-retest reliability (Pearson's  $r$  correlation coefficient ranges from 0.88 to 0.95).

#### 2.4.5. General Health Questionnaire

The General Health Questionnaire-28 item version (GHQ-28) (37), a self-administered instrument that screens for non-psychotic psychopathology in clinical and non-clinical settings, was used to assess caregivers' psychological distress. Its four subscales measure somatic symptoms, anxiety/insomnia, social dysfunction, and severe depression. In the present study the Likert scoring procedure (0,1,2,3) was applied providing a more acceptable distribution of total scores ranging between 0 and 84. Higher scores on the scale are indicative of poorer psychological well-being. The Greek version of GHQ-28, using the Likert response scale, has acceptable psychometric properties

(Cronbach's alpha coefficient = 0.90) and a recommended cut-off score of 23/24 for identifying persons at high risk for a psychiatric disorder (38).

#### 2.4.6. Outcome measures

Outcome was measured by the following variables: (i) the presence/absence of relapse within the first 6, 12, 18 and 24 months following the baseline family assessment, as a dichotomous variable (0=no relapse, 1=relapse); (ii) time to relapse; (iii) total number of psychiatric admissions and (iv) total length of stay at psychiatric hospitals during the two-year study period; (v) whether hospitalisations were voluntary or involuntary. The presence of relapse (requiring hospitalisation) was assessed through computerized hospital records. Patient charts were reviewed for the remaining outcome variables.

#### 2.5. Statistical analysis

The association between presence of relapse and sociodemographic or clinical characteristics of patients and caregivers were assessed through independent sample t-tests (for continuous variables) and Pearson's Chi-square tests (for discrete variables).

The association between illness chronicity and relapse likelihood or type of hospitalisation was initially assessed through a Pearson Chi-square test. The association between illness chronicity and number or length of hospitalization was studied using independent sample t-tests. The association between illness chronicity and time to experience a relapse within the two-year study period was examined via Kaplan–Meier survival analysis using the log-rank test (39). Moreover, the effect of illness chronicity on time to relapse adjusting for various sociodemographic variables was examined through Cox regression analysis. Potential confounders related with either the outcomes or the exposure of interest in the bivariate associations with a p value <0.2 (patient's residence), as well as *a priori* selected potential confounders (patient's gender, age, and employment status) were included in the multivariate models.

The association between family variables and relapse likelihood or type of hospitalisation was initially assessed through a Pearson Chi-square test. The association between family variables and number or length of hospitalisation was studied using independent sample t-tests. The contribution of family variables to time to first readmission was examined by multiple Cox regression proportional hazards analysis. Each one of the family variables was first entered into the analysis to determine its overall effect on patients' relapse, and then paired with potential confounders to assess whether it remained a significant predictor of time to relapse after adjusting for these confounding variables. Potential confounders related with either the outcomes or the exposure of interest in the bivariate associations with a p value <0.2 (patient's residence and chronicity of the illness), as well as *a priori* selected potential confounders (patient's gender, age, and employment status) were included in the multivariate models. Effect modification by illness chronicity was evaluated using the likelihood ratio

test through inclusion of the interaction terms in the models (statistically significant effect modification if p-value <0.10).

Estimated associations are described in terms of Hazard Ratio (HR) and their 95% confidence intervals (CI). All hypothesis testing was conducted assuming a 0.05 significance level and a two-sided alternative hypothesis. All statistical analyses were performed using SPSS Statistics 20 software (IBM, Armonk, NY, USA).

### 3. Results

#### 3.1. Relapse rate in relation to sociodemographic characteristics

Of the 100 patients followed-up, 16% relapsed within the first 6 months, rising to 23% by 12 months, 30% by 18 months, and finally 34% by 24 months. Of the 34 patients who relapsed over the two-year follow-up period, 20 patients (58.8%) had only one readmission to the psychiatric clinic, 6 patients (17.6%) had two, and eight patients (23.6%) had three or more. Regarding the type of hospitalisation, 16 patients (47%) had been admitted to hospital voluntarily, and 18 (53%) involuntarily. The mean survival time (period without relapse) for the whole sample was 18 months. Survival rates at 6, 12, 18, and 24 months were 84%, 77%, 70%, and 66%, respectively. Patients and caregivers of patients who did and those who did not experience relapse were comparable on all sociodemographic characteristics with one exception: the subgroup of patients who showed at least one relapse were more likely to come from urban settings (see Tables 1 and 2).

#### 3.2. Relapse rate and time to relapse in relation to illness chronicity (FEP vs. chronic patients)

As expected, chronic patients were more likely to experience clinical relapse during the two-year study period as compared to the FEP subgroup ( $\chi^2=11.41$ ,  $df=1$ ,  $p=0.001$ ). From the 34 relapsers during the two-year follow-up period only 9 were FEP and 25 were chronic patients. Comparison of FEP and chronic patients on time to relapse showed a significant difference between the survival curves by log-rank test ( $\chi^2=12.29$ ,  $df=1$ ,  $p<0.001$ ), indicating that chronic patients had a significantly shorter time to relapse (Mean = 15.83 months, 95% CI: 13.22, 18.45) than FEP patients (Mean = 21.54 months, 95% CI: 19.97, 23.12). A Cox regression analysis confirmed this association and showed that illness chronicity was a risk factor for patient relapse (HR=0.28, 95% CI: 0.13, 0.60,  $p=0.001$ ), a relationship that remained significant after adjustment for the effect of patient's gender, age, residence and employment status (HR=0.21, 95% CI: 0.09, 0.47,  $p<0.001$ ).

#### 3.3. Relapse rate and time to relapse in relation to family functioning

From a variety of family variables examined, only caregivers' high global EE and high CC levels were significantly associated with increased relapse rate ( $\chi^2=3.95$ ,  $df = 1$ ,  $p = 0.047$  and  $\chi^2=3.95$ ,  $df=1$ ,  $p=0.035$ , respectively). Analysis by the global EE score showed that 29 out of 73 (39.7%) patients from high-EE households relapsed as compared with 5 out of 27 (18.5%) from low-EE

households. Similarly, 22 out of 50 (44%) patients from high-CC households relapsed compared with 12 out of 50 (24%) from low-CC households.

Further analysis was conducted investigating the effect of each one of the family variables on time to relapse. Contrary to our hypothesis, dysfunctional family functioning in terms of *Cohesion and Flexibility* was not found to be a significant risk factor for relapse in psychosis. A Kaplan-Meier survival analysis showed no significant difference between patients who experienced unbalanced levels of family cohesion and flexibility, as well as impaired global family functioning, than those who experienced functional levels (Table 3).

Moreover, there was some evidence that *EE* (total FQ score) was related to the timing of relapse, as indicated by a marginally significant difference between the survival curves by log-rank test ( $\chi^2=3.89$ ,  $df=1$ ,  $p=0.049$ ). Patients from low-EE households ( $n=5$ ) had a significantly longer time to relapse (mean = 21.38 months, 95% CI: 19.22, 23.54) than those from high-EE households ( $n=29$ , mean = 17.69 months, 95% CI: 15.66, 19.72). This effect appeared to be dependent upon sociodemographic factors, since the effect of global EE failed to reach significance after adjusting for gender, age, residence, employment status and illness chronicity using Cox regression analysis ( $p=0.126$ ). When the two EE components were considered separately in Kaplan-Meier survival models, only CC score emerged as a significant risk factor for time to relapse. Patients from high-CC households ( $n=22$ ) had a significantly shorter time to relapse (mean = 16.96 months, 95% CI 14.40, 19.53) as compared with patients from low-CC households ( $n=12$ , mean = 20.41 months, 95% CI 18.53, 22.92; log-rank test,  $\chi^2=4.78$ ,  $df=1$ ,  $p=0.029$ ) (Figure 1). A Cox regression analysis showed that this effect remained significant after controlling for patients' gender, age, residence, employment status, and illness chronicity (HR=0.48, 95% CI: 0.24, 0.98,  $p=0.043$ ). Conversely, there was no significant difference in survival curves based on the EOI component (log rank  $p = 0.175$ ) (Table 3).

