Published in final edited form as:
Child Dev. 2011 January ; 82(1): 33–47. doi:10.1111/j.1467-8624.2010.01539.x.

Intergenerational Transmission of Adaptive Functioning: A Test of the Interactionist Model of SES and Human Development

Thomas J. Schofield, **Monica J. Martin**, **Rand D. Conger**, **Tricia K. Neppl**, **M. Brent Donnellan**, and **Katherine J. Conger**

Abstract

The Interactionist Model of human development (Conger & Donellan, 2007) proposes that the association between socioeconomic status (SES) and human development involves a dynamic interplay that includes both social causation (SES influences human development) and social selection (individual characteristics affect SES). Using a multigenerational dataset involving 271 families, the current study finds empirical support for the Interactionist Model. Adolescent personality characteristics indicative of social competence, goal-setting, hard work, and emotional stability predicted later SES, parenting, and family characteristics that were related to the positive development of a third generation child. Processes of both social selection and social causation appear to account for the association between SES and dimensions of human development indicative of healthy functioning across multiple generations.

Keywords

transgenerational patterns; socioeconomic status; interactionist model

After decades of studying dysfunction and maladjustment, social and behavioral scientists have begun to recognize the importance of environmental/contextual and dispositional factors that promote or facilitate healthy development, an approach consistent with the theme of this special issue of Child Development. In addition to conforming with the recognition that healthy development is more than the simple absence of maladjustment (see Christopher & Campbell, 2008), this work on positive development offers alternative pathways for interventions and programs focused on promotion of resilience under stressful conditions (Joseph & Linley, 2009; Sin & Lyubomirsky, 2009). The present report is consistent with this approach to research on human development inasmuch as it considers the interface between socioeconomic status (SES) and markers of healthy functioning across multiple generations of family members.

Past research has demonstrated a positive association between socioeconomic status and competent or healthy child development (e.g., Duncan & Magnuson, 2003; Haveman & Wolfe, 1994; Huston et al., 2005; Linver, Brooks-Gunn, & Kohen, 2002; Mayer, 1997; McLoyd, 1990). However, this association between SES and development may be viewed from at least two different perspectives. Some researchers propose that SES influences parental behavior and, in turn, child development (e.g., Linver et al., 2002). This view represents the ***social causation perspective*** which predicts that social conditions lead to variations in health and well-being. Other researchers propose that the relationship between SES and parenting is an artifact, and that prior characteristics of future parents affect both their SES and relationships with their children. This view represents the ***social selection***

Correspondence regarding this manuscript should be addressed to tomschofield@ucdavis.edu.

perspective which proposes that the traits and dispositions of individuals influence both their social circumstances and their future emotions and behaviors (e.g., McLeod & Kaiser, 2004).

The interactionist model incorporates hypotheses consistent with both of these perspectives, and suggests that the association between SES and human development involves a dynamic interplay between processes of social causation and social selection (Conger, Conger, & Martin, in press; Conger & Donnellan, 2007). That is, the interactionist view of human development proposes an ongoing reciprocal relationship between the characteristics of individuals and the broader socioeconomic environments in which they live. In the current analyses, we utilize data from an ongoing, prospective, longitudinal study of three generations to test the interactionist model in relation to the competent and healthy development of children, consistent with the theme of the special issue.

Social Causation Perspectives on Social Class and Socialization

In this section we describe two major approaches consistent with the social causation view of SES effects on child development and evaluate empirical evidence related to these perspectives. The *family stress model* of economic hardship (FSM), hypothesizes that financial difficulties have an adverse effect on parents' emotions, behaviors, and relationships which, in turn, negatively influence their parenting or socialization strategies (Conger & Conger, 2002). The FSM proposes that economic hardship (e.g., low income) leads to economic pressure (e.g., inability to meet basic material needs) in the family. In addition, the model predicts that when economic pressure is high, parents and other caregivers (e.g., members of the extended family) living with children are at increased risk for becoming emotionally distressed as indicated by feelings of depression, anxiety, anger, and alienation. According to the model, emotional distress and economic pressure both predict increased conflict and reduced warmth and support in the relations between caregivers (Conger & Conger, 2002).

