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Accuracy of Retrospective Reports of Family Environment

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Abstract

Retrospective reports of family environments are often the only way to collect data concerning the influence of a child's experience in the family on later development. However, the accuracy of retrospective measures can be problematic because of social desirability or potential failures of memory. The purpose of this study is to compare retrospective and prospective measures of family environment. In this unique study, 198 parents and 241 adolescent children (mean age 15.7) described their family environment, and then 25 years later completed retrospective reports. We test the effects of memory, positivity, gender, and generation on retrospective reports, as well as testing the ability of prospective and retrospective measures to predict adult well-being and adult-child/elder-parent relationships. Results show moderate correlations of .30 – .45 between prospective and retrospective measures. In examining the relative effectiveness of prospective and retrospective measures to predict later life outcomes, we find that retrospective reports of the family environment most validly capture influences on the child in domains of strong emotional content but are less successful in cognitive domains.

Introduction

Adults emerge from the crucible of the family (Napier & Whitaker, 1978); the family environment can help us understand individual outcomes. Family effects have been observed in adolescence (Bell & Bell, 1982; Belsky, 1984; Grotevant, 1997; Nash, McQueen, & Bray, 2005; Powers, Hause, Schwartz, Noam, & Jacobson, 1983; Wall, Larson, Loth, & Neumark-Sztainer, 2013), in young adulthood (Aquilino, 1997; K. M. White, Speisman, & Costos, 1983), and later in life (Bell & Bell, 2012; Roberts & Bengtson, 1993; Rossi & Rossi, 1990). Thus information on the family environment can be crucial to understanding adult outcomes.

A wide variety of self-report and observational methods have been employed to evaluate the family's perception of their family environment (Sherman & Fredman, 2013; Touliatos,

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Ethical approval

All procedures performed in this study were in accordance with the ethical standards of the 1964 Helsinki declaration and its later amendments. Wave 2 data collection was approved by the University of Houston IRB. Wave 1 data collection predated the Belmont Report and the establishment of IRBs. Nevertheless, all Wave 1 families signed an informed consent document and were debriefed.

Author contributions

DB: consulted on the design of the study, conducted data analyses, and organized and wrote the paper. LG: designed and executed the study and collaborated in the writing and editing of the final manuscript.

The authors declare that they have no conflict of interest

Written informed consent was obtained from all individual participants included in the study.

Perlmutter, & Straus, 1990; Touliatos, Perlmutter, Strauss, & Holden, 2001). Family measures have been included in studies of marriage (Gottman, 2013), family (Paley, Cox, & Kanoy, 2001), parent-child relationships (Russell, Mize, & Saebel, 2001), adult child-elder parent relationships (V. L. Bengtson & Lovejoy, 1973), family of origin (Bray, Williamson, & Malone, 1984), and multi-generational patterns (Clingempeel, Colyar, Brand, & Heatherington, 1992). Methods have included self-report (Olson, 1986; Pinsof et al., 2005), qualitative interviewing (Chodorow, 1993), projective tasks (Bricklin, 1992; Sotile, Julian, Henry, & Sotile, 1988), and coding of observed structured tasks (Gottman & Krokoff, 1989; Grotevant & Cooper, 1986; Melby & Conger, 2001; Rueter & Conger, 1995) or Q-Sorts (P. L. Bengtson & Grotevant, 1999).

The idea of emergent qualities of a social system, that the whole is more than the sum of its parts, can be traced by to Spencer (1880). Family systems theory views the family as a system which maintains relationships within the family and between the family and the outside world (J. M. White, Klein, & Martin, 2015). The family can be seen as a “unity of interacting personalities” (Burgess, 1962). Family system qualities include communication, overt or covert conflict, problem solving, cohesion, affect and emotion, intimacy, differentiation, stress, and roles.

General views about the family system are reflected in family members’ sometimes diverging perceptions of the family (Oliveri & Reiss, 1982). Perceptions of the family have been found to vary by generation and sex (Larson, 1974). Gehring, Mark, and Sider (1994) found that fathers represented family relationships as more balanced than did mothers; children were more likely to describe the family as unbalanced during conflict. Parents and children may each enlarge the degree of influence they have in the dyad but agree on the degree of closeness (Jessop, 1981). Family perceptions of adolescence also vary by age, with younger adolescents perceiving more cohesion and larger power differences in dyadic relationships (Feldman & Gehring, 1988).

Divergent perceptions between parents and adolescents can be associated with lower adolescent health (Bell, Bell, & Nakata, 2001; Paikoff, Carlton-Ford, & Brooks-Gunn, 1993). Stress and illness impact perceptions of the family. For instance, respondents with clinical illness are less likely to represent their families as being cohesive, moderately hierarchical or as having clear generational boundaries (Gehring & Marti, 1993). Adolescents experiencing higher levels of social anxiety perceive parents as more socially isolating and more over-concerned about others’ perceptions (Caster & Inderbitzen, 1999). The perceived family environment moderates young adolescents’ life stress adjustment (Burt, Cohen, & Bjorck, 1988).

