

## HOW SHOULD FAMILY INTERDEPENDENCE BE STUDIED? THE METHODOLOGICAL ISSUES OF NON-INDEPENDENCE

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One of the principal features of the family is the interdependence among its members and among relationships. This complexity challenges family researchers from a methodological point of view: they have to find and implement the most suitable research strategy to preserve the family's relational specificity. How do researchers handle this complexity? What research designs have been devised? What unit of analysis has been used? How many and which types of family relationships have been investigated? In order to answer these questions, we conducted a systematic review of recently published studies (2003-2013) on the family, and we analyzed two special issues on methodology. The results show that there is a general increase in interest on family topics and on methodological-relational issues. However, most of the studies adopt an individual perspective and do not take interdependence into account. Suggestions for future research are discussed.

**Key words:** Family relationships; Interdependence; Methodology; Review; Family studies.

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What do we mean by “family”? Everyone is able to answer this question, but when we compare our answers, we realize that they greatly differ from one another. We can observe the same differences in scientific studies on the family. Since 2000, family studies have investigated the nuclear family as characterized by gender and generational differences and its position in an intergenerational history of relationships. Today, the landscape is more complex, and research endeavors are investigating different family forms: marital status (married couple, separated couple, remarried spouse), gender of the marital/parental couple, and those of different cultures. Moreover, there are many research topics investigated by family researchers: family relationships, parent-child relationship, marital relationship, family structure, and so forth.

In our opinion, the family, conceptualized as an organization of relationships, can be identified as “the common thread” running through the different family forms. The organizational/relational perspective, initially identified as the main characteristic of a small group by Lewin



(1948), was applied to the study of the family by Sroufe and Fleeson (1988) to underscore the deep interdependence among family members who have a shared history and a future perspective (Scabini & Manzi, 2011). On the other hand, the family therapy movement, which developed beginning in the 1960s, conceived the family as a system (the family is more than the sum of its parts) that works through multiple interactions among its members. The family is a *unitas multiplex*, a complex system that must meet the challenge of maintaining both its unity (as a whole) as well as giving space to relationships among single members. This means that the whole and the parts have to be simultaneously taken into account. The idea of the family as a complex unity is central to the relational-symbolic model of family research and intervention (Cigoli & Scabini, 2006), which particularly develops the intergenerational aspect of family bonds.

The complexities of the family have challenged researchers from a methodological point of view. Bray, Maxwell, and Cole (1995) maintain that the study of the family is intrinsically complicated due to the complex nature of the relationships within it. Studying families involves the consideration of a relational object. This assumption is central to the methodology because it means that researchers have to choose appropriate research methods to capture some of the relational features of the family.

The pivotal point for family studies is how to translate the relational complexities of the family to empirical research projects without oversimplifying and losing the relational specificity of the family (Larsen & Olson, 1990; Scabini, Marta, & Lanz, 2006). Approaching family studies from this perspective implies giving attentive consideration to research methodology: to the way in which research, able to capture the organization of relationships, should be structured. Theory (the point of view adopted with respect to the family) and method (how it is studied) are intrinsically connected: in other words, as Campbell already maintained in the 1970s, object and method come into being together. In this paper, we identify the pivotal methodological questions that researchers have to consider in order to plan research projects that preserve the relational specificity of the family. Then, we analyze the state of the art family studies in order to identify the adopted research strategies that respect the organizational/relational structure of the family.

#### NON-INDEPENDENCE IN FAMILY STUDIES: AMONG FAMILY MEMBERS AND WITHIN RELATIONSHIPS

The complexity of the family orients research toward adopting a “multiple perspective” approach in studying family relationships. In particular, a plurality of family members and relationships should be taken into account in order to define a research object that is as close as possible to the family under study. In fact, the family-object, understood to be a relational organization, is a synergy: a totality-unit that is more than the sum of its parts. It is a multiple, complex unity that can never be fully captured; therefore, the researcher should design research strategies that are able to approximate the object as completely and closely as possible (Tagliabue, Lanz, & Rossi Del Corso, 2010).

When a family study involves several relationships or several perspectives, researchers deal with the interdependence between people and among relationships that characterizes the family as a complex unity. Family members and family relationships are interdependent because two people belonging to the same family mutually influence each other, while two relationships



within the same family also mutually influence each other. The wife's perception of the marital relationship is related to her husband's perception of the same relationship (interdependence between people), but it is also related to her perception of the mother-child relationship (interdependence between relationships).