The FSM also proposes that caregivers' emotional distress and relationship problems will be directly related to disruptions in parenting (e.g., being harsh and inconsistent, relatively uninvolved, and low in nurturance and affection). According to the model, then, when families experience economic hardship, children are at risk for suffering both decrements in positive adjustment (e.g., cognitive ability, social competence, school success, and attachment to parents) and also increases in internalizing (e.g., symptoms of depression and anxiety) and externalizing (e.g., aggressive and antisocial behavior) problems. Empirical support for this model has been found across a broad array of ethnic or national groups, geographic locations, family structures, children's ages, and research designs (e.g., Conger et al., 1992; Conger et al., 1993; Conger et al., 2002; Mistry, Vandewater, Huston, & McLoyd, 2002; Parke et al., 2004; Solantaus, Leinonen, & Punamäki, 2004; Yeung, Linver, & Brooks-Gunn, 2002). Simply put, the FSM argues that economic pressures are associated with declines in child health and well-being.

The *family investment model* (FIM) draws on the investment model from the field of economics, which proposes that families with greater compared to fewer economic resources are able to make more substantial investments in the development of their children and these investments, in turn, lead to greater health, well-being and socioeconomic security for their children across time (Corcoran & Adams, 1997; Duncan & Magnuson, 2003; Haveman & Wolfe, 1994; Linver et al., 2002; Mayer, 1997). These investments involve several different dimensions of family support including: (a) learning materials available in the home, (b) parent stimulation of learning both directly and indirectly through support of advanced or specialized tutoring or training, (c) the family's standard of living (i.e.,

adequate food, housing, clothing, medical care, etc.), and d) residing in a location that fosters a child's competent development. For example, wealthier parents are expected to reside in areas that promote a child's association with conventional friends, access to good schools, and involvement in a neighborhood or community environment that provides resources for the developing child such as parks and child-related activities. The investment model also predicts that economic well-being will be positively related to childrearing activities expected to foster the academic and social success of a child. Although the original investment model only included income as a marker of SES, Conger and Donnellan (2007) extend the framework by proposing that the FIM can include three possible measures of SES: family income, parent education, or parent occupational status.

A number of studies have supported the two most basic propositions of the investment model: (1) family income during childhood and adolescence is positively related to academic, financial, and occupational success during the adult years (Corcoran & Adams, 1997; Mayer, 1997; Teachman, Paasch, Day & Carver, 1997) and (2) family income predicts the types of investments parents make in the lives of their children (Bradley, Corwyn, McAdoo, & García Coll, 2001; Mayer, 1997). Some research also suggests that investments by parents mediate the association between income and child developmental outcomes such as cognitive development and social behaviors (e.g., Linver et al., 2002; Yeung, Linver, & Brooks-Gunn, 2002). Also consistent with the FIM, several studies have shown that parent education predicts competent child development (see Duncan & Magnusson, 2003; Han, 2005; Kohen, Brooks-Gunn, Leventhal, & Hertzman, 2002) and that parent education predicts socialization practices and priorities (Hoff, Laursen, & Tardif, 2002; Huston and Aronson, 2005; Tamis-LeMonda, Shannon, Cabrera, & Lamb, 2004). With regard to the mediating hypothesis, Hoff (2003) showed that more highly educated parents create a richer, more complex language environment for their children which, in turn, completely mediated the association between parent education and child productive vocabulary. Another study found that associations between parent education and child's cognitive and behavioral outcomes were partially mediated by parents' stimulation of learning in the home (Bradley & Corwyn, 2003).

When combined with more recent experimental work showing that income and changes in income affect child development (Huston et al., 2005), the results related to the social causation perspective provide a great deal of suggestive evidence consistent with the idea that markers of SES involving income and education are significantly related to the health and competent development of children. In addition, these dimensions of SES appear to have their effects on children primarily through specific mediating processes involving socialization practices. Thus, the empirical evidence reviewed here provides some support for both the FSM and the FIM and the social causation perspective in general.

Social Selection Perspectives on Social Class and Socialization

Despite the evidence just reviewed, the connections among SES, childrearing practices, and child development may be interpreted as a process of social selection rather than social causation. This view draws heavily from both economic arguments about how parents influence the lives of their children and from suggestions by behavioral geneticists (e.g., Lerner, 2003; Rowe & Rodgers, 1997). For example, Mayer (1997) notes that parents pass on a range of endowments to their children that not only include the kinds of economic investments discussed earlier, but also genes, behavioral dispositions, values, and priorities in life. Based on the findings from her analyses of income differentials between families, Mayer (1997) notes that "parental income is not as important to children's outcomes as many social scientists have thought. This is because the parental characteristics that employers value and are willing to pay for, such as skills, diligence, honesty, good health,

and reliability, also improve children's life chances, independent of their effect on parents' income. Children of parents with these attributes do well even when their parents do not have much income" (*p*. 2–3).