Prospective longitudinal studies are the ideal design for studying developmental questions, how the family environment effects family members. Prospective measures are contemporaneous with the environment studied. Successful prospective results have the ability to establish temporal order and causal priority and provide an unambiguous and persuasive basis for intervention. Data about the person or the person’s environment collected in the past (prospective measures in a longitudinal study) that are used to predict current outcomes provide direct evidence that data collected in the present will predict future

outcomes. Thus, prospective studies have direct relevance to clinical and policy interests. If we know that if a child is experiencing X within the family and that in the future some undesirable outcome Y is likely to occur, then we can screen children for X and intervene. For relevance to prospective intervention, a prospective measure is the “gold standard” for measuring a concept. For results from retrospective studies to have direct clinical and policy implications, prospective and retrospective measures must predict the same outcomes.

There are, however, significant methodological limitations with prospective studies. There are many research questions for which the required skills, time, resources, and or commitment involved in completing a longitudinal study are unavailable. Changes in the discipline may mean that currently important concepts were not previously operationalized, so they could not have been measured at the earlier time. Participants may be lost over time in a systematic way which may affect the ability to make valid inferences based on the remaining sample (attrition bias). These issues of bias and history highlight the methodological difficulties of prospective research, but they do not invalidate their more direct relevance to clinical application and policy.

Retrospective studies are convenient, often necessary, but their validity needs to be established. If prior experiences have been faithfully recorded in memory and do not fade over time, then retrospective recall can be accurate. However, previous studies comparing prospective and retrospective measures have yielded conflicting conclusions. Inaccuracy of recall may result from a tendency to simplify distant memory (Manzoni, Vermunt, Luijkx, & Muffels, 2010). Some studies have looked at consistency of recall by asking participants at two times as adults to recall childhood events, with the idea that if prior experiences are accurately recorded in memory, then recall at different times will be consistent. Dube et al. (2004) have found reasonable reliability for retrospective recollection of adverse childhood experiences by persons in their 60s (kappa varying between .41 and .86, with a summary kappa of .64 over a period of about 20 months). These results do not speak to the accuracy of such retrospective reports, but do indicate that recollection varies only moderately during adulthood. A similar study by Fergusson et al. (2000) looked at 3-year reliability in recall of adverse childhood experiences by persons 18 and 21 years old. They found kappa reliabilities around .45, indicating some consistency, but substantial variation in recall.

Compared with studies of consistency of recall, studies that compare original prospective data and retrospective data are less encouraging. Williams (1994) found that more than one-third of women who had documented experiences of sexual abuse as children did not recall these experiences 20 years later. Studies that compare retrospective reports with childhood records involving childhood trauma (Raphael, Widom, & Lange, 2001; Williams, 1994), academic performance (Gilger, 1992), and arrest (Morris & Slocum, 2010) have found mixed results.

It has been suggested that recall of childhood trauma may be particularly likely to involve memory inaccuracy (Raphael et al., 2001). Memory not related to trauma may be more accurate. There are a few longitudinal studies that have examined the accuracy of recall of non-traumatic events or states. Using interview data from the British National Child Development Study, Brown (2012) studied the consistency of answers about number of

people and number of rooms in the household given at age 11 with retrospective reports at age 50. Fifty-year-olds were typically able to recall these items with a reasonable degree of accuracy, although there was a tendency to underreport. Less accurate answers were given by those with less stable families, living in larger households, and less well educated. Women reported more accurately than men. One of the few studies to look at family environment prospectively interviewed males at age 14 and again at about age 48. The study found low accuracy of recall in reports of parental discipline (Offer, Kaiz, Howard, & Bennet, 2000).

For certain issues, retrospective results may be valuable in their own right and may even be preferred. A retrospective measure may build on life experiences, and over the lapse of time might allow for a person's deeper and more mature understanding. In cases of trauma, a retrospective report, may be more useful for understanding current life functioning than an accurate report of earlier experience more closely affected by the trauma (Raphael et al., 2001). How we construct our life story helps us create a coherent sense of current self (Wilson & Ross, 2003). Raphael, Widom, and Lange (2001) examined how prospective and retrospective measures of childhood abuse (sexual, physical, or neglect, using court substantiated cases of child abuse) predict adult pain. They found that there was no relationship between childhood abuse and later adult pain when measured prospectively; but a strong relationship when measured retrospectively. Thus for remedial interventions to treat a current problem associated with trauma, retrospective measures of childhood experiences may be particularly helpful.

It has been argued that retrospective measures of family processes may be particularly prone to error. Henry et al., in a large study of 18 year-olds followed prospectively from birth, compared prospective and retrospective variables in several areas (Henry, Moffitt, Caspi, Langley, & Silva, 1994). They found that psychosocial variables (e.g. reports of subjective psychological states and family processes) yielded the lowest level of agreement between prospective and retrospective reports. Strong correlations were found for attachment to parents (.40), a state that may be relatively stable over the course of childhood and adolescence, but low (.06) for reports of depression or anxiety, which may vary substantially, especially over early and late adolescence. In family research, prospective measures can capture the individual's foundational understanding of the family environment, an understanding which may undergo periodic reinterpretation throughout life. However, for family environment qualities which are relatively stable over time, semantic (general, summary) memory may provide for relatively accurate recall (Bower, 1987; Manzoni et al., 2010).