With respect to *FB*, Kaplan-Meier survival analysis revealed that time to relapse was significantly longer in the low-FB group of patients ( $n=16$ ) than in the high-FB group ( $n=18$ ,  $\chi^2=4.39$ ,  $df=1$ ,  $p=0.036$ ) (Figure 1). The mean time to relapse for patients whose caregivers reported low levels of FB was 20.18 months (95% CI: 18.41, 21.95), whereas for those whose caregivers reported high levels of FB was 16.45 months (95% CI: 13.50, 19.40). A Cox regression analysis confirmed this association and showed that high FB was significantly associated with shorter time to relapse (HR=0.49, 95% CI: 0.25, 0.97,  $p=0.040$ ), a relationship that remained significant after adjustment for the effect of patient's gender, age, residence, employment status, and illness chronicity (HR=0.47, 95% CI: 0.23, 0.95,  $p=0.037$ ).

Finally, there was no significant difference in the survival curves based on levels of caregivers' psychological distress (log rank  $p = 0.206$ ) (Table 3).

### 3.4. Hospitalisation indices in relation to chronicity of the illness and family functioning

No differences between FEP and chronic patients were found regarding the type, number and cumulative length of hospitalisation. Caregivers' psychological distress was found to be significantly associated with cumulative length of patient hospitalisation during the two-year follow-up period. Patients whose caregivers reported high levels of psychological distress had a significantly longer cumulative length of hospitalisation ( $M=45.83$ ,  $SD=33.17$  days) as compared with patients whose caregivers reported low levels of psychological distress ( $M=23.81$ ,  $SD=24.41$ ). However, after adjustment for confounding variables (patient's gender, age, residence, employment status, and illness chronicity) this association became non-significant (data not shown in tables).

### 3.5. Associations among family functioning, illness chronicity and time to relapse

The potential moderating role of illness chronicity in the association between family functioning and time to first relapse was examined in the form of the interaction term of the two predictors in the Cox proportional hazard models. Although results did not reveal a significant interaction between family scales and illness's chronicity ( $p>0.10$ ), this analysis may have been underpowered because of the relatively small size of corresponding clinical subgroups. In view of this null effect, the interaction term was not included in the final multivariable models presented above.

## 4. Discussion

The main finding of the present study is that certain characteristics of family functioning (high levels of CC - a key component of EE -and FB) are significant predictors of early clinical relapse leading to hospitalisation. Importantly we did not find evidence that illness chronicity (which was also a significant predictor of time to relapse) moderated the association between family functioning characteristics and time to relapse. Therefore, an adverse family atmosphere characterised by high levels of EE and FB was found to be a risk factor for both patients with a first psychotic episode as well as for more chronic patients with psychosis.

EE has been shown to be one of the most consistent predictors of psychiatric relapse (8-10, 40). Our findings concur with previous research showing that high levels of caregivers' CC, rather than EOI, is an important predictor of patient clinical status (3, 9, 16-20). King & Dixon (16) found that the relapse rate in their sample of young patients with schizophrenia was best predicted by CC from fathers and by EOI in mothers. Even though EOI and CC appear to be very diverse aspects of family function, it has been recently shown that it is akin to the negative affect that causes a relapse (41-42). According to our findings, it may be some aspect of the caregiver's critical attitude towards the patient rather than their self sacrifice, over-involvement and exaggerated emotional response that accelerates the course of processes leading to a relapse. The mechanism underlying this phenomenon is not fully understood (43). The diathesis-stress attribution model of EE, treating EE as a major stressor for patients, is the most often-cited (22), and supported by several empirical studies (3, 44-46).

Recently, the cognitive model of caregiving (47) predicts that caregiver's negative "internal" attributions with regard to patient's behaviour lead to greater likelihood of CC toward the latter. In turn, patients become more symptomatic which possibly leads to rehospitalisation in response to caregivers' CC (48-50).

Similarly, time to relapse was significantly shorter for patients whose caregivers reported high levels of FB as compared to those who reported low levels of FB. Given that FB has been traditionally investigated as a consequence of relapse and not as a risk factor, it is difficult to discuss this further. Conceptualizing EE and FB as interactive rather than unidirectional processes, we suggest that high burden of caregiving is likely to generate negative emotions toward the patient, such as increased CC, confounding caregiving experience and possibly hindering the process of recovery. Also, recent studies have demonstrated that high EE is associated with a poor course of psychosis in terms of a higher number of rehospitalisations and time spent in hospital (9, 19). In contrast to these findings, our results indicate no observed association between any dimension of family environment with the number and duration of rehospitalisations

What is deemed stressful may depend on the sociocultural context, which influences family emotional climate and EE levels (51). In Greece, the vast majority of patients with psychosis return to live with their families after discharge from hospital and depend on the assistance and continued involvement of their relatives (52-53). Although the Greek family is seemingly a nuclear family (54-57), in reality it functions as an extended one (54, 58) characterised by cohesiveness and tight knit bonds and interactions. Our group has recently shown considerable differences in familial EE between FEP and chronic patients indicating that the patient may be more sensitive to high levels of CC as the illness process progresses, and also that family CC increases with length and severity of illness (59). It appears that overly close family ties and exaggerated emotional reactions, as suggested by the prominence of EOI, characterise the family environment from the early stages of the illness and later on. This explanation coincides with previous studies which view EOI as a dominant cultural feature of the behaviour of Greek families (60). Taken together, it seems that emotional closeness is present at higher rates among family members of either FEP or chronic families making this relational style more susceptible to becoming habitual in the face of a severe psychiatric disorder (59).

Most EE research has established CC to be the primary predictor of poor clinical outcomes. Such findings have been largely based on the fact that high-CC family members comprised the largest proportion of high-EE households. The present study confirmed the predictive validity of CC in a sample where EOI was the most prevailing characteristic. These results highlight the sociocultural context's role in influencing the family's emotional climate and EE levels (51). Furthermore, most studies on EE have been carried out with families with a relative who had been recently hospitalised, and as such, one might conclude that familial EE assessed at the time of admission, which represents a crisis time for the whole family, is most predictive of relapse during the follow-up period. Conversely, studies exploring the role of familial EE status measured during remission, while the patients were out

of hospital and living in the community, failed to support the predictive validity of high EE in patient relapse (16, 61). Thus, this study contributes to the literature by bolstering the predictive value of the dysfunctional family environment for relapse among patients who were in remission.

Although the predictive validity of EE in terms of CC, as well as FB, are obviously of interest, a comprehensive assessment of family functioning in terms of cohesion and flexibility may yield additional information regarding the mechanisms through which family dynamics predict psychotic relapse. The failure to find predictive value for family functioning as operationalised by the Circumplex Model (30) in the present sample does not imply that family cohesion and flexibility are irrelevant over the long-run. Indeed, they may be relevant as the disorder becomes more chronic or as predictors of other indexes of patient relapse, not assessed in the present study, such as symptom exacerbation not necessarily leading to hospitalisation. This may be a fruitful line of inquiry to adopt since family functioning is a multifactorial concept and preventing relapse is an essential element of early intervention in psychosis.

#### Strengths and limitations

The strengths of the present study include the population-based prospective design of the study, its large sample size, the assessment of various aspects of family functioning through standardized scales and the high participation rate (96.1%). Furthermore, participating families comprised a relatively homogeneous group, originating from a specific region and being treated in a single psychiatric unit using similar therapeutic protocols. Additionally, the inclusion of a recent-onset group along with a more chronic group may have provided a better examination of the relative significance of the family environment, since the short-term course of the disorder was less confounded by repeated hospitalisations or long duration of illness; factors which may considerably affect family attitudes. Moreover, treating physicians have been the same over the two years of the study, and diagnostic and treatment interventions applied were similar for all included patients during all their hospitalisations.