Consistent with this view, a series of studies show that the traits and dispositions of children and adolescents predict to their SES as an adult. For instance, McLeod and Kaiser (2004) found that internalizing and externalizing problems occurring as early as six years of age predict lower adult educational attainment, after controlling for SES in the family of origin. In their investigation, Feinstein and Bynner (2004) discovered that after controlling for childhood SES, poor cognitive performance during early and middle childhood predicted lower educational attainment, lower income, and less work success during the adult years. Presumably these earlier behavioral, emotional, and cognitive problems reduced the competence of these children in social and academic pursuits, thus jeopardizing their eventual success as adults. These studies provide suggestive evidence regarding the plausibility of the selection argument.

The Interactionist Model (IM)

Building on these earlier findings, Conger and Donnellan (2007) proposed that the relationship between SES and human development likely involves processes of both social selection and social causation. Their interactionist model systematically incorporates social selection and social causation processes into an overarching conceptual framework. As illustrated in Figure 1, the basic tenets of the IM are described in relation to the variables and participants in the present study. G2 represents a cohort of early adolescents followed to adulthood, G1 represents the parents of these adolescents and their characteristics during G2's adolescence, and G3 is G2's oldest biological child born during early adulthood.

To address the social selection approach, the model begins with specific personality characteristics of future parents (G2) during adolescence. In the present analyses, we focus on positive attributes of the type Mayer (1997) proposes will lead both to G2 SES and to the healthy development of G3. Specifically, we focus on G2 'alpha' personality (Digman, 1997), which includes attributes such as prosociality, social competence, persistence, planfulness, and emotional stability. Digman proposed that: "…Factor α is what personality development is all about…if all proceeds according to society's blueprint." (*p*. 1250). That is, alpha personality describes a healthy and well-functioning individual. As illustrated by the dotted paths in Figure 1, the selection framework proposes that these characteristics will be positively related to: G2 SES in adulthood, the investments that G2 parents make in their children (G3), and G2 family stress processes. To strengthen our degree of confidence in any associations between adolescent characteristics and these aspects of adult life, the model also includes G1 SES and investments, as suggested by Conger et al. (in press) in their extension of the model. The model also proposes a direct, positive path from G2 personality to G3 child adaptive functioning. This direct pathway could occur biologically (e.g., through genes or intrauterine environment) or via social learning processes whereby G3 offspring emulate G2 characteristics that demonstrate continuity from adolescence to the adult years.

The social causation aspects of the IM are reflected in pathways from G2 SES to family stress processes to G3 child outcomes along the lines specified by the FSM and in pathways from G2 SES to parental investments in their offspring along the lines proposed by the FIM. The interactionist model indicates that, although social selection will play a role in determining an adult's social position, G2 socioeconomic circumstances will have an additive influence on eventual G3 adaptive functioning independent of original G2 characteristics. That is, although G2 adult SES is expected to be affected by earlier G2 characteristics, the model depicted in Figure 1 proposes that G2 SES will have an additional

and independent impact on parental investments and family stress processes, consistent with both the FIM and FSM. Moreover, family stress processes are expected to decrease parental investments and have a negative impact on G3 development above and beyond the influence of G2 alpha personality. Both material investments (learning materials, physical environment of the home, healthcare resources) and emotional investments (parenting goals, behaviors, and relationship quality) are included in the model, consistent with findings from earlier research (Yeung et al., 2002). Simply put, the model in Figure 1 describes a reciprocal dynamic according to which G2 personality affects G2 SES which, in turn, influences later G2 behavior as a parent and family member. These adult characteristics of G2 and G2's family are predicted to have a direct influence on the development of the following generation (G3). The following analyses evaluate predictions from the model.