Retrospective research has advantages of convenience and availability. However, when retrospective measures are years away from the experience they attempt to recapture, there can be many threats to validity. Retrospective measures risk recall bias (Manzoni et al., 2010; Morris & Slocum, 2010; Raphael et al., 2001; Scott, McLaughlin, Smith, & Ellis, 2012), positivity bias (Collidge, Tambone, Durham, & Setal, 2011; Manzoni et al., 2010; Ross & Newby-Clark, 1998), social desirability bias (Ensminger, Juon, & Green, 2007; Hardt & Rutter, 2004; Karney & Frye, 2002), and mood bias (Ensminger et al., 2007; Mair et al., 2006; Widom, Raphael, & DuMont, 2004). Gender (Brown, 2012; Yankura & Aldwin,

2009) and age (Schnitzspahn, Horn, Bayen, & Kliegel, 2012; St. Jacques & Levine, 2007; Widom et al., 2004) can also influence recall.

Because of these difficulties and because prospective data are generally not available, much research is conducted using retrospective measures with the anticipation that they will be congruent with an unavailable prospective measure, even though the quality of such retrospective data may be problematic. This paper explores the relationship between prospective and retrospective family self report measures. The methodological issue of prospective vs. retrospective reports is addressed by using data from a unique longitudinal study of families over two generations. We compare Wave 1 (prospective) reports by parents and adolescents who described their family environment during the midlife-adolescent life cycle stage, and then 25 years later were asked to recall and describe their family environment at that earlier time (Wave 2 retrospective). We address two research questions. First, do retrospective reports of family environment reliably reproduce prospective reports? And second, how do retrospective measures compare to prospective measures in predicting current outcomes such as mid-life adult well-being.

Method

Participants

Data were collected at Wave 1 from 198 parents (Generation 1, G1) and 241 children (Generation 2, G2). Wave 2 telephone interviews were conducted with 128 G1s (elder parents), 59 men and 69 women from 76 Wave 1 families. Wave 2 telephone interviews were also conducted with 179 G2s (midlife former adolescents), 54 men and 125 women from 82 Wave 1 families. Wave 2 home interviews were conducted with 42 G1 couples and with 89 G2s (69 female and 20 male) and their current families. All participants were White and at Wave 1 were considered middle class. Table 1 describes parents and children at Waves 1 and 2.

Procedures

The original (Wave 1) goal of the research project presented here was to examine the effects of family environment on adolescent functioning. Family interviews were initially conducted in 1974–75 (Bell & Bell, 2009). When the opportunity to re-interview family members arose some 20 years later, the research project goal was expanded to examine the effects of family environment on later life outcomes such as well-being and relationship quality. Telephone interviews with elder parents and midlife adults (former adolescents) and home interviews with former adolescents and their families were conducted in 1994–2000 (Wave 2). Waves 1 and 2 of the research project provide data for the analyses presented here.

Wave 1—Families with two or three children were recruited through a screening instrument completed by 283 adolescent girls in three Chicago area high schools. Families of 215 of the screened girls were invited to participate in a home interview; 99 families agreed and were interviewed in their homes. All members of each family signed a joint informed consent prior to participating. As part of the home interview, the Family Environment Scale (Moos,

1974; FES) was completed individually by G1 parents and G2 children who were asked to describe their current family.

Wave 2 telephone interviews—Former participants were located through high school alumni yearbooks and through Wave 1 phone numbers for families who had not moved. Former participants were often located through their family members. Telephone interviews were conducted with 128 G1s. A few elders were deceased or unable to participate for health reasons. Of those whom we were able to locate and who were healthy, the participation rate for G1 women was 92%, for men, 86%. Telephone interviews were also conducted with G2s. The participation rate was 95% of those located for women and 87% for men. On average, the G1 telephone interviews were conducted 24.0 years ($SD = 1.3$) after the Wave 1 family interview. For G2s, the interval was 22.9 years ($SD = 1.3$). The Wave 2 telephone interview focused primarily on current well-being and the adult child—elder parent relationship.