There are also some limitations to this study. The population of patients and caregivers were from a single catchment area and hence, generalisability of results may be compromised. Furthermore, due to the small number of patients with a diagnosis of bipolar disorder ( $n=7$  for FEP and  $n=11$  for chronic patients), separate analyses for patients with schizophrenia and bipolar disorder could not be performed, which may limit the clinical interpretation of our results. Future research should include larger and representative samples and data from different diagnostic groups. Another possible limitation is the evaluation of hospitalisation rather than other parameters that could potentially be used to define relapse, such as symptom exacerbation. Although rehospitalisation is frequently used to define relapse as it is simple to measure and provides tangible data to analyse, it is sometimes dependent on various circumstances and could be confounded with family environment. For example, relatives of chronic patients tend to be less tolerant of symptoms, and make greater efforts to have the

patient readmitted to the hospital when, under the same clinical circumstances, caregivers of FEP patients might allow the patient to remain at home. In future research, symptoms should be assessed during follow-up using structured clinical interviews so that relapse is ascertained on the basis of increases in symptom severity. Finally, although the patients were under pharmacotherapy, compliance to medication was not assessed nor included in the final models as a possible confounder.

#### Conclusion and future directions

These findings suggest that caregivers' CC and burden of care are long-term risk factors of the course of psychosis from the early stages of the illness and later on. In contrast, emotional closeness and over-involvement appear not to have a negative impact on the course of psychosis. Our findings highlight the importance of early intervention with the families of patients with psychosis. Extensive literature has demonstrated the positive impact of psychoeducational interventions in improving family environment, reducing relapse and easing the burden of care (62-68). Thus, parameters associated with EE and FB should be examined by the therapeutic team in everyday practice, and if we suspect dysfunctional dynamics, interventions should be made. These could include family psychoeducation as well as short-term admission of the patient in a rehabilitation psychiatric hostel, or involvement of other family members as caregivers etc.

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#### Conflicts of interest

The authors have no conflicts of interest to declare.

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**Table 1.** Sociodemographic characteristics of family caregivers participating in the study.

	Total group		Relapsers Caregivers (n=34)		Non-relapsers Caregivers (n=66)		p-value <sup>a</sup>
	M	SD	M	SD	M	SD	
<b>Age</b>	56.80	9.98	56.97	10.64	56.71	9.71	0.903
<b>Children in the family</b>	2.72	1.15	2.88	1.09	2.76	1.16	0.606
<b>Number of family members</b>	4.47	1.26	4.56	1.21	4.42	1.29	0.615
<b>Gender</b>	N	%	N	%	N	%	
Male	15	15.0	7	20.6	8	12.1	0.261
Female	85	85.0	27	79.4	58	87.9	
<b>Education</b>							
Elementary/High school	64	64.0	20	58.8	44	66.7	0.083
High School/Some years in University	31	31.0	10	29.4	21	31.8	
University degree	5	5.0	4	11.8	1	1.5	
<b>Employment status</b>							
Employed	28	28.0	12	35.3	16	24.2	0.244
Not employed	72	72.0	22	64.7	50	75.8	
<b>Origin</b>							
Urban	57	57.0	24	70.6	33	50.0	<b>0.049</b>
Rural	43	43.0	10	29.4	33	50.0	
<b>Residence</b>							
Urban	82	82.0	32	94.1	50	75.8	<b>0.024</b>
Rural	18	18.0	2	5.8	16	24.2	
<b>Marital status</b>							
Single	3	3.0	0	0.0	3	4.5	0.311
Married	63	63.0	24	70.6	39	59.1	
Divorced/Widowed	34	34.0	10	29.4	24	36.4	
<b>Financial status</b>							
No individual income	30	30.0	7	20.6	23	34.8	0.197
<10.000€	39	39.0	13	38.2	26	39.4	
10.000€-20.000€	31	31.0	14	41.2	17	25.8	
<b>Family structure</b>							
Two-parent family	64	64.0	23	67.6	41	62.1	0.586
One-parent family	36	36.0	11	32.3	25	37.9	
<b>Living with the patient</b>							
No	19	19.0	6	17.4	13	19.7	0.804
Yes	81	81.0	28	82.3	53	80.3	
<b>Relation to patient</b>							
Parent	92	92.0	30	88.2	62	93.9	0.319
Other	8	8.0	4	11.8	4	6.1	
<b>Contact with the patient</b>							
Daily	95	95.0	33	97.1	62	93.9	0.498
1-2 times/week	5	5.0	1	2.9	4	6.1	

<sup>a</sup> P-values from t-test for continuous variables and chi-square test for categorical variables.

**Table 2.** Sociodemographic, family and clinical characteristics of the patients participating in the study.

	Total group		Relapsers (n=34)		Non-relapsers (n=66)		p-value <sup>a</sup>
	M	SD	M	SD	M	SD	
<b>Age</b>	31.09	5.75	30.29	5.78	31.50	5.73	0.323
<b>Number of hospitalizations</b>	0.28	0.75	3.41	3.11	1.94	1.43	<b>0.002</b>
<b>Age at illness onset</b>	24.03	5.48	22.56	4.47	24.79	5.82	0.053
<b>Symptom severity (BPRS)</b>	43.02	15.15	46.88	15.48	41.03	13.90	0.067
<b>Functioning (GAS)</b>	56.68	15.52	55.74	17.40	57.17	14.58	0.665
<b>Gender</b>	N	%	N	%	N	%	0.803
Male	66	66.0	23	67.6	43	65.2	
Female	34	34.0	11	32.3	23	34.8	
<b>Education</b>							0.874
Elementary/High school	38	38.0	12	35.3	26	39.4	
High School/Some years in University	52	52.0	18	52.9	34	51.5	
University degree	10	10.0	4	11.8	6	9.1	
<b>Employment status</b>							0.173
Employed	14	14.0	7	20.6	7	10.6	
Not employed	86	86.0	27	79.4	59	89.4	
<b>Origin</b>							0.129
Urban	91	91.0	33	97.1	58	87.9	
Rural	9	9.0	1	2.9	8	12.1	
<b>Residence</b>							<b>0.004</b>
Urban	86	86.0	34	100.0	52	78.8	
Rural	14	14.0	0	0.0	14	21.2	
<b>Marital status</b>							0.998
Single	85	85.0	29	85.3	56	84.8	
Married	6	6.0	2	5.9	4	6.1	
Divorced/Widowed	9	9.0	3	8.8	6	9.1	
<b>Financial status</b>							0.476
No individual income	49	49.0	14	41.2	35	53.0	
<10.000€	47	47.0	18	52.9	29	43.9	
10.000€-20.000€	4	4.0	2	5.9	2	3.0	
<b>Diagnosis</b>							0.629
Schizophrenia	82	82.0	27	20.6	55	83.3	
Bipolar disorder	18	18.0	7	79.4	11	16.7	
<b>Onset of mental illness</b>							0.952
≤ 12 months	22	22.0	8	23.5	14	21.2	
1-4 years	28	28.0	9	26.5	19	28.8	
>4 years	50	50.0	17	50.0	33	50.0	
<b>Type of patient</b>							<b>0.001</b>
FEP	50	50.0	9	26.5	41	62.1	
Chronic	50	50.0	25	73.5	25	37.9	
<b>Longer hospitalization</b>							0.965
Up to 20 days	65	65.0	22	64.7	43	65.1	
20+ days	35	35.0	12	35.3	23	34.9	
<b>Last hospitalization</b>							0.324
Up to 6 months	32	32.0	13	38.2	19	28.8	
7-12 months	65	65.0	21	61.8	44	66.7	
>1 year	3	3.0	0	0.0	3	4.5	

*Abbreviations:* FEP: First-Episode Psychosis; BPRS: Brief Psychiatric Rating Scale; GAS: Global Assessment Scale.

<sup>a</sup> P-values from t-test for continuous variables and chi-square test for categorical variables.