Method

Participants

Data for the present study were drawn from the Family Transitions Project (FTP), an ongoing, longitudinal study of 558 target youth (51% female) and their families. Interviews were first conducted with members of this cohort of adolescents (G2) and their parents (G1) between 1989 and 1991, when they were in either the seventh (1989) or ninth (1991) grade. Participants were interviewed annually in their homes through 1995 (with the exception of 1993), and thereafter they were interviewed in alternating years, with an average retention rate of almost 90% through 2005, when they averaged 29 years of age. Of the original 558 families, 107 adolescents came from single-mother families and the remainder of these youth lived with both their biological parents. Participants lived in rural counties in north central Iowa, and thus were all European Americans from primarily lower-middle and middle-class families. Additional information about the initial recruitment and the families involved is available in Conger and Conger (2002).

Beginning in 1997, the oldest biological child (G3) of the G2 target was recruited for study. To be eligible for participation the child had to be at least 18 months of age and the G2 target parent must have been in regular contact with the G3 child. The current study focuses on the 271 G2 targets (112 males, 159 females) who had a G3 child eligible for participation by 2005. Our study used data from the G2 targets' adolescent years, prior to their becoming parents, as well as data from the annual assessments of each G3 child. A total of 90% of the G2 target parents with eligible children agreed to participate. The G2 targets averaged 25.6 years of age at T1, the first assessment during which G3 entered the study. Almost 81% of the G2 targets were living with the other biological parent of the G3 child at T1. The average age of the G3 children across annual assessments was 2.31 years old at T1 (n = 270), 3.30 years at T2 (n = 212), 4.35 at T3 (n = 160), 5.43 at T4 (n = 144), and 6.58 at T5 (n = 111). There were 149 G3 boys and 122 G3 girls.

Procedure

G2 targets and their G1 parent(s) were recruited from public and private schools in rural areas of Iowa during G2's adolescent years. Letters explaining the project were sent to eligible families, who were then contacted by telephone and asked to participate. Seventy-eight percent of the two-parent families, and over 90% of the single-parent families agreed to be interviewed. During each assessment period, professional interviewers made home visits to each family for approximately 2 hours on two occasions. During the visits, each family member completed a set of questionnaires covering an array of topics related to work, finances, school, family life, mental and physical health status, and social relationships. In addition, G1 and G2 participated in structured interaction tasks which were coded by trained observers. The first task consisted of the family members (mother, father,

the target adolescent, and a sibling) discussing issues raised by task cards, including when problems usually come up, what happens, and why particular problems exist for that family. The family members were given 30 min to complete this task. The second task, 15 min in length, also involved the same four family members. For this task, the family was asked to discuss and try to resolve issues and disagreements they had cited as most problematic in a questionnaire they had completed earlier in the visit.

Beginning as early as 1997 the G2 target and G3 child were visited at home once each year by trained interviewers. Data were collected from G2 targets and their G3 children, as well as from the romantic partners (married or cohabiting) of the G2 targets (when they had one), following procedures similar to those described for G2's family of origin. The G2 target and participating partner (when applicable) completed a series of questionnaires on parenting beliefs and behaviors, the characteristics of the G3 child, social relationships, economic circumstances, and mental and physical health status.

During the annual visits, the G2 parents and G3 child engaged in two separate videotaped interaction tasks. The first was a *puzzle task*, which lasted 5 minutes. This task was also completed separately with G2's partner and G3 when applicable. In the puzzle completion task, G2 and G3 were presented with a puzzle that was too difficult for children to complete alone. G2 parents were instructed that children must complete the puzzle alone, but parents could provide any assistance necessary. Puzzles varied by age group so that the puzzle slightly exceeded the child's skill level. Only the G2 target and the G3 child participated in the *clean up task*, which always followed the puzzle task and lasted 5 minutes for 2 year olds and 10 minutes for older children. The clean up task began with the child playing alone with various developmentally appropriate toys. An interviewer then joined the child in play. The interviewers were instructed to dump out all of the toys in order to set up the task. Interviewers then retrieved the parent and instructed the parent that their child needed to clean up the toys alone, but parents could provide any assistance necessary.

Both interaction tasks created a stressful environment for both parent and child and the resulting behaviors indicated how well the parent handled the stress and how adaptive the child was to an environmental challenge. We expected that skillful, nurturing and involved parents would remain warm and supportive toward the child whereas less skillful parents were expected to become more irritable and short-tempered as the child struggled with the puzzle or cleaning up the toys. Trained observers coded the quality of the behaviors between participants using the Iowa Family Interaction Rating Scales (Melby & Conger, 2001). Each interaction task (puzzle and clean up) was coded by an independent observer.