Wave 2 home interviews—Still married elder couples (G1s) in which both completed the telephone interview and both were healthy were asked to participate in a couple home interview; 95% ($N = 42$) agreed. G2s with children, at least one of whom was an adolescent, were asked to participate in a repeat of the original Wave 1 home interview; 77% of sons and 83% of daughters agreed. Family home interviews were conducted with 89 of the G2s and their current families. They represented 66 of the Wave 1 families. As at Wave 1, participants completed the FES on their current couple or family at the beginning of the interview. About an hour and a half later, at the end of the interview, G1s and G2s completed a retrospective FES. For the G1s, the instructions were “*Please answer these questions describing your family when aa [name of oldest child] was xx years old; bb [next child] was yy years old, and [if they had three children], cc was zz years old*” (actual ages of the children at the Wave 1 interview). Instructions for G2s were “*Please answer these questions now describing your family growing up when you were xx years old*” (actual age at the Wave 1 interview). On average, G1 parents completed the home interview 25.3 years ($SD = 0.7$) after the family interview, while G2 former adolescents were interviewed 28.5 years ($SD = 4.2$) after the family interview. The reason for the greater spread for the G2s was that it was necessary to wait for some G3 children to reach adolescence.

Measures

Moos Family Environment Scale—The FES has been reported to have a good stability over time (Moos, 1990, 1991; Moos & Moos, 2002). Each FES scale has nine items rated 1 (*true*) or 0 (*false*). Seven of the 10 scales of the FES (Moos, 1974) were used to measure aspects of the family’s internal environment. The score for each scale was the proportion of items answered in the direction of the name of the scale (thus ranging from 0 to 1). Thus a score of .77 for cohesion indicates that the participant answered 77% of the items to indicate cohesion. Retrospective reports were completed by participants in the second wave who had shortly before rated their current families and participated in family discussions about some of the FES items. It is possible that describing the current Wave 2 family may have cued participants’ memories and improved the accuracy of retrospective recall of the Wave 1 family (Hasher & Griffin, 1978).

For each scale, a positivity score was assigned corresponding to estimates of each scale for an ideal family (Moos & Moos, 2002). The scales were *cohesion*, the degree of commitment, help, and support family members provide for one another (positivity = 8.1); *organization*, the degree of importance of clear organization and structure in planning family activities and responsibilities (7.0); *independence*, the extent to which family members are assertive, are self-sufficient, and make their own decisions (6.8); *expressiveness*, the extent to which family members are encouraged to express their feelings directly (6.5); *achievement orientation*, how much activities (such as school and work) are cast into an achievement-focused or competitive framework (5.8); *control*, how much set rules and procedures are used to run family life (4.0); and *conflict*, the amount of openly expressed anger and conflict among family members (2.1). In addition, scales were also coded for cognitive vs. emotional domain. The scales of organization, independence, achievement orientation, and control were coded as cognitive domain (= 1), while the scales of cohesion, expressiveness, and conflict were coded as emotional domains (= 0).

Adult outcomes—For the purpose of comparing the predictive accuracy of prospective and retrospective FES reports, four adult outcomes for the G2s were assessed at the G2 Wave 2 telephone interview. The first outcome measure was well-being (Ryff, 1989). Three other outcome measures assessed aspects of the G1–G2 relationship as reported by G2s: *Closeness* between G2s and parents, *support given* by G2s to parents, and *support received* by G2s from parents. For each relationship domain, the measures of relationship to both parents were averaged. *Closeness* was measured on a scale from 0 (*not at all close*) to 2 (*very close*).

For *support received* from the parents, support was computed from items measuring affection, respect, and caregiving using 6-point Likert scales from 0 (*strongly disagree*) to 5 (*strongly agree*). Items were: “My mother/father(M/F) perks me up or cheers me up,” “I feel loved and cared for by my M/F,” “My M/F knows how to take care of me,” “We have mutual respect for each other,” “My M/F sees me the way (s)he wishes I were instead of as I really am” (reversed), “My M/F respects me as an individual,” “It is hard for my M/F to let me live my own life” (reversed), “My M/F wishes I were someone I am not” (reversed), “I know I can depend on my M/F,” “My M/F pays attention to me when I tell him/her about my life,” “My M/F takes responsibility for helping me when I need help,” “I know I can depend on my M/F,” and “My M/F helps me if I call on him/her unexpectedly.”

Similar items were used to measure *support given* to each parent. “I perk my M/F up or cheer him/her up,” “I try to think of ways to help my M/F,” “I can share my true feelings with my M/F about the significant events in my life,” “I help my M/F if he/she calls upon me unexpectedly,” “I do things to take care of my M/F,” and “My M/F and I have mutual respect for each other.” Alpha reliability for the support received scale was .90, for the support given scale was .82.

Data Analyses

Analyses are designed to compare retrospective and prospective measures of perceived family environment in order to evaluate changes over time as well as looking for attrition

bias (Table 2). We amplify this analysis in Table 3 to evaluate positivity and social desirability biases, cognitive biases, and gender and generation biases as they are related to prospective and retrospective differences and accuracy. In Table 4 we examine reliability, and in Table 5 we examine validity. Validity analyses compare the ability of prospective and retrospective FES scales to predict the adult outcomes of well-being and parent-child relationships. These analyses evaluate the extent to which retrospective measures can substitute for prospective measures.