From a statistical point of view, the interdependence of family data gives rise to non-independent scores (Kenny & Judd, 1986). In other words, data from family members should be considered non-independent from a theoretical point of view because people belonging to the same relationships or group are more similar than people belonging to different groups (Kenny, Kashy, & Cook, 2006).

Kenny and colleagues (Kenny & Judd, 1986; Kenny et al., 2006) emphasize three factors that give rise to the non-independence of data in groups: compositional effect, common destiny, and reciprocal influence. First, the non-independence of data in families can result from compositional or non-random sampling effects: groups or families are not composed randomly, and roles within families are not interchangeable (Scabini, 1995). Unlike other groups, the family has tied bonds: it is not possible to exit from the parent-child relationship, nor is the filial relationship a voluntary choice (Scabini & Cigoli, 2000). This feature implies that family members share biological, psychological, and contextual characteristics, resulting in their non-independence. Second, non-independence can come about due to a family or group's common destiny or shared history. In particular, in family relationships, the intergenerational relationships and the hierarchical difference among generations are fundamental characteristics. In addition, even when the family of origin is not the main focus of the research, it still affects the adult family members because family history is part of their identity and it influences the marital and parent-child relationships (Barni, Ranieri, & Scabini, 2012; Donato, Iafate, Bradbury, & Scabini, 2012). This feature implies that family members and family relationships are embedded in the same history, resulting in non-independence among them. Finally, social interaction may result in group-linkage: members of a family or group continually interact with one another, and their interactions produce a strong linkage that might be reflected in non-independent data. The same is true for interactions of dyadic subsystems within the family, which result in non-independence of family relationships (Lanz & Tagliabue, 2014; Tagliabue & Lanz, 2010).

Those different sources of non-independence come into play when two or more different points of view on the same relationship are investigated, but also when two or more relationships are studied. Indeed, in family studies, research deals with two different types of non-independence of observations: different perceptions of the same relationship (e.g., mother and child; husband and wife) and the plurality of relationships (e.g., marital and parent-child relationships; father-child and mother-child relationships; father-grandparent and mother-grandparent relationships). In addition, the specificity of the family as a research topic has prompted researchers to manage non-independence as a source of information, and to plan research designs and choose statistical techniques by taking into account the interdependence among family members and family relationships rather than overlooking it.

#### RESEARCH DESIGN: UNIT OF ANALYSIS AND NUMBER OF RELATIONSHIPS

How can research manage interdependence within family relationships? We identify different degrees of interdependence within the family according to the level of the complexity that



research would like to probe. When the focus of the research is on family relationships or on how family relationships affect the individual well-being of family members, the research is confronted with the question of the interdependence of family relationships. From a methodological point of view, the main question is to choose a suitable research design able to detect, in the right way, the degree of interdependence in the research questions. The dyadic research method, developed by Kashy and Kenny (2000) to investigate close relationships, is a research methodology that can be fruitfully adopted by family researchers to analyze not only dyadic data, but also family members' different points of view and different types of relationships. In dyadic research, there are two common types of research questions. The first type regards the correspondence (e.g., agreement, similarity) of dyad members' experiences on a given variable; the second type studies how dyad members influence each other (Kenny et al., 2006; Wittenborn, Dolbin-MacNab, & Keiley, 2013). For example, a within-dyad research question may be "Is change in one partner's depressive symptomatology related to change in the other partner's relational happiness?" A between-dyad research question aims to compare dyads on a variable of interest and to examine factors that predict variability among dyads' responses. An example of a between question might be "Do young adults involved in a romantic relationship perceive their parent-child relationship differently than single young adults?"

Furthermore, in order to develop a dyadic research question, selecting a dyadic research design is the first step for family researchers interested in pursuing dyadic or family research questions. Cross-sectional and longitudinal dyadic research questions can be addressed through a number of research designs. Kashy and Kenny (2000) differentiate research designs on the basis of the number of relationships and the number of members of the dyad from which data are collected. The number of relationships considered (one versus two or more) classifies the research design into standard/nonstandard (SD/NSD) dyadic designs. The SD dyadic design involves studying dyads in which each research participant is a member of only one dyad in the study. In a NSD dyadic design, it is a matter of studying dyads in which each research participant is a member of two or more dyads in the study. For both SD and NSD, the researcher could potentially gather data from one (non-reciprocal; SDNR/NSDNR) or both (reciprocal; SDR/NSDR) members of a dyad. The reciprocal/non-reciprocal classification, in the family context, is linked to the unit of analysis considered, which could be considered as the point of view on the family. For instance, if the design is non-reciprocal, then the unit of analysis will be individual because there is only the point of view of one family member on the relationship; however, if the design is reciprocal, then the unit of analysis will be dyadic because there are two points of view on the same relationship.