**Table 3.** Association between family functioning and patient time to relapse, univariate and multivariate analyses

		N	Kaplan-Meier regression				Unadjusted Cox regression <sup>‡</sup>			Adjusted Cox regression <sup>‡</sup>			
			Mean (months)	(95% CI)	$\chi^2$	df	p-value	HR	(95% CI)	p-value	HR	(95% CI)	p-value
Patient group	FEP	9	21.54	(19.97, 23.12)	12.29	1	<b>&lt;0.001</b>	0.28	(0.13, 0.60)	<b>0.001</b>	0.21	(0.09, 0.47) <sup>a</sup>	<b>&lt;0.001</b>
	Chronic	25	15.83	(13.22, 18.45)									
<b>FACES-IV</b>													
Family cohesion	Dysfunctional	5	17.99	(13.47, 22.50)	0.13	1	0.720	1.19	(0.46, 3.07)	0.721	1.32	(0.49, 3.55) <sup>b</sup>	0.588
	Functional	29	18.79	(17.05, 20.53)									
Family flexibility	Dysfunctional	15	17.70	(14.98, 20.41)	1.26	1	0.262	1.47	(0.75, 2.89)	0.265	1.16	(0.54, 2.52) <sup>b</sup>	0.699
	Functional	19	19.24	(17.23, 21.26)									
Global family functioning	Dysfunctional	6	19.11	(15.49, 22.73)	0.02	1	0.969	1.01	(0.42, 2.46)	0.969	1.23	(0.48, 3.18) <sup>b</sup>	0.665
	Functional	28	18.60	(16.79, 20.41)									
<b>FQ</b>													
Critical comments	Low	12	20.41	(18.53, 22.92)	4.78	1	<b>0.029</b>	0.46	(0.23, 0.94)	<b>0.033</b>	0.48	(0.24, 0.98) <sup>b</sup>	<b>0.043</b>
	High	22	16.96	(14.40, 19.53)									
Emotional overinvolvement	Low	10	20.24	(18.09, 22.39)	1.84	1	0.175	0.60	(0.29, 1.26)	0.180	0.73	(0.34, 1.60) <sup>b</sup>	0.438
	High	24	17.74	(15.50, 19.97)									
Global expressed emotion	Low	5	21.38	(19.22, 23.54)	3.89	1	<b>0.049</b>	0.40	(0.15, 1.03)	0.057	0.46	(0.17, 1.24) <sup>b</sup>	0.126
	High	29	17.69	(15.66, 19.72)									
<b>FBS</b>													
Family burden	Low	16	20.18	(18.41, 21.95)	4.39	1	<b>0.036</b>	0.49	(0.25, 0.97)	<b>0.040</b>	0.47	(0.23, 0.95) <sup>b</sup>	<b>0.037</b>
	High	18	16.45	(13.50, 19.40)									
<b>GHQ</b>													
Caregivers' psychological distress	Low	16	20.03	(18.17, 21.88)	1.60	1	0.206	0.65	(0.33, 1.27)	0.210	0.66	(0.32, 1.36) <sup>b</sup>	0.259
	High	18	17.12	(14.40, 19.83)									

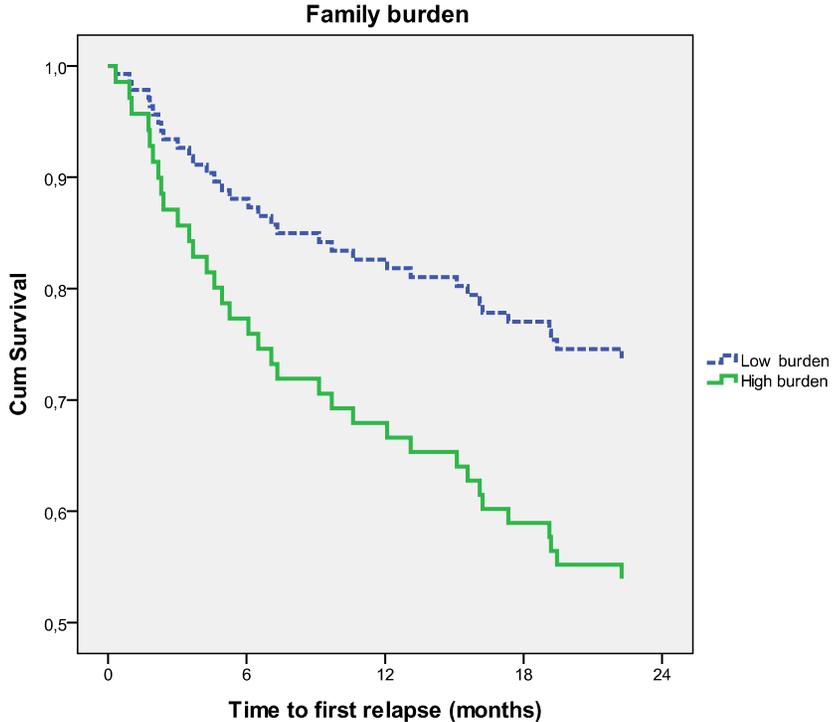
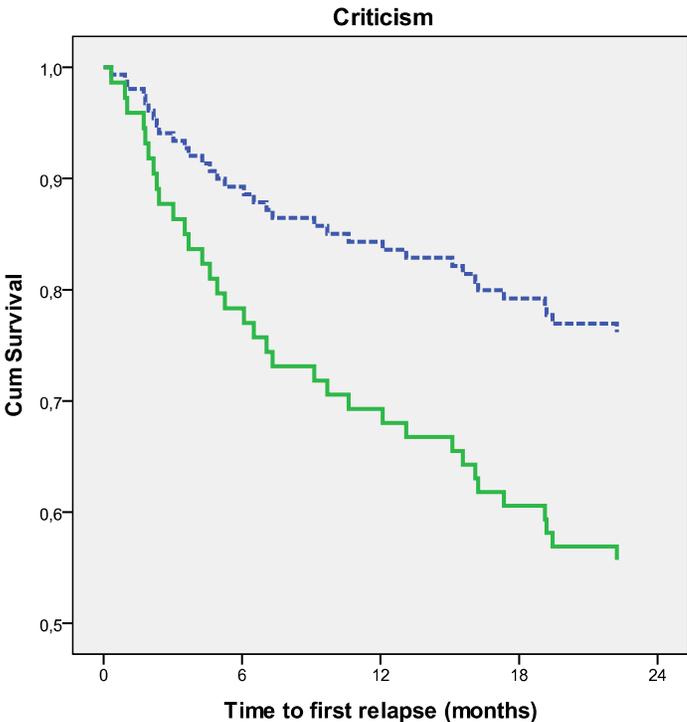
Abbreviations: FEP: First-Episode Psychosis; FACES: Family Adaptability and Cohesion Evaluation Scales; FQ: Family Questionnaire; FBS: Family Burden Scale; GHQ: General Health Questionnaire.

<sup>‡</sup> Hazard Ratio (HR) and 95%CI of HR retained from Cox regression survival analysis. Significant p values are in bold.

<sup>a</sup> Adjusted for patient gender, age, residence, and working status.

<sup>b</sup> Adjusted for patient gender, age, residence working status, and chronicity of the illness.

**Figure 1.** Survival curves for patients' time to first relapse during the two-year follow-up period in relation to family caregivers' levels of criticism and burden.



## Highlights

- We investigated whether dysfunctional family functioning contributes to relapse over a two-year follow-up period in patients experiencing their first episode of psychosis (FEP) and chronic patients with psychosis.
- Family caregivers of 50 FEP patients and 50 chronic patients with psychosis participated in the study.
- High expressed emotion, as indexed primarily by increased levels of criticism rather than emotional over-involvement, and great levels of family burden were associated with shorter time to relapse.
- Illness chronicity, which was also a significant predictor of time to relapse, was not found to moderate the association between family functioning characteristics and time to relapse.
- An adverse family atmosphere - characterized by high levels of caregivers' criticism and family burden - was found to be a risk factor for the course of psychosis both from the early stages of the illness and later on.