Results

When Wave 2 participants who completed the home interview were compared with those not interviewed at Wave 2, they did not differ on Wave 1 characteristics in terms of age, birth order, family size, education, adolescent grade point average, or FES scores on family cohesion, conflict, independence, achievement orientation, organization or control (Table 1). However, those interviewed at Wave 2 had reported a greater degree of family expressiveness at Wave 1 ($p < .01$) and their families were perceived by coders to have greater family health ($p < .01$).

The first data column of Table 2 displays means and standard deviations of FES scales for the entire Wave 1 sample. Wave 1 scores serve as the prospective scores for this longitudinal study. Cell entries are the proportion of nine items answered positively, so .77 for the cohesion subscale indicates that participants agreed with the high-cohesion choice 77% of the time. Family members described their families prospectively as cohesive, organized, independent, and achievement oriented, as well as not conflictual.

The second through fourth columns include data only for those participants who completed both waves. We compared the entire Wave 1 sample prospective scores in Column 1 with the Wave 2 sample retrospective scores in Column 2. Treating this as a two-sample t-test, none of the subscales showed a significant difference (analysis not shown): these results showed little difference in Wave 1 means and standard deviations between the full sample and those who were later interviewed at Wave 2. Thus we had little evidence of attrition bias. Columns 2 and 3 show prospective and retrospective scores on each FES scale and Column 4 tested changes in perception of the Wave 1 family. We found that the retrospective mean score of .29 was a nonsignificant .01 more cohesive than the prospective score. Participants remembered their adolescent families as being significantly more organized, independent, and controlling than they had experienced the family at the time. They remembered the family as exhibiting significantly less expressiveness and conflict than they had reported at Wave 1. Thus there were significant overall differences in how people saw their earlier family compared to their experience at the time.

Accounting for retrospective measures

Table 3 examines the factors that influence retrospective reports. Each participant had seven FES scores, one for each FES scale. These data created a multi-level model where scales were clustered within person and then within family. All variables were standardized prior to analysis. Results were predicted in a regression analysis by the corresponding prospective score (to estimate ceiling effects: a negative coefficient indicating that scales with higher

scores were less able to improve), by gender and generation, by the social desirability of that scale (reflected in the positivity score), by the cognitive domain characteristics of the scale.

In the first results column, the dependent variable was the difference between prospective and retrospective scores (positive coefficients indicate higher retrospective scores). Results showed a ceiling effect ($p < .001$), a generation effect ($p < .01$), positivity bias ($p < .001$), cognitive bias ($p < .001$), and a generation by positivity interaction ($p < .05$; G1s were more positive). In addition, there were two negative interactions: G1s perceived less of the cognitive dimensions of family environment (more of emotional dimensions: $p < .05$) than G2s, and family members were less likely to report positive scales when the scales were cognitive ($p < .05$). We also found a generation bias: the older G1 parents reported all scales somewhat higher ($p < .01$).

Accuracy of retrospective reports was investigated in the final results column where the negative of the absolute discrepancy was predicted (higher coefficients representing greater accuracy). In terms of accuracy, that is the ability of retrospective reports to replicate prospective scores, higher prospective scores led to higher accuracy ($p < .001$), probably reflecting ceiling effects and thus constraints on changes. Females were more accurate in their recall than males ($p < .05$), and G1 parents were more accurate than G2 adult children ($p < .001$). G2 women were more accurate than G2 men (women had an advantage in general [+0.06] but elder G1 women then lost that advantage [-0.06]). Retrospectively, Table 3 showed a cognitive bias where cognitive elements such as organization and control were over-recalled and emotional elements such as expressiveness and conflict were under-recalled. There was no evidence of positivity or cognitive domain affecting accuracy in these data.

Reliability of prospective and retrospective measures

Reliabilities of the FES scales are given in Table 4. Columns 1–3 display alpha reliabilities and the final column shows the test-retest correlation between Wave 1 and Wave 2 scores for the longitudinal sample. Reliability results for the full sample (first column) showed that the independence and achievement orientation scales achieved poor internal reliability with alpha $.50$ (compared to published large sample reliabilities: Moos & Moos, 2002). Except for independence reliability at Wave 1, reliabilities among those who would eventually be interviewed at Wave 2 were comparable to the full sample. For all scales the retrospective measures had higher reliabilities than the prospective measures. The higher consistency of retrospective reports suggested that distant memory of the family may be simplified and reduced in nuance (Manzoni et al., 2010).

The final column displays the correlations between retrospective and prospective scores and serves as a 20-year test-retest reliability. The test-retest estimates showed that retrospective scores were moderately correlated with prospective score, indicating some consistency in the two measures. Although as correlations, these were quite respectable numbers, as reliabilities that represent the interchangeability of the measures, they were less than stellar. None of the test-retest reliabilities reached conventional levels of acceptability ($.60$ as a minimum, but preferably at least $.70$).