Measures

SES—As noted earlier, both income and education are widely used indicators of SES. We include both per-capita income and education as separate measures of SES in the current study. To assess G1 educational attainment in single mother households, we used G1 mother's self-report of years of schooling completed by 1991, and the average of mother's and father's self-reports of years of schooling completed by 1991 was used in two-parent families. G2 educational attainment was assessed using the G2 target's self-report of years of schooling completed at the time of G3's first assessment (T1). Educational attainment was available for 94% of G1 families, and 95% of G2 families. To assess G1 per-capita income in single mother households we used G1 mother's self-report of per capita income, which we then divided by 1000. Mother and father self-reports of per capita income were used in two-parent G1 families. G2 per-capita income was assessed using G2 target's self report of per capita income at T1, which we then divided by 1000. Per-capita income was available for 93% of G1 families, and 83% of G2 families.

G2 Alpha Personality—G2 self-reported personality during adolescence using the self report form of the NEO Five Factor Inventory (NEO-FFI), a short form of the NEO, which consists of 12 items tapping each of the five personality factors: Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness to Experience. Digman (1997) proposes that high levels of agreeableness and conscientiousness and a low level of neuroticism generate a second order factor he calls alpha personality, and recent work is consistent with Digman's proposal (DeYoung, 2006; Jang et al., 2006; Markon, Krueger, & Watson, 2005). To minimize respondent burden, NEO-FFI items were distributed across two assessments (1991 and 1992) when the G2 youth were in the ninth and tenth grades, and were available for 81% of the sample. Previous studies have demonstrated and described the convergent and discriminant validity of the NEO-FFI (Costa & McCrae, 1992). In the current study, the data demonstrate high levels of internal consistency for the three scales used in analyses (Agreeableness $\alpha = .75$; Conscientiousness $\alpha = .84$; Neuroticism $\alpha = .85$).

Family stress—To assess dimensions of family stress consistent with the FSM, we took an approach similar to Sameroff (Sameroff, 1998; Sameroff, Seifer, Barocas, Zax, & Greenspan, 1987) and Furstenburg (Furstenberg, Cook, Eccles, Elder, & Sameroff, 1999) and used T1 measures of economic pressure, parental psychological distress, and marital conflict to construct an index of family stress. We include economic pressure because the theoretical model from which we draw (Conger & Conger, 2002) suggests that economic hardship (e.g., low income) leads to economic pressure (e.g., unmet material needs, painful cutbacks). From this perspective, socioeconomic status as reflected in low education and low income (i.e., SES) is kept separate from the processes (e.g., increases in economic pressure and parental distress) through which SES affects parents and children.

To create the family stress index score for each family, we first created six continuous scales of family stress (can not make ends meet, financial cutbacks, parental anxiety, parental depression, parental hostility, and marital hostility). Then each of the six scales was dichotomized so that the quarter of the sample reporting the most family stress on that scale was assigned to the high family stress category for that scale (coded 1) and the remaining 75% of the sample was assigned to the low family stress category for that scale (coded 0). Most scales, however, did not allow for an exact 25% and 75% split, which resulted in 22.5% to 27.7% of the sample being assigned to the high stress category across all six scales. The six dichotomized scales were then averaged to make the family stress index, which ranged from zero to one. The G2 target's self-report was used to assess all measures of family stress in single-parent homes, and an average of G2 target's and partner's self-reports were used for all measures of family stress in two-parent families. While single parent families were missing hostile marital interaction scores, averaging the six dichotomized scales produced index values of the same possible range for both single parent and two parent families. The family stress index had a mean of .24 and a standard deviation of .30. Approximately 46% of the sample fell into the low family stress category on all six items, while about 5% of the sample was in the high family stress category for all items. Ninety-seven percent of the sample had valid scores on the family stress index. Because of space limitations we are not able to provide details about each scale here; however, a description of each of the six scales, the percentage of the sample in the high and low family stress groups for each of the six components, and the mean score for the high and low family stress groups for each component is available on request from Thomas Schofield.

Parental Investments—We used the same index strategy to create measures of parental investments. As mentioned earlier, we created separate indexes for material investments and emotional investments. For parental investments we used information from both G2 and G2's partner when available. We included partner data for two reasons. First, spouses may influence each other's parenting, and to the degree G2 targets and their partners collaborate

in investments like monitoring, including only one parent may create bias in our estimate. Second, given that G2 selected his or her spouse, any effect G2 has on G3 is partially due to G2's selection of a spouse.