## **5. General discussion and conclusions**

Families play a central role in providing long-term care and support for patients affected by psychosis. This thesis presented a compilation of studies which assessed the intrafamilial relationships of patients with severe psychiatric disorders, such as schizophrenia or bipolar disorder, in the early course of psychosis. It aimed to develop a closer and better understanding of the role of family dynamics in relation to patients' process of recovery, as well as caregivers' psychological well being. To the best of our knowledge, this is the first systematic attempt to evaluate family functioning in terms of cohesion and flexibility conjoint with other aspects of the family emotional climate, such as EE, FB and caregiver's psychological well being in FEP patients. In our analyses we included as comparison groups families of chronic patients with psychosis and healthy controls.

This section provides a global discussion and provides a broader and more integrated interpretation of the entire research project.

### **5.1. Standardisation of family assessment scales**

Within the context of the present PhD thesis two psychometric instruments specifically designed to assess intrafamilial relationships - FACES IV Package and FQ - were translated and validated in the Greek population. Given that there is a scarcity of family functioning scales available in Greece, we chose the FACES IV Package to be translated and adapted to the Greek population because: it is based on a well grounded theory of family therapy (the Circumplex Model of Marital and Family Systems); it is a reliable and valid instrument for both research and clinical use; it has been shown to discriminate between healthy and problematic functioning families, showing clinical validity; and it is a result of long-term study and scientific enquiry. The FQ was chosen since it has been shown to be a research-applicable alternative measure of the concept of EE, which has been a cornerstone of family research in psychosis.

The psychometric properties of the FACES IV Package were evaluated in a non-clinical sample. The findings indicated that the Greek version displayed similar factor structure to the original questionnaire (two balanced scales – Balanced Cohesion and Balanced Flexibility – and four unbalanced scales – Disengaged, Enmeshed, Rigid, and Chaotic), demonstrated good internal consistency (Cronbach's  $\alpha$  coefficient ranges from 0.59 to 0.79 for the six scales) and high test-retest reliability (Intraclass correlation coefficient ranges between 0.94 and 0.97). The psychometric properties of the FQ were evaluated in family caregivers of patients with schizophrenia or bipolar disorder. The results showed that the Greek version demonstrated good psychometric properties including a clear factor structure (two subscales of EE – CC and EOI), high internal consistency of subscales (Cronbach's  $\alpha$  coefficient = 0.90 for CC and 0.82 for EOI) and high test-retest reliability (Intraclass correlation coefficient = 0.99 for CC and 0.98 for EOI).

Both scales appear to be valid and reliable instruments to be used in both research and clinical assessment of intrafamilial relationships. Both instruments can be used as research tools to study

family dynamics in the Greek family in various populations. They may also be used as supplements to clinical interviews when exploring family issues and conducting assessments to inform treatment decisions.

## **5.2. Family emotional climate in FEP: findings from the existing literature**

A systematic review of the literature revealed that, while many studies have been conducted examining the role of family functioning on the course of illness for chronic patients with psychosis, few investigators have considered the role of family functioning on FEP and have primarily focused at two dimensions: (a) the affective attitudes and behaviours expressed to the patient from his or her family members, usually characterised as EE, and (b) the burden of care [see review by Koutra, Vgontzas, Lionis, & Triliva (2014)]. In total, 27 studies that fulfilled the inclusion criteria, varying greatly in their aims and scope. The stressful family environment has been extensively studied in FEP using the concept of EE with the majority of the studies aiming to estimate the prevalence of caregiver's EE, explore its relationship to patients' relapse and define the impact of specific patients' and caregivers' characteristics on EE. On the contrary, few studies have focused on FB and relatives' psychological distress at FEP. Specifically, they assessed both the negative consequences on family routines and the emotional disturbances experienced by caregivers, while concomitantly aiming to assess caregivers' FB and psychological distress prevalence, the relationship between specific patients' and caregivers' factors and FB, as well as stability of FB and relatives' coping strategies at FEP.

The results of this review indicated that similarly to chronic patients, a high prevalence of high EE in caregivers of FEP patients was reported. High EE status appeared to be independent of the patient's illness-related characteristics, but dependent of relatives' attributions. In contrast to chronic patients, low levels of FB and psychological distress among family members of FEP patients were observed indicating that in the early stages of the illness family involvement is not yet associated with significant disruption in their lives. Studies assessing FB in chronic patients have found a well-established link of FB with patient's illness-related factors. On the other hand, in FEP patients the families' appraisal of FB is more closely associated with their coping mechanisms. Given that family functioning is a multifaceted concept, further research evaluating various dimensions of family life, including family's emotional cohesion and flexibility to change, were considered necessary to provide a comprehensive picture of family interactions from the early stages of the illness.

## **5.3. Family functioning in FEP as compared to chronic patients and healthy controls**

Given the dearth of research on family functioning in FEP patients, the goal of the present study was to examine a variety of aspects of family life and possible differences in family functioning of FEP patients in comparison with chronic patients with psychosis and healthy controls.

Within the Circumplex Model (Olson et al., 1979), cohesion is how systems balance their separateness versus togetherness and flexibility is how systems balance stability versus change. From this point of view, our findings indicated that families of psychiatric patients experienced significant difficulties in achieving balanced levels of cohesion and flexibility, and higher levels of dysfunction, consistent with previous studies which have underscored that caring for a psychiatric patient can be a risk factor for unhealthy family functioning (Chang, Blasey, Ketter, & Steiner, 2001; Friedmann et al., 1997; Phillips, West, Shen, & Zheng, 1998; Romero, Delbello, Soutullo, Stanford, & Strakowski, 2005; Sun & Cheung, 1997). A further comparison between the two groups of psychiatric patients showed that families of FEP patients presented higher levels of cohesion and flexibility, thus indicating that the family system was more balanced and functional, as compared to families of chronic patients. Taken together, our findings indicate that even at the early stages of the illness, the family system appears to be more dysfunctional experiencing low levels of cohesion and flexibility as compared to control families; however, levels of cohesion and flexibility significantly decrease as a result of the chronicity of the illness.

Furthermore, significantly low levels of CC were observed in the families of FEP compared to chronic patients (24% for caregivers of FEP patients compared with 76% for those of chronic patients). These findings indicate that the patient may be more sensitive to high levels of CC as the illness process progresses, and also that family CC increases with length and severity of illness. It might be hypothesised that lack of hope that arises from the continuous cycle of relapse and recurring episodes could, over time, translate into less helpful reactions on part of the family (Meneghelli et al., 2011). In contrast to family negativity (i.e. CC), which was a key feature of caregivers of chronic patients, it appears that overly close family ties and exaggerated emotional reactions, as suggested by the prominence of EOI, characterise the family environment of FEP patients. Both groups showed a high prevalence of high EOI (46% for caregivers of FEP patients and 78% for those of chronic patient). This finding is consistent with previous studies which view EOI as a dominant cultural feature of the behaviour of Greek families (Mavreas, Tomaras, Karydi, Economou, & Stefanis, 1992).

Contrary to assumptions that FEP has a great impact on the family, we found low levels of FB among family members of FEP patients (12% for caregivers of FEP patients as compared to 68% of chronic patients), whereas caring for a psychiatric patient, either FEP or chronic, was linked to poor mental health. This finding is inconsistent with studies which have found high levels of burden from the early stages of the illness among caregivers (Addington, Coldham, Jones, Ko, & Addington, 2003; Boydell et al., 2014; Wong et al., 2008), but support the findings of recent studies implicating no severe family burden among key relatives of FEP patients (Gonzalez-Blanch et al., 2010). This finding could be explained that in the early illness stages family involvement is not associated with significant disruption in caregivers' lives.

Finally, the comparison between the two groups of families of psychiatric patients with controls revealed that caregivers of both FEP and chronic patients were significantly more likely to

report mental health problems and poor mental health, whereas the comparison between caregivers of FEP and chronic patients indicated greater psychological distress for caregivers of chronic patients. Our findings indicated a high percentage of 62% of psychological distress for caregivers of chronic patients whereas this percentage was reduced to 30% for those of FEP patients. The latter finding is consistent with the 12% rate found by Tennakoon and colleagues (2000) and by Addington and colleagues (2003) (26% of relatives of FEP patients demonstrated severe distress and 21% moderate distress). These findings suggest that even in the early stages of the illness caregivers experience psychological distress; however, this effect becomes stronger as patients' illness follows a chronic and recurring course.