Predictive accuracy of retrospective measures

We now ask whether retrospective reports provided adequate proxies for prospective data in understanding longitudinal outcomes. Our focus in this study was the ability of experienced family environment in adolescence to predict later life outcomes. Most retrospective family studies use characteristics of the childhood family to explain adult outcomes, so we focused on predicting G2 adult outcomes here. We considered adult well-being as well as later-life parent-child relationships as potential outcomes of the adolescent family experience. Results are presented in Table 5. We regressed on prospective score, retrospective score, and their interaction ($N = 88$ midlife G2s). Analyses in the left-hand column estimated the standardized regression coefficients for each prospective FES predictor collected in the adolescent family. In the second column we estimated the corresponding coefficient for the retrospective FES predictor collected at midlife. The third column tested the difference between prospective and retrospective scores by regressing the retrospective score on the prospective score and the interaction term: only the coefficients for the interaction term were reported here for this analysis. This interaction term tested the extent to which the retrospective prediction differed from the prospective prediction. Because of attenuation resulting from low reliabilities on some scales, some meaningful effects might have been missed at conventional levels of significance. Thus, we accepted tests at a marginal ($p < .10$) level of significance as potentially meaningful in Table 5.

A positive result of these analyses was that only one of the interactions was significant: the effect of family control on support to parent. In this, the marginally significant ($p < .10$) retrospective effect was not mirrored in the prospective effect. However, this was the only significant interaction we found among the 28 analyses in Table 5. Thus we did not find evidence that retrospective predictions were substantially inaccurate compared to prospective predictions.

Other results were mixed. There were two analyses where prospective data were significant and retrospective data were not: achievement orientation on closeness; achievement orientation on support to parent. There were seven analyses where retrospective data were predictive of adult outcomes but prospective data were not: expressiveness on well-being; organization, independence, and control on support to parent; organization, independence, and expressiveness on support to adult child. There were eight analyses where both prospective and retrospective data gave the same prediction with at least the .10 level: independence on well-being; cohesion and conflict on closeness; cohesion and conflict on support to parent; cohesion and conflict on support to adult child. And there was one case where both analyses were significant, but in opposite directions: achievement orientation prospectively predicted lower support to child while retrospectively predicting greater support.

Discussion

This study, comparing prospective and 25-year retrospective reports, identified some strengths and some weaknesses in retrospective data when the researcher wishes to substitute them for prospective data. In evaluating the ability of retrospective data to substitute for prospective data, we used as our criterion the ability to predict adult well-being

and relationship quality. While in some domains retrospective reports were consistent with prospective reports in predicting well-being and characteristics of adult child–elder parent relationships 25 years later, in other domains, retrospective reports gave misleading predictions that did not match predictions from prospective reports. The greater predictive success of retrospective data may be a result of the greater internal reliability and thus lower attenuation of the retrospective measures. This methodological difference may account for finding that some adult outcomes were better predicted by retrospective data than by prospective data. Thus there may be a form of retrospective bias where the greater reliability of retrospective data finds outcomes predicted that are obscured by greater turbulence in prospective data. At the same time, a major source of bias in retrospective measures may be that participants could be using their knowledge of current outcomes in reconstructing their recall, a form of retrospective bias that may potentially contribute to a misleading association of retrospective measure and outcome.

Six of seven results where prospective and retrospective predictions agreed in the same direction involved the effects of emotional domains. The family environment dimensions of cohesion and conflict were found to predict adult outcomes, as well from retrospective as from prospective measures. The emotional memory induced by the positive warmth of cohesion and the negative heat of conflict seems to have improved the memory of these aspects of the family environment. It is notable that in the most emotional family domains of cohesion and conflict, prospective and retrospective reports told the same story. It may be that in both short term memory (prospective) and distant memory (retrospective), it was the more extreme emotional events that were remembered retrospectively more than reported prospectively, so that retrospective memory was best able to recover the long-ago experiences of the adolescent's family in these domains. These effects appear to have occurred in spite of a positive cognitive bias where cognitive elements such as organization and control are over-recalled and a negative emotional bias where elements such as expressiveness and conflict are under-recalled.

The other successful prediction was the effect of independence on well-being. To the extent that an environment of independence may encourage autonomous self-care, it may explain overall well-being. The cultural importance of independence in U.S. families may explain the tendency for family members to retrospectively recall more independence than they had experienced at the time. However, independence had the lowest test-retest reliability. Thus the significance of independence as a predictor of well well-being can be taken to indicate that, in spite of limited overlap in explained variance, that overlap appears to be what predicts adult well-being.

Limitations

There were several limitations to this study. The sample of families was relatively small and not diverse. All families were White, middle class, and selected through local high schools. This sampling design was intentional. Given limitations in feasible sample size, it was felt that variations in race and class would obscure the investigation of family interaction and process that were the primary foci of the study. However, this sample limitation may have also limited variation in family environment and thus the power of analyses. One of the

difficulties in comparing prospective and retrospective measures stems directly from the lapse of time. Measuring instruments are frequently improved over time, so prospective measures in longitudinal studies may be somewhat dated when using past prospective data to predict current outcomes. Although the Family Environment Scale has been very widely used as a measure of family climate, its scales can have moderate to weak internal consistency. This weakness tends to attenuate effect sizes, so some inconsistencies between prospective predictions and predictions using retrospective measures may have been undermined by this attenuation, particularly family independence and achievement orientation. This attenuation is certainly one factor in modest test-retest correlations.