Four different research designs emerge by intercrossing the aforementioned classifications: the SDNR dyadic designs; the SDR dyadic designs; the NSDNR dyadic designs; the NSDR dyadic designs (see Figure 1). Each research design handles different degrees of interdependence among family members and among relationships. In particular, the SDNR dyadic design is the research design in which the interdependence is at the lowest level, whereas the NSDR dyadic design is the research design in which both types of interdependence (among family members and among family relationships) are considered. When the research design is reciprocal, the unit of analysis is either dyadic (data from two family members) or family (data from all family members). For example, if the researcher wants to know how much communication there is within the marital couple, he/she could adopt a dyadic unit of analysis by asking both husband and wife to evaluate the frequency



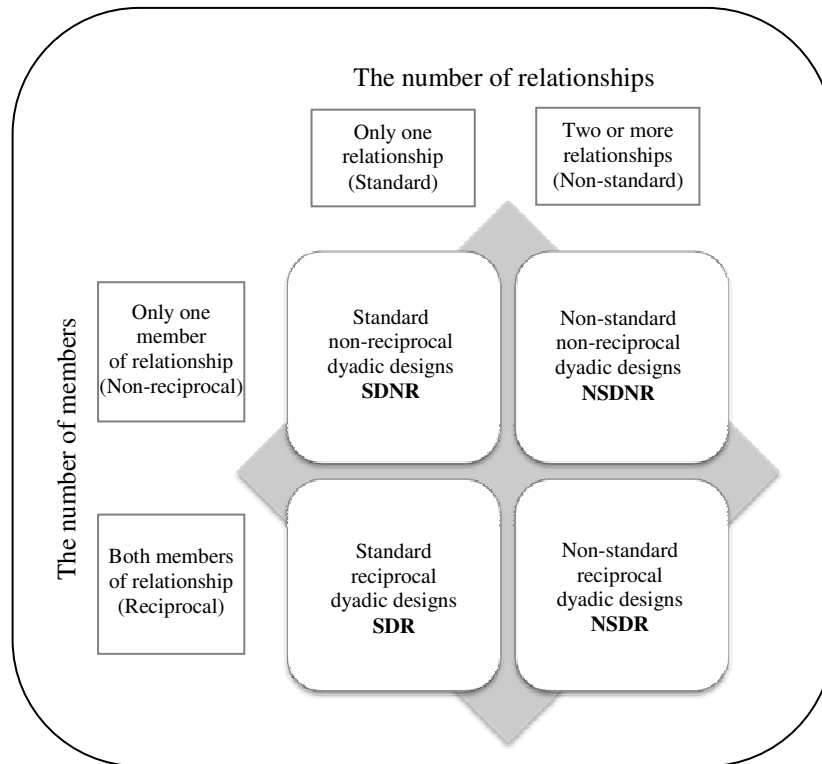


FIGURE 1  
Research design for relationship studies.

and quality of their communication. On the other hand, if family communication is the object of interest, then a research design in which all the family members are asked to evaluate all their family relationships regarding the frequency and quality of communication is based on a family unit of analysis.

The question about the unit of analysis is not new for family researchers. In fact, in the 1990s, the increase in studies on family relationships based on data gathered from only one family member led some authors to underscore the necessity of using the dyadic or family unit of analysis in order to not lose the relational features of the family bond (e.g., Carlson, 1989; Grotevant, 1989; Larsen & Olson, 1990). Moreover, in 1964 Straus wrote: “A discipline concerned with groups cannot depend on measurement of the characteristics of individuals ... it is necessary to move to the next level of abstraction and develop ways of measuring group properties” (p. 9). Both family and social scholars recommend studying family relationships by collecting data from either dyads or all family members. In this way, the sampling unit becomes the dyad or the family itself. In a family study, the participants will not be individual subjects, but families: in this way, the data (families) will be independent from one another, and the data obtained from family members can be considered nested data.

Thus, we need to develop methods that respect the group’s specificity, thinking of groups as something different than the sum of the persons involved (Lewin, 1948). What, then, is the most suitable unit of analysis for family research? Fortunately or unfortunately, there are no right or wrong answers. The choice of unit of analysis depends on the research design that the researcher



has decided to use. It is clear that each choice allows us both to emphasize some specifics of family relationships and to eclipse others. How have these methodological challenges been addressed by empirical research? How have researchers developed coherent research projects? Through a review of empirical studies carried out from 2003 to 2013, we analyzed how relational interdependence has been investigated.