To assess *G2 material investments* we constructed an index similar to the family stress index. We follow the formulation of Mayer (1997) who defines investments broadly, and includes neighborhoods in her conceptualization. Each family's score on the material investment index was calculated by averaging across eight dichotomous material investment items at T1: adequate material resources, books in the home, newspapers in the home, items to promote learning in the home, quality of residence, household size, health insurance, and neighborhood quality. For each item, 75% of the sample was assigned to the high material investments category--those families making the most material investments in the G3 child (coded 1). Some measures, however, did not allow for this 75% split, which resulted in 73.1% to 89.3% of the sample being assigned to the high investments category across all measures. The eight dichotomized scales were averaged into the material investment index. This index had a mean of .80 with a standard deviation of .22. None of the families in the sample was in the low material investments category for all eight items, and about 37% of the sample was in the high investments category for all items. Ninety-nine percent of the sample had valid scores on the material investments index. Details regarding all components of this index are available upon request from Thomas Schofield.

For *G2 emotional investments,* we constructed an index to assess the G2 target's, and when applicable, their partner's emotional investments in the G3 child. Each family's score on the emotional investments index was calculated by averaging across 10 dichotomous emotional investment domain scores: childrearing enjoyment, parental monitoring, consistent discipline, punitive parenting (reversed), observed harshness (reversed), observed warmth, time spent with child, belief that people need to learn how to be good parents, cooperative coparenting, and parental happiness. For each item, 75% of the sample was assigned to the high emotional investments category--those families making the most emotional investments in the G3 child (coded 1). Some measures, however, did not allow for this 75% split, which resulted in 63.1% to 80.8% of the sample being assigned to the high investments category across all measures. The G2 emotional investments index had a mean of .73 and a standard deviation of 0.19. About 10% of the sample was categorized as highly emotionally invested on all items; none fell into the low emotional investment category on all 10 items. One-hundred percent of the sample had valid scores on the G2 emotional investments index.

For *G1 emotional investments,* we constructed an index to parallel as closely as possible the index created for G2 by averaging across nine dichotomous emotional investment items: parental monitoring, consistent discipline, punitive parenting, observed harshness, observed warmth, time spent with child, belief that people need to learn how to be good parents, cooperative coparenting, and parental happiness. These data were collected in 1991 when the G2 targets were still in high school, before becoming parents themselves. The G1 emotional investments index had a mean of .57 and a standard deviation of .23. About 4% of the sample was categorized as highly emotionally invested on all items; 18 families (2.7%) fell into the low emotional investment category on all nine items. One-hundred percent of the sample had valid scores on the G1 emotional investments index.

G3 developmental outcomes—*Secure attachment* was assessed using the Attachment Q-sort (Waters, 1987), which was completed by the G2 target as well as a spouse/partner at T1, when the G3 child was on average 2.30 years old. Their Q-sort profiles of the G3 child were both correlated with a criterion profile reflecting a securely attached child. The correlations between this criterion profile and each caregiver's profile of the child were then averaged and used as an index of the degree to which the child was securely attached to their

primary caregiver or caregivers. The attachment Q-sort has been shown to have good reliability and validity (Vaughn & Waters, 1990; Waters, 1987) and was available for 93% of our sample.

Observed prosocial behavior by the G3 child was assessed by trained raters who watched the child during videotaped interactions with primary and secondary caregivers during T1. Children were rated on the degree to which they were prosocial, communicative, positively assertive, and responsive. Separate ratings were made for interactions with mother and interactions with father. The eight items were then combined into a composite scale of child's prosocial behavior, which had good reliability ($\alpha = .85$) and was available for 96% of our sample. With regard to interrater reliability, intraclass correlations were .63 for prosocial, .64 for communicative, .61 for positively assertive, and .58 for responsive. Because ratings were taken from each child's first assessment, and there were mean differences in observational ratings across assessment points, the scores were standardized within timepoints before being merged into the final scale.