#### **5.4. The role of socio-demographic and illness-related characteristics on family functioning**

The contribution of social and clinical factors on family functioning of patients with psychosis has been the focus of limited research and has focused mostly to certain aspects of intrafamilial transactions, such as EE and FB. Furthermore, there are no data concerning the family functioning of patients with psychosis, as reflected through family cohesion and flexibility. Finally, studies on factors affecting family functioning are limited in Greece, where family members are the major source of caregiving in psychosis. Given that socio-cultural factors likely play an important role in determining both relatives' attitudes towards patients and perceived burden from the caregiving experience, the study of risk factors of unhealthy family functioning in the Greek context is considered necessary.

Initially, we evaluated simultaneously the effect of socio-demographic and illness-related characteristics on family cohesion and flexibility, as well as caregivers' EE, FB and psychological distress in the entire patient sample combining FEP and chronic patients. Our results indicated that caregivers' characteristics, such as female gender, non-working status, rural origin, urban residence, low financial status, relation to the patient (i.e. being spouses or siblings rather than parents), less frequent contact with the patient (i.e. 1-2 times per week compared to daily contact) and family structure (i.e. one parent families), were among the most significant determinants of family functioning. Also, patients' socio-demographic characteristics including older age, low educational level, rural origin, urban residence, unemployment status, as well as illness-related factors, such as earlier onset of mental illness, higher number of hospitalisations, longer duration of hospitalisation and clinical diagnosis (i.e. schizophrenia compared to bipolar disorder) impacted negatively intrafamilial relationships. These findings are consistent with recent investigations that reported that a variety of both patients' and caregivers' socio-demographic characteristics, as well as clinical features of the illness, affect the family environment of patients with psychosis with regard to EE status (Bertrando et al., 1992; Heikkila et al., 2002; Mavreas et al., 1992; Mo, Chung, Wong, Chun, & Wong, 2008; Vaughan et al., 1992) and FB levels (Caqueo-Urizar & Gutierrez-Maldonado, 2006; Grandon, Jenaro, & Lemos, 2008; Li, Lambert, & Lambert, 2007; Roick et al., 2007; Schneider, Steele, Cadell, & Hemsworth, 2011).

In a second analysis, we investigated how different aspects of family functioning in families of patients with psychosis were affected by specific illness-related characteristics, such as symptom severity and patient’s psychosocial functioning. We hypothesised that the poorer psychiatric status of the patient would lead to unhealthy family functioning in terms of cohesion and flexibility, as well as higher levels of EE, FB and caregiver’s psychological distress. Our findings indicate that severe psychopathology and patient’s low psychosocial functioning are risk factors for poor family functioning. Even though chronicity of the illness was found to be a strong confounder in the relationship between symptom severity and patient’s psychosocial functioning and family outcomes, no significant interaction effect was observed between chronicity and the afore-mentioned outcome variables. In light of these findings, dysfunctional family interactions are considered a reaction to increased symptom severity and impaired psychosocial functioning, independently of the patient being either in the early stages of the illness or later on.

Of the two clinical variables investigated in this analysis, symptom severity rather than the functional status of the patient had the most significant impact on family cohesion and flexibility, as well as caregiver’s EE status in terms of EOI, and psychological distress. This means that as patients’ symptom severity increases the family system becomes less balanced and functional, whereas caregivers are more likely to express their concern in terms of over-concern and protection (which in exaggerated form becomes EOI), and experience high levels of psychological distress from the early stages of the illness and later on. Consistently with a previous Greek study (Mavreas et al., 1992), in which high EE in the form of EOI was related to patients’ symptomatology, our findings indicate that high EOI might reflect efforts on the part of the relatives to cope with the difficulties of living with a patient experiencing increased symptomatology. Our findings also suggest that increased symptomatology and a low functional level of either FEP or chronic patients contributes to greater burden for their caregivers. This finding is consistent with earlier studies on FEP (Tennakoon et al., 2000; Wolthaus et al., 2002) or chronic patients (Grandon et al., 2008; Hjarthag, Helldin, Karilampi, & Norlander, 2010; Hou, Ke, Su, Lung, & Huang, 2008; Lowyck et al., 2004; Perlick et al., 2006; Provencher & Mueser, 1997; Roick, Heider, Toumi, & Angermeyer, 2006; Schene, van Wijngaarden, & Koeter, 1998; Tang, Leung, & Lam, 2008). The patients’ impaired competence and efficiency which results in the patient’s dependence on caregiver and consequent increased level of his/her burden, combined with the limited resources in community care in Greece, may explain similarity of FEP and chronic patients’ caregivers regarding their burden status.

**Table 2.** Socio-demographic and clinical characteristics related with family functioning in psychosis.

Caregivers’ characteristics	Patients’ characteristics	Family variables
<ul style="list-style-type: none"> <li>• Relationship to patient</li> <li>• Contact with the patient</li> </ul>	<ul style="list-style-type: none"> <li>• Education</li> <li>• Origin</li> </ul>	Family functioning in terms of cohesion and flexibility, communication and satisfaction.

<ul style="list-style-type: none"> <li>• Family structure</li> <li>• Financial status</li> </ul>	<ul style="list-style-type: none"> <li>• Clinical diagnosis</li> <li>• Onset of mental illness</li> <li>• Number of hospitalisations</li> <li>• Time since last hospitalisation</li> <li>• Increased symptomatology</li> </ul>	
<ul style="list-style-type: none"> <li>• Gender</li> <li>• Origin</li> <li>• Working status</li> <li>• Family structure</li> </ul>	<ul style="list-style-type: none"> <li>• Residence</li> <li>• Number of hospitalisations</li> <li>• Increased symptomatology</li> </ul>	Expressed emotion in terms of critical comments and emotional overinvolvement
<ul style="list-style-type: none"> <li>• None</li> </ul>	<ul style="list-style-type: none"> <li>• Working status</li> <li>• Onset of mental illness</li> <li>• Number of hospitalisations</li> <li>• Clinical diagnosis</li> <li>• Duration of longer hospitalisation</li> <li>• Increased symptomatology</li> <li>• Impaired psychosocial functioning</li> </ul>	Family burden as indexed by objective and subjective burden
<ul style="list-style-type: none"> <li>• Residence</li> <li>• Working status</li> </ul>	<ul style="list-style-type: none"> <li>• Age</li> <li>• Origin</li> <li>• Duration of longer hospitalisation</li> <li>• Increased symptomatology</li> </ul>	Caregivers' psychological distress

### 5.5. Towards a better understanding of caregiver distress in psychosis

Few studies have examined the psychological underpinnings of caregivers' psychological distress, and the question as to why some caregivers are more distressed than others remains largely unanswered. Recent models of caregiving in psychosis are framed within a stress-appraisal-coping model (Joyce et al., 2003; Raune, Kuipers, & Bebbington, 2004; Szmukler, Herrman, Colusa, Benson, & Bloch, 1996), in which caregivers' appraisals of the impact of the illness and their coping are key determinants of their distress level. Furthermore, the concept of EE, particularly EOI, is linked to caregivers' burden and distress (Breitborde, Lopez, Chang, Kopelowicz, & Zarate, 2009; Patterson, Birchwood, & Cochrane, 2005). While appraisal and coping appear to be important for caregivers' overall perception of the caregiving experience, little is known about whether and how perceived family dynamics in terms of cohesion and flexibility are related to caregivers' psychological distress. According to the existing literature, EE and FB may constitute mediating factors of caregivers' psychological distress.