#### AIMS: LITERATURE AT A GLANCE

The complexity and diversity of family science determines a broad diversity in the methods used in family research (Snyder & Kazak, 2005). However, family researchers, as was mentioned, should be focused on maintaining the coherence between the relational definition of the family, the choice of unit of analysis, and the data analysis techniques used. Most family theories underscore the systemic nature of the family object both within family therapy and family research (Olson, Russell, & Sprenkle, 1989; Scabini & Cigoli, 2012; Sluzki, 2007; Walsh, 2003). From a methodological point of view, consideration of the non-independence in close relationship data (Kenny et al., 2006) and multiple informant strategies (van Dulmen & Egeland, 2011; Wagner, Rau, & Lindemann, 2010) call for a higher coherence and conscious use of strategies and data analysis techniques that manage the non-independence of data.

Our goal was to investigate whether those researching family relationships have been taking into account the interdependence of family data, which they may do by collecting different perspectives on family relationships and by considering a plurality of family relationships. To accomplish this, we reviewed research on family relationships by analyzing articles published from 2003 to 2013. In particular, our first aim was to review the scientific literature in order to identify papers published in the last 11 years on family issues. The second aim was to analyze the method used in those papers and, in particular, the research design, unit of analysis, and plurality of the relational typologies. Finally, to underscore the methodological challenges proposed in recent years by family methodologists, we analyzed two special issues devoted to methodological issues of the *Journal of Family Psychology*, the APA's journal specifically devoted to the study of the family.

Overall, our aim was to conduct an exploratory verification as to what extent interdependence has been taken into account by research, particularly considering research design, unit of analysis, and plurality of relationship types investigated.

#### CONTENT ANALYSIS DESCRIPTION

We conducted a review of studies recently published on family relationships, using PsychINFO as the electronic database. We decided to focus our review on only one of the most consulted databases due to the explorative nature of our review. The search in PsychINFO was performed using the following keywords and Boolean operators: “family” AND “relation\*” OR “marital” OR “parent-child” OR “sibling” We included only journal articles; therefore, we did not include material published in books or conference papers. Furthermore, we limited our research to articles published from 2003 to 2013, in English language, and in European countries. The analysis of the papers selected showed that from 2003 to 2013, in European countries, there were 3830 articles published in 882 journals.



A preliminary quantitative analysis of the selected papers showed that: 1) there has been an increase in the number of research articles published (in particular, 43.65% of the total papers were published in the last four years), and 2) there is a general interest in family topics attested to by the considerable number of journals that published the papers (see Table 1).

TABLE 1  
Number of articles on family relationships from 2003 to 2013 in European countries

Years	Number of articles
2003	243
2004	258
2005	289
2006	317
2007	326
2008	382
2009	343
2010	382
2011	413
2012	396
2013	481

In order to identify the papers that focus more specifically on family relationships and the journals that were specifically dedicated to this topic, we first decided to consider only the last four years and selected journals that have published at least 10 articles on family issues. Thus, the total number of articles was reduced to 129 in 10 journals. Then, in order to identify the journals focused on family research, we also selected those journals that had published at least one article on family issues yearly during the study period. The number of articles that met these criteria was 573 in 15 journals.

Thus, 702 papers were analyzed in all. Among them, 12 were papers duplicated within the dataset, and two were introductory papers for special issues. The final dataset consisted of 688 articles. Of the 688, 1.74% were theoretical papers and 3.49% were methodological; the others were empirical. Of the 652 empirical papers, 79.45% used a quantitative approach, whereas only 12.88% used a qualitative approach, and 5.52% a mixed approach. In the others (2.15%) the approach was not specified.

The 652 empirical papers were analyzed in terms of the unit of analysis and the number of relational typologies considered. The abstract of each article was coded by a researcher according to the following coding schema, which makes it possible to identify the degree of interdependence considered in each article.

1. *Unit of analysis*. This was based on the number of informants involved in each study. The subcategories are as follows: 1. Individual; 2. Dyadic; 3. Family.

2. *Number of relational typologies* that are investigated in each study. The subcategories are as follows: 1. Marital; 2. Parent-child; 3. Sibling; 4. Family; 5. Other.