Academic competence was assessed using teacher reported perceptions of the G3 child's behavior and efficacy in the school setting, using an 11-item inventory created for this study. Teacher reports were taken from the first available assessment; for the teacher reports, this was generally T4 when the G3 child was on average between five and six years old. Questions were asked on a scale from 5 = strongly agree to 1 = strongly disagree. Sample items include, "He/She does most of his or her schoolwork without help from others" and "He/She tries hard at school." Items were combined into a single scale, which had good reliability ($\alpha = .94$), and was available for 61% of our sample.

Receptive vocabulary was assessed using the Peabody Picture Vocabulary Test (revised: PPVT-R; Dunn & Dunn, 1981) which was administered yearly from T3 to T5. During this period the G3 child was on average 4.35, 5.43, and 6.58 years of age. The PPVT-R has good psychometric properties (Williams, 1997; Williams, & Wang, 1997) and was available for 82% of our sample. For these analyses, the standardized scores were averaged across the three assessments.

Results

Correlations and Descriptive Statistics

Descriptive statistics for all study variables are presented in Table 1. Consistent with theoretical expectations, G2 alpha personality was positively associated with later G2 educational attainment ($r = .42$), income ($r = .18$), and parental investments ($r = .36$ for emotional investments, .25 for material investments), and negatively associated with family stress ($r = -.24$). G2 SES was positively associated with later parental investments, especially material investments ($r = .46$ for education, .36 for income). G3 outcomes were positively correlated with parental investments and negatively correlated with family stress. The patterns of associations were generally supportive of the theoretical model, and justified the formal model testing that follows. G2 education and per-capita income were only moderately correlated, so models were run using both as separate markers of SES.

Model Tests

We first ran analyses establishing measurement invariance across G2 males and females, in order to test whether G2 alpha personality could be considered equivalent across the two groups. We used Mplus Version 4 (Muthén & Muthén, 2006) to estimate the model using full information maximum likelihood estimation, first focusing on the measurement model associated with G2 alpha personality, then turning to the structural paths predicted by our theoretical model. We first fit a single-factor model using the three indicators for alpha

personality: agreeableness (A), neuroticism (N), and conscientiousness (C). A series of analyses demonstrated strict factorial invariance across gender for G2 alpha personality (see Meredith, 1993). In addition, in the following model tests we evaluated gender differences in findings for G2. There were no significant differences by gender; therefore we report the results for the combined G2 sample. And consistent with Digman's (1997) characterization, G2 alpha personality had significant loadings for conscientiousness, (standardized $\lambda = .83$, *SE* = .05), neuroticism (reversed; standardized $\lambda = .78$, *SE* = .05), and agreeableness (standardized $\lambda = .57$, *SE* = .06).

Because many different structural equation models can fit a particular data set equally well, we next evaluated our theoretical predictions using nested model comparisons. This approach slowly adds parameters, moving from the most parsimonious to the most theoretically informed model. Only if added complexity improves model fit do we conclude there is empirical support for theoretical predictions. Our baseline model (see Model 1a in Table 2) included all variables presented in our theoretical model (Figure 1). This model included correlations among variables at each time point in the model, but did not include structural coefficients predicting from one time point to the next.

The next model (Model 1b) added all 18 paths depicted in our theoretical model (the six theoretical paths involving SES were run for both income and education). For each G3 outcome, the addition of these theoretical predictions resulted in a significant improvement in model fit (e.g., $\Delta\chi^2 = 323.14$, $p < .001$ comparing Model 1b to Model 1a for secure attachment). Also important, the following results are from multiple-group analyses by gender of the G3 child. These paths were allowed to vary across the two groups, G3 males and G3 females, resulting in a total reduction of 44 degrees of freedom. Because the paths from family stress to emotional investments and material investments were replacing within-time correlations, they did not reduce the degrees of freedom. Model 1c allowed a path from G1 emotional investments to G3 adjustment for two of our four models. While not predicted by our theoretical model, this path was suggested by the modification indices for both secure attachment and academic competence. Model 1d equated all 24 structural paths (25 paths for secure attachment and academic competence) across G3 males and females. Because model 1d resulted in a significant worsening of fit for academic competence, model 1e allowed the paths from emotional investments and family stress to academic competence to vary across G3 gender. Model 1f set all nonsignificant structural paths to zero. The magnitude and significance of the remaining structural coefficients were not affected by the exclusion of nonsignificant paths in model 1f. Model 1f was selected as the final model for all four outcomes, and practical fit indices were all in the acceptable range (TLI values ranged from .938 to .980; RMSEA ranged from .026 to .044). Standardized coefficients for model 1f for all four outcomes are presented in Table 3.