In the present study, we tested a path analytic model explaining caregivers' psychological distress that takes into account perceived family cohesion and flexibility, emotionally charged behaviours toward the patient (EE), and caregiver's sense of burden associated with the caregiving experience (FB). It was hypothesised that the two concepts—family dynamics and psychological distress—are significantly inter-related, albeit indirectly. Features of family dysfunction appear to set

the stage for emotionally charged behaviours toward the patient, worsening caregiver's perceived burden associated with caring for a mentally ill member, and further increasing the level of psychological distress experienced by caregivers. In light of this, we hypothesised that when caregivers view their family as functional their behaviour toward the patient will be positively affected (as indexed by low levels of EE). Conversely, when the family is viewed as dysfunctional their behaviour will be negatively affected resulting in high levels of EE. Furthermore, strong (negative) EE behaviours toward the patient will likely be associated with stressful interpersonal interactions and conflict, enhancing the sense of burden. In addition, increased levels of EE are expected to further enhance the psychological burden experienced by caregivers leading to higher levels of psychological distress. Given the differences between families of FEP and chronic patients with psychosis in terms of a variety of family functioning dimensions, we examined whether the aforementioned model is independent disease duration.

Our results suggested that the proposed model is relatively independent of illness chronicity. Neither family cohesion nor family flexibility were found to have significant direct effects on caregivers' psychological distress. Instead, the indirect effects of family dynamics on caregivers' psychological distress were exerted primarily through CC and FB. Two main paths were identified. The first suggests direct, joint effects of flexibility and cohesion on CC, further impacting psychological distress through FB. Thus, the more dysfunctional the levels of cohesion and flexibility in the family, the more likely for the caregivers to adopt a highly critical attitude toward the patient. There were also indirect effects linking CC with caregivers' PD through the mediating effect of FB. The second underlying path linked family flexibility directly to perceived burden and, indirectly, to psychological distress. A possible interpretation following the Circumplex Model is that caregivers who experience dysfunctional levels of flexibility are not able to efficiently adjust to changes (e.g., the recent diagnosis of a mental disorder) or stress (e.g., the family member becomes chronically ill). Thus, more unbalanced flexibility levels are associated with greater feelings of burden among caregivers, which are related to higher levels of psychological distress.

### **5.6. The contribution of family dynamics in patient relapse over a two-year period**

While the association between the family environment and patient relapse is considered to be strong in more chronic forms of the illness, the findings are less conclusive for the early stage of the disorder. Several studies have established EE as a highly reliable psychosocial predictor of psychiatric relapse in patients with schizophrenia in a variety of cultural and social contexts (Butzlaff & Hooley, 1998; Cechnicki et al., 2013; Hooley, 2007). Recently there has been some controversy about the predictive value of EE in FEP patients with some studies reporting either weak (Barrelet, Ferrero, Szegethy, Giddey, & Pellizzer, 1990; Huguelet, Favre, Binyet, Gonzalez, & Zabala, 1995; Lee, Barrowclough, & Lobban, 2014) or no effect of EE on patient relapse (Stirling et al., 1991, 1993). In the last analysis of this study, we prospectively investigated whether dysfunctional family functioning

contributes to relapse over a two-year follow-up period in FEP and chronic patients with psychosis. Relapse was defined as patient rehospitalisation due to acute psychotic exacerbation, while additional variables including number, length, and type of hospitalisations were also evaluated.

The results showed that certain characteristics of family functioning (high levels of CC - a key component of EE -and FB) are significant predictors of early relapse leading to hospitalisation. Importantly, we did not find evidence that illness chronicity (which was also a significant predictor of time to relapse) moderated the association between family functioning characteristics and time to relapse. Therefore, an adverse family atmosphere characterised by high levels of EE and FB was found to be a risk factor for both patients with a first psychotic episode as well as for more chronic patients with psychosis. These findings are consistent with previous research showing that high levels of caregivers' CC, rather than EOI, are an important predictor of patient's relapse (Brown et al., 1972; Cechnicki et al., 2013; Hooley & Hiller, 2000; Kavanagh, 1992; King & Dixon, 1999; Marom, Munitz, Jones, Weizman, & Hermesh, 2005; Vaughn, Snyder, Jones, Freeman, & Falloon, 1984). It appears that caregiver's critical attitude towards the patient rather than their self sacrifice, over-involvement and exaggerated emotional response affects negatively the course of the illness leading to a relapse.

The theoretical mechanism that explains how EE leads to symptom escalation is not fully understood (Barrowclough & Hooley, 2003); however, the diathesis-stress attribution model of EE, treating EE as a major stressor for patients, is the most often-cited (Hooley & Gotlib, 2000), and supported by several empirical studies (Brown et al., 1972; Cutting, Aakre, & Docherty, 2006; Kuipers et al., 2006; Nuechterlein & Dawson, 1984). Recently, the cognitive model of caregiving (Kuipers, Onwumere, & Bebbington, 2010) predicts that caregiver's negative "internal" attributions with regard to patient's behaviour lead to greater likelihood of CC toward the him/her. In turn, patients become more symptomatic which possibly leads to rehospitalisation (Goldstein, Rosenfarb, Woo, & Nuechterlein, 1994; Rosenfarb, Goldstein, Mintz, & Nuechterlein, 1995; Woo, Goldstein, & Nuechterlein, 2004). Our group has previously shown that overly close family ties and exaggerated emotional reactions, as suggested by the prominence of EOI, characterise the family environment from the early stages of the illness. Taken this into account, our results confirmed the negative predictive value of CC even in a sample where EOI was the most prevailing characteristic, thus highlighting the sociocultural context's role in influencing the family's emotional climate and EE levels (Bhugra, 2003).

Furthermore, time to relapse was significantly shorter for patients whose caregivers reported high levels of FB as compared to those who reported low levels of FB. Given that FB has been traditionally investigated as a consequence of relapse and not as a risk factor, it is difficult to explain this finding. If however one understands EE and FB as bidirectional processes, we suggest that high burden of caregiving is likely to generate negative emotions toward the patient, such as increased CC, possibly hindering the process of recovery. Also, recent studies have demonstrated that high EE is

associated with a poor course of psychosis in terms of a higher number of rehospitalisations and time spent in hospital (Cechnicki et al., 2013; Marom et al., 2005). In contrast to these findings, our results did not show an association between any characteristics of family environment with the number and duration of rehospitalisations

Contrary to our hypothesis, impaired family functioning in terms of cohesion and flexibility was not found to be a significant risk factor for relapse in psychosis. This negative finding in the present sample does not imply that family cohesion and flexibility are irrelevant in the course of the illness. Indeed, they may be important as the disorder becomes more chronic or if we use other indexes of patient relapse, not assessed in the present study, such as symptom exacerbation not necessarily requiring hospitalisation.

### **5.7. Strengths and limitations**

The strengths of the present study include the population-based prospective design of the study (Paper 8), its large sample size, the assessment of various aspects of family functioning through standardised scales and the high participation rate (96.1%). Furthermore, participating families comprised a relatively homogeneous group, originating from a specific region and being treated at a single psychiatric unit using similar therapeutic protocols. It should be noted that the Inpatient Psychiatric Unit of the University Hospital of Heraklion is the only public facility in the East part of the island of Crete, covering a population of about 400.000 residents. Additionally, the inclusion of a recent-onset group along with a more chronic group may have provided a better opportunity to examine the relative significance of the family environment, since the short-term course of the disorder was less confounded by repeated hospitalisations or long duration of illness, factors which may considerably affect family attitudes. Moreover, treating physicians have been the same over the two years of the study, and diagnostic and treatment interventions applied were similar for all studied patients. Furthermore, all assessments were performed during a specific post-hospitalisation time period (patients had to have been out of hospital for at least 6 weeks). This selection criterion is a strength in our study, since it controls to some extent for functioning difficulties related to adjustment to a recent diagnosis for FEP patients or a recent relapse for chronic patients. In addition, the inclusion of a control group for comparison with the two groups of families of psychiatric patients allowed us to eliminate and isolate confounding variables and bias (Paper 5). Moreover, path analysis allowed us to assess both direct and indirect effects and highlight the potential role of significant mediators (Paper 7). Finally and more importantly, we controlled for possible confounders both at the stage of the design and analysis by using multivariate models and goodness-of-fitness test to assess the models' performance.