3. *Research design*. This was defined by crossing the unit of analysis and the number of relational typologies. The subcategories are SDNR dyadic design, NSDNR dyadic design, SDR dyadic design, and NSDR dyadic design.



Four researchers have been involved in the coding process. Twenty percent of the abstracts were used for training the coders and were coded independently by two coders. Eighty percent of the abstracts were coded by only one researcher. At the end of the coding process, all the critical codes were discussed among the four researchers.

#### Research Design: Unit of Analysis and Number of Relational Typologies

As regards the unit of analysis, 71.12% of the papers adopted an individual unit of analysis, 18.54% a dyadic unit of analysis, and 10.34% a family unit of analysis. Most of the research on family relationships is based on only one family member's point of view, using an individual perspective to investigate family relationships, and does not take into account the interdependence of the family system. It is important to note that in 14% of the abstracts, it was not possible to identify the unit of analysis or to define the member of the family or the dyads involved in the research.

Regarding the number of relationships considered in the studies, 61.35% investigated only one relationship, 6.75% investigated two different kinds of relationships, and 0.46% investigated three different relationship types; 31.44% did not investigate any family relationship, but focused on the structural features of the family (for example, different types of family or the role of marital status). The most investigated relationship was parent-child (56.3%) followed by the marital relationship (29.9%).

When the unit of analysis and number of relational typologies were crossed, considering only research on family relationships, we learned that 61.35% of papers chose an individual unit of analysis that assessed one relationship (SDNR dyadic design); 4.24% of papers chose an individual unit of analysis that assessed two relationships, and 0.25% of papers chose an individual unit of analysis that assessed three relationships, both resulting in NSDNR dyadic designs. Papers that chose a dyadic unit of analysis, thus using a reciprocal design, and one relationship amounted to 19.20% (SDR dyadic design); papers that chose a dyadic unit of analysis and two relationships amounted to 2.49% (NSDR dyadic designs). Finally, papers with a family unit considering one relationship (8.98%; SDR dyadic design), two relationships (2.99%; NSDR dyadic designs), and three relationships (0.50%; NSDR dyadic designs) were found. Generally, the SDNR dyadic design was the most used research design, whereas the NSDR dyadic design was the least used.

#### ANALYSES OF SPECIAL ISSUES

The Journal of Family Psychology published two methodological special issues, the first in 2005 and the second in 2011. The first one took into account several aspects of method in family research, whereas the second one focused more on mixed methods.

The first special issue presented an introduction by Snyder and Kasak (2005) and 14 papers. The main aim of this special issue was to propose critical methodological issues in family research, explaining both their principal aspects and their innovations in order to help both researchers and educational or clinical practitioners gain greater knowledge through those methods.

The second special issue presented an introduction by Weisner and Fiese (2011) and seven papers. This issue was more focused on one specific aspect of family research: the use of mixed methods. According to the guest editors of this special issue, "Mixed method approaches



can reveal patterns in the data when reliance on a single method may obscure important findings” (p. 796), so they are particularly useful in family research where complexity and nonlinearity are the main features of family processes and outcomes.

In the first special issue, several research designs and data analyses that handle the interdependence of family data were proposed. In four papers, the single family member was considered the unit of analysis; however, with the exception of one paper, in the others it was included jointly with the dyad (eight papers) and/or the family (six papers). This means that the focus on the different levels within the family system are stressed in this methodological special issue. Moreover, in 11 papers, researchers focused on the concept of interdependence; levels nested in one another (individual nested in the family) or family processes (interaction or co-construction) were taken into account. Regarding statistical techniques used to analyze data, they are often linked to interdependence: indeed, multilevel models (e.g., hierarchical models, multilevel log-linear models, cluster, dyadic indexes, qualitative coding of interactions, APIM) were proposed, in addition to analyses of change (e.g., longitudinal analyses, discrete-time survival analyses). Thus, family methodologists overall highlight the importance of considering the interdependence both among family levels and family processes (change). However, when studies in the second special issue are analyzed, the previous recommendations are not found as often. Indeed, despite the focus on mixed methods analyses, the units of analysis considered were individual (three papers), individual and dyadic (one paper), dyadic (two papers), and triadic (one paper). Moreover, in all the papers, the only family relationship considered was the parent-child relationship, although its quality was not directly measured in the research. Finally, the quantitative data analysis techniques used were multivariate analyses (ANOVA, MANOVA, regression, Fisher’s exact test, Fisher-Freeman-Halton exact test, chi-square), and the qualitative analyses were content and interpretative analyses.