In evaluating retrospective data, we focused on predicting adult well-being and relationship quality. Our results might have been different if we had tried to predict more individualistic outcomes like occupational success or physical health. The fact that some of our measures were quite low in reliability certainly interfered in the comparison of predicting adult outcomes by retrospective and prospective measures. Retrospective and prospective scores were found to be correlated between .30 and .45. The strength of these effects was similar to the strongest effect found by Henry et al. (1994). While such correlations were quite respectable, they represented only 9% to 20% shared variance. This small level of shared variance has implications for the substitutability of retrospective measures for prospective measures. However, although low reliability attenuates the effects of a variable, a strong effect may still be detectable in spite of attenuation. Even though achievement orientation had a poor alpha reliability at Wave 1 (.45), this scale showed strong prospective effects on adult family relationships.

Evaluation and Future Directions

The family is a critical nexus in the child's development. Family environment would thus seem to be a central concept for capturing those aspects of an adolescent's family that are likely to affect those individuals 25 years later. Whatever the outside forces that affect the family, such as employment and income, prejudice and discrimination, or parental stress and mental health, these factors play out in the interactions and cultural norms within the family. Prospective measures of the family environment at the time can capture family members' experiences of the family environment from which adult outcomes will emerge. A prospective measure of the family environment will capture the subjective experience of the child. If interventions are to be initiated prior to the development of a problem, prospective measures in a longitudinal study are the "gold standard" for identifying opportunities for early intervention.

When prospective data are not available, retrospective data can be collected and substituted in analyses. For many of the questions that researchers wish to investigate, retrospective data are the only data available. Researchers may try to capture childhood experiences by relying on distant memory using retrospective measures. One may anticipate, however, that how people remember the family may differ to a large or small degree from how they experienced it at the time. Nevertheless, in spite of such expected deviations in memory, researchers are frequently required to rely on such memories in order to understand adult outcomes.

In the data presented here, parents and adolescents described their families on family environment scales and then, over 20 years later, both parents and former adolescents reported their retrospective memories of their family at that earlier time. Our results showed that retrospective measures of family environment were moderately related to prospective measures. There were significant but limited differences between the original prospective measures of the family environment and later retrospective measures. The largest difference was a standard deviation or less: family organization was overreported in retrospective measures, while expressiveness and conflict were underreported.

Results showed that the internal (alpha) reliability of retrospective measures was consistently higher than that of the corresponding prospective measures. The greater reliability of retrospective scales compared to prospective scales by the same persons may indicate the simplification of distant memory (Manzoni et al., 2010). Participants may have developed a more consistent memory of their family experiences over time than they had developed from within the turbulence of adolescent-midlife family life. This result suggests a pattern that may emerge if family members are reconstructing semantic (general) memory of events rather than recalling those events episodically, a pattern that may be strengthened over long periods of time (Manzoni et al., 2010; Menon, 1994). We suggest that this increased coherence may add a retrospective bias.

In addition, cognitive elements of the family environment were more recalled, although not quite so much for parents and not quite so much for the positive scales. Thus, people tended to recall positive family experiences and those that were more cognitive, less emotional both prospectively and retrospectively. Although the emotional domain of cohesion was the most highly reported dimensions of family environment, emotional domains were less reported than cognitive domains when controlling for other factors (Table 3). Parents were not quite so affected by these biases. When retrospective scores were compared with prospective scores, the positive organization and independence scales in a cognitive domain were strongly over-recalled, while the emotional scales of expressiveness and conflict were under-recalled (Table 2).

However, the elements of positivity and cognitive domain did not seem to have an effect on accuracy. Instead, only gender and age predicted accuracy of recall. Like St. Jacques and Levine (2007) and Aquilino (1997), we found that elder parents had a more accurate recollection (more similar to their original scores) than did their adult children. Like some others (Alea & Bluck, 2003; Gilger, 1992), we found that women's retrospective reports were more accurate than men's. Positive measures were more likely to be recalled, but mainly by the Wave 1 adolescents.

If we look at scales that successfully predicted at least two of the dependent variables, we find that significant prospective effects of achievement orientation were not replicated in retrospective data. In terms of predictive value, we have found, disappointingly, that retrospective measures do not always substitute well for prospective measures and may in fact make misleading predictions, at least within the more cognitive domains of family environment. For domains like family organization and independence, our results parallel Raphael, Widom, and Lange (2001), who found that there was no relationship between

childhood prediction and later adult outcome when measured prospectively; but a strong relationship when measured retrospectively.

Our results suggest that researchers need to be careful in using retrospective measures of the family environment as a guide to family interventions. Although prospective and retrospective measures may overlap considerably, they sometimes seem to capture substantially different elements of family experience. Thus researchers might need to be careful in interpreting the effects of retrospective measures in positive, cognitive domains of family experience on adult outcomes. In our analyses, retrospective reports on the domains of family organization, independence, and expressiveness predicted support between parent and adult child that were not captured with prospective reports. There clearly is a need for more research on these issues.