Some limitations of this study are worth discussing. First, the population of patients and caregivers were from a single catchment area and hence, generalisability of results may be compromised. Second, due to the small number of patients with a diagnosis of bipolar disorder in each

group - FEP or chronic - separate analyses for patients with schizophrenia and bipolar disorder could not be performed, which may limit the clinical interpretation of our results. A third limitation is that some parts of our study are cross-sectional, thus limiting the direct inference of causation (Papers 4-7). Future research should include longitudinal designs, larger and representative samples and data from different diagnostic groups. A fourth limitation could be the definition of “chronicity”, which was set in our study as “two or more hospitalisations”. Important information about the family’s gradual adaptation to psychosis may be missed when chronicity is defined in such wide terms. In addition, chronicity defined by the number of hospitalisations has some limitations, because the number of hospitalisations may be influenced by social factors and by the level of psychiatric health care system. Another possible limitation is the use of hospitalisation rather than other parameters that could potentially be used to define relapse, such as symptom exacerbation (Paper 8). Although rehospitalisation is frequently used to define relapse as it is simple to measure and provides tangible data to analyse, it is dependent on various factors including family environment (i.e. caregivers’ tolerance to manage the patient at home). Finally, although the patients were under pharmacotherapy, compliance to medication was not assessed nor included in the final models as a possible confounder (Paper 8).

### **5.8. Implications for practice and future research**

This study’s findings provide a better understanding of family dynamics in early psychosis and their relevance to the course of the disorder and of caregivers’ psychological well-being from a systemic framework. This line of research is important since it points out that psychosocial factors, as outlined by family dynamics, are related to the course of psychosis from the early stages of the illness in addition to putative biological mechanisms. Furthermore, this research has significant implications on the implementation of family psychoeducational interventions from the early stages of the illness aiming to ameliorate dysfunctional dynamics in terms of cohesion and flexibility, reduce negatively charged emotional climate in the family (i.e. high CC towards the patient) and ease the burden of care. Finally, the current study is a first step toward understanding the interplay of family dynamics with caregivers’ psychological distress, thus opening up the possibility to reduce the burden and improve caregivers’ emotional well-being by using family psychoeducational interventions.

Our findings further highlight the importance to conduct a comprehensive family assessment to identify and weigh factors that affect the family environment of people with severe psychiatric disorders. Instead of focusing on a single dimension, such as EE, an approach which embraces a broader view of family functioning in terms of cohesion and flexibility may provide a more thorough picture of family interactions. Having a better understanding of family functioning from the early stages of the illness can, through psychoeducational initiatives, strengthen the family as a unit, so as to provide better care to the patient.

Our results highlight the importance of early intervention with the families of patients with psychosis. Early interventions to support and educate the family about the illness may be more successful compared to interventions at later stages of the illness. Thus, family psychoeducational interventions should be offered early on in order to maximise the family's adaptive functioning to the illness: by educating caregivers about the nature and the course of patient's illness; improving dysfunctional interactions and communication patterns within the family; enhancing family's problem solving skills; improving family caregivers' coping strategies; and minimising any disruption to family life caused by psychosis. While psychoeducational interventions in the early stages of illness may prevent the onset and the negative impact of dysfunctional family interactions in the course of the illness, the needs of the families of chronic patients should not be neglected. For example, work with families of chronic patients aims to ameliorate the negative effects of the illness and improve dysfunctional interactions in terms of increased levels of EE and FB. Also, family interventions that enhance the caregiving capacity of family members by reducing the stress associated with their caregiving roles, have a clinically significant impact on the course of psychosis. Extended research over the past several decades has shown marked reductions in relapse and rehospitalisation rates and improvement in psychosocial functioning among patients whose families received psychoeducation. Improved caregiver knowledge on the nature of the illness, including improved knowledge in regard to medication, is the mechanism through which better outcome might be achieved for FEP patients.

## **5.9. Conclusions**

Today, families of mental health patients are actively participating in the care of their relatives. Families can and do play a significant role in the recovery efforts of FEP patients and relatives may be encouraged to serve as therapeutic agents in the process of patients' psychosocial rehabilitation. The family system changes over the course of a few months following a FEP as family members adapt to the illness. The degree to which the family adapts to a recent diagnosis of psychosis affects both the family well-being and patient recovery. Thus, it is important for the family to remain functional in order to support the patient and prevent further deterioration by providing a supportive and safe environment, especially in the early stages of the illness.

From the research presented thus far it can safely be concluded that, even at the early stages of the illness, the family system appears to be more dysfunctional experiencing low levels of cohesion and flexibility as compared to families of healthy controls. Moreover, unbalanced family functioning in terms of cohesion and flexibility, elevated levels of CC towards the patient, high levels of objective and subjective burden, as well as severe psychological distress reported by caregivers were found to be strongly associated with chronic and enduring psychosis. EOI seems to be a dominant cultural feature of the behaviour of Greek families with caregivers being overly involved in patients' lives from the early stages of the illness. Contrary to assumptions that FEP has a great impact on the family, we

observed low levels of FB among family members of FEP patients, whereas caring for a psychiatric patient, either FEP or chronic, was linked to poor mental health.

A variety of social and illness-related risk factors were identified as important determinants of family functioning in psychosis, with patients' severity of psychopathology and reduction of psychosocial functioning being the most important. These findings provided new evidence in regard to the effect of several socio-demographic and clinical factors on caregivers' EE, FB and psychological distress. Upon closer examination, dysfunctional levels of family cohesion and flexibility, high levels of caregivers' EOI and psychological distress can be primarily tied to patient's increased symptom severity, whereas both symptom severity and patient functioning were found to be important contributing factors that affect caregivers' burden. Chronicity of the illness does not appear to be a moderating factor in the aforementioned relationships.

Previous research has identified specific characteristics in Greek families that may influence the type of care they provide. Family functioning as conceptualised in the Circumplex Model has not been previously evaluated in relation to EE, FB and caregivers' psychological distress. Our study is the first to present this line of research which can potentially be useful in developing an in-depth understanding of the intrafamilial relationships and implementing new interventions suitable for families of patients with psychosis from the early stages of the illness. In light of this framework, caregivers of patients with psychosis who experience higher levels of family dysfunction in terms of flexibility display higher levels of CC towards the patient which, in turn, lead to greater burden and consequently, higher levels of psychological distress for themselves. Given that caregivers' emotionally charged behaviours toward the patient can influence the course of psychosis, these findings highlight the role of perceived family functioning in triggering negative comments and emotionally charged behaviours toward the patient.

Finally, we followed-up the sample of patients for two years in an attempt to determine whether family dysfunction, in terms of cohesion and flexibility, combined with other aspects of family emotional climate, such as EE, FB and caregiver's psychological distress, contributes to patient relapse. Although we did not find evidence that impaired family functioning in terms of cohesion and flexibility is associated with increased likelihood of relapse, an adverse family atmosphere characterised by high levels of EE and FB was found to be a risk factor for early relapse leading to hospitalisation for both patients with a first psychotic episode as well as for more chronic patients. Yet the mechanisms through which a psychosocial event like CC can result in symptom relapse remain relatively unexplored. Overall, these findings support the idea that the interaction styles of high-EE relatives may be stressful for vulnerable patients, thus highlighting the importance of early intervention in these families.

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## List of abbreviations

BPRS	Brief Psychiatric Rating Scale
CC	Critical Comments
FACES IV	Family Adaptability and Cohesion Evaluation Scales IV
FB	Family Burden
FBS	Family Burden Scale
FEP	First Episode Psychosis
FQ	Family Questionnaire
EE	Expressed Emotion
EOI	Emotional Overinvolvement
GAS	Global Assessment Scale
GHQ-28	General Health Questionnaire-28 item version
PD	Psychological Distress