## CONCLUSION AND OUTLOOK

The increased number of studies on family topics and of journals that published papers on family relationships clearly points to the importance of the family in several psychological domains. Unfortunately, the increase in the number of papers published has not been followed by in-depth methodological consideration of the methods used to investigate family relationships.

Indeed, many family theories underscore the importance of adopting a systemic approach to studying the complexities of the family, and suggest dyadic research on close relationships as the most suitable research design and method to handle interdependence; nevertheless, few studies consider more than one family relationship and a family, or dyadic, unit of analysis. Moreover, with reference to the papers published in the special issues of the *Journal of Family Psychology*, family or relational data analysis techniques were mostly proposed in the 2005 special issue, and to a lesser extent in the 2011 issue.

The majority of the studies used a NSDNR research design involving a single informant and focused on only a single relationship type, allowing the researchers to have only a partial view of the complexities of family relationships. The researchers’ choice to consider only one point of view on family relationships does not allow them to analyze the interdependence of family relationships. However, it is possible to increase the possibility of examining how family members



influence one another by collecting responses from more than one family member (Lanz & Rosnati, 2002; Wittenborn et al., 2013).

The profusion of studies using individual units of analysis reveals that the researchers prefer to use a single informant strategy to collect data, and that the issue of dyadic research (Kenny et al., 2006) and the debate about the coherence between theories and methods in family research need to be examined (Kreppner, 2005; Tagliabue & Lanz, 2004; Van Maanen, Sørensen, & Mitchell, 2007). The choice to use only single informants to investigate family relationships or only one relationship is also owing to the difficulty in recruiting whole families or dyads. Indeed, the recruitment of dyads or families is likely to be more time consuming than the recruitment of a single informant.

The Journal of Family Psychology dedicated two special issues to methodology in family relationships in 2005 and 2011. In both issues, the main concern was to illustrate methods and techniques that make it possible to facilitate research on family issues without losing the specificity of family relationships. Reflection on the coherence between theory and methods is crucial to developing research projects that provide new insights into the challenges that research on family members and relationships has to address. Indeed, it seems that there is a gap between the theoretical and methodological issues proposed in the literature and concrete research practices, which, due to the difficulty of sample recruitment and the consideration of more complex research questions, remains anchored in research designs characterized by adopting individual units of analysis and focusing on only one family relationship (often the parent-child relationship).

Methodological coherence is key to an awareness of the limits of one's own findings. In fact, every study is focused only on specific aspects of the family, and the results shed light on some, but not all, features of the family.

Our analysis of the papers published in the 2005 special issue revealed that, although much progress has been made regarding the methodological capacity to handle relational issues within family research, progress still takes years to enter into the research practices of family researchers. Additionally, an examination of the papers from the 2011 issue revealed ongoing difficulties in including relational topics and methods in family research; this finding matches the findings of our review, highlighting that it is always difficult to handle the complexity of the family.

#### FUTURE CHALLENGES

The study of the family requires research projects that are able to translate the relational complexities of the family into empirical research projects without oversimplifying and losing the relational specificity of the family (Larsen & Olson, 1990; Scabini et al., 2006). Nowadays, it is easy to manage the non-independence of data from a statistical point of view because many technical papers and statistical models (e.g., Hierarchical Linear Modeling; Structural Equation Modeling) have been developed (Bolger & Shrout, 2007; Curran, 2003; Hox, 2002). However, those techniques are not useful for investigating family interdependence if they are not applied to each phase of the research project. From a theoretical and methodological point of view, the challenges for the researcher consist of studying family relations while always keeping in mind the different levels present in the family (individual; dyadic; family). It is not possible to capture the full complexity of the family in a research project, but researchers could shed light on some as-



pects. There are compromises to be made at every step of the research process, and it is important to identify these limitations in order to fully understand what we are giving up as well as what we are gaining. We study family relations in order to approach as closely as possible an understanding of the family as something that is more than the sum of the relationships within it.

The task of developing research designs able to investigate interdependence within family relationships is also shared by researchers focused on small groups and organizations. Research on both small groups and organizations has to address key research questions regarding interdependence and multiple informants (de Moura, Leader, Pelletier, & Abrams, 2008; Kenny, Mannetti, Pierro, Livi, & Kashy, 2002; Wagner et al., 2010). The complexities of the family as a research object should induce family researchers to share the methodological concerns specific to family research in order to develop research projects able to investigate the increasingly complex interdependence.

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