Our results suggest that retrospective studies of the more emotionally charged elements of family life may be particularly useful in informing family educators and interventionists. We found that cohesion as a positive dimension of family environment and conflict as a negative dimension were well captured by both prospective and retrospective reports as they predict relationships between parents and adult children. In anticipating the effect of the family environment on adult well-being and relationships, retrospective effects by the more emotional aspects of the family experience appear to be more accurately captured than are more cognitive effects.

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Table 1

Sample Characteristics

	G1		G2	
	Male	Female	Male	Female
Number at Wave 1	99	99	78	163
Number at Wave 2	42	42	20	69
College graduate	38%	24%	75%	62%
Mean age (SD) at Wave 1 (prospective)	44.2 (4.6)	41.9 (4.4)	15.5 (2.2)	15.9 (2.6)
Mean age (SD) at Wave 2 (retrospective)	69.6 (3.9)	67.5 (4.1)	44.4 (3.2)	44.2 (4.1)

Table 2

Means and Standard Deviations for the Family Environment Scale

Scale	Full sample Wave 1 Prospective	Longitudinal sample		
		Wave 1 Prospective	Wave 2 Retrospective	Wave 1/2 Difference
Cohesion	.77 (.22)	.78 (.21)	.79 (.27)	.01 (.25)
Organization	.62 (.23)	.63 (.23)	.76 (.24)	.13 (.24)***
Independence	.62 (.17)	.64 (.17)	.72 (.20)	.08 (.21)***
Expressiveness	.55 (.24)	.59 (.24)	.48 (.29)	-.11 (.28)***
Achievement orientation	.62 (.19)	.60 (.21)	.61 (.24)	.01 (.27)
Control	.54 (.23)	.54 (.23)	.62 (.26)	.08 (.28)***
Conflict	.42 (.24)	.40 (.24)	.29 (.30)	-.12 (.28)***
N	437		172	

p < .001

Table 3

Determinants of Retrospective Family Environment

	Longitudinal change	Retrospective accuracy
Prospective score	-.46 ^{***}	.10 ^{**}
Female	.00	.06 [*]
Generation	.07 ^{**}	.21 ^{***}
Positivity	.24 ^{***}	.05
Cognitive domain	.25 ^{***}	.03
Female × Age	-.01	-.06 [*]
Female × Positivity	.01	-.02
Female × Cognitive	-.02	.01
Generation × Positivity	.19 [*]	-.02
Generation × Cognitive	-.07 [*]	.04
Positivity × Cognitive	-.08 [*]	-.01
N	1162	1162
Wald Chi-Square (df=11)	433.24 ^{***}	74.04 ^{***}

*
p < .05;**
p < .01;***
p < .001

Table 4

Reliability Analyses: The Family Environment Scale

Scale	Full sample	Longitudinal sample		
	Wave 1 Prospective	Wave 1 Prospective	Wave 2 Retrospective	Wave 1/2 Test-retest
Cohesion	.69	.69	.79	.45
Organization	.60	.58	.70	.44
Independence	.34	.10	.50	.30
Expressiveness	.60	.61	.69	.44
Achievement orientation	.45	.55	.60	.34
Control	.57	.57	.68	.35
Conflict	.68	.70	.83	.45
N	437		172	

p < .001

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Validity Analyses: Prediction of Adult Outcomes from Prospecting and Retrospective Reports

Table 5

	Well-being			Closeness			Support to Parent			Support to Child		
	Prosp	Retro	Inter	Prosp	Retro	Inter	Prosp	Retro	Inter	Prosp	Retro	Inter
Cohesion	.13	.10	-.00	.28*	.28+	.06	.39***	.42***	-.13	.32***	.39***	-.04
Organization	-.00	-.01	.14	-.12	.14	-.01	-.01	.23*	-.04	-.09	.23*	-.09
Independence	.22**	.18+	-.05	-.02	-.03	-.08	-.00	-.27**	-.00	.04	-.19+	.00
Expressiveness	.11	.25*	.14	-.01	.17	-.09	.02	.16	-.09	.00	.21*	.03
Ach orientation	-.05	-.06	-.04	-.21*	.05	.09	-.21*	.17	.14	-.33**	.18+	.12
Control	.12	-.16	-.03	.03	.04	-.13	.11	.18+	-.28**	.02	.09	-.06
Conflict	-.13	.08	-.09	-.30*	-.20+	-.06	-.34***	-.24*	-.09	-.26*	-.22*	-.05

Prosp: Prospective score; Retro: retrospective score; Inter: interaction of prospective and retrospective scores (centered)

Closeness: G2 (adult child) report of closeness to G1 (elder parent); Support to parent: G2 report of support to G1; Support to child: G2 report of support from G1

Table entries are standardized regression coefficients. N = 88;

+ p < .10;

* p < .05;

** p < .01;

*** p < .001