Results from the Final Models

Findings related to social selection—The results in Table 3 are numbered to be consistent with the paths identified in Figure 1. Consistent with the social selection perspective, results from Model 1f showed that G2 alpha personality significantly predicted later SES across G3 outcomes both in terms of education (path 4.3 ranged from .44 to .46), as well as income (path 4.3 ranged from .16 to .17). G2 alpha personality also directly predicted G2 family stress and emotional investments. Although G2 alpha personality was correlated with G2 material investments (Table 1), the path from G2 personality to G2 material investments (7.3) was not significant in the context of the full model. That is, the relationship between G2 personality and material investments was completely mediated by G2 SES. There was also a significant, positive path from G2 alpha personality to G3 child adaptive functioning, but only for secure attachment. Although this direct path was

statistically significant, it was only about one-half the magnitude of the zero-order correlation (Table 1) suggesting a significantly mediated association. Also consistent with social mediation, tests of indirect paths between G2 personality and G3 outcomes were significant for secure attachment, (β = .109, SE = .030, $p < .001$), observed prosocial behavior, (β = .045, SE = .020, $p = .020$), receptive vocabulary, (β = .109, SE = .030, $p < .001$), and academic competence (β = .129, SE = .040, $p = .001$). G2 personality was indirectly related to G3 outcomes via emotional investments (for all outcomes except receptive vocabulary), family stress (for all outcomes except receptive vocabulary), G2 education (for receptive vocabulary), and via G2 SES to material investments (for all outcomes except secure attachment).

Findings related to social causation—Consistent with the social causation perspective, G2 SES significantly predicted G2 material investments in the child both in terms of education (path 7.4 ranged from .26 to .33) and income (path 7.4 ranged from .25 to .32). Although G2 SES was correlated with G2 emotional investments and family stress (Table 1), contrary to our prediction, these paths were not significant after accounting for G2 personality during adolescence. As expected, however, G2 family stress was negatively related to G2 emotional and material investments, G3 attachment, and academic competence for G3 boys. Also consistent with the social causation perspective, G3 outcomes were predicted by G2 emotional investments and material investments, except that G2 material investments did not predict G3 attachment. G2 SES predicted higher G3 PPVT scores, but this was true only for education (β = .21).

The role of G1—To strengthen the degree of confidence in any associations between G2 personality and later G2 SES, family stress, and parental investments, the model also included as controls paths from G1 SES and emotional investments to G2 SES and emotional investments, respectively. Although we also created G1 indices for family stress and material investments, they failed to show any significant associations with later G2 and G3 outcomes, so those indices were excluded from these analyses. G1 emotional investments were significantly associated with G2 personality and G2 emotional investments. An unanticipated finding was that G1 emotional investments also uniquely predicted G3 secure attachment and academic competence (path 8.1 in Table 3). Although G1 education was correlated with G2 alpha personality (Table 1), the path from G1 SES to G2 personality was not significant after controlling for G1 emotional investments. G1 SES was significantly associated with G2 SES for both education as well as income.

Discussion

Consistent with the theme of this special issue of Child Development, the current analyses find support for the interactionist model of intergenerational transmission (Conger & Donnellan, 2007) of healthy or adaptive G3 child functioning. As predicted by the interactionist model, G2 personality characteristics indicative of social and personal competence during adolescence predicted later SES, family stress and parental investments. In turn, family stress and investments predicted adaptive functioning of the G3 child, after controlling for G2 personality. We also discovered meaningful continuities in G1 and G2 SES and parenting behaviors.

Findings Related to Social Selection

Predictions from the social selection perspective, as incorporated in the interactionist model, were partially supported by the data. G2 alpha personality measured in adolescence predicted higher SES, greater emotional investments in their children, and less G2 family stress after controlling for G1 SES and emotional investments. These results are consistent

with the social selection hypothesis that earlier personal characteristics predict later social circumstances and behaviors. However, with the exception of secure attachment, G2 personality did not directly predict G3 adaptive functioning. This finding fails to support the social selection hypothesis that healthy adaptive functioning can be explained by a direct association between G2 characteristics and G3 functioning. Rather, the social circumstances predicted by G2 personality were directly related to G3 healthy development.

Findings Related to Social Causation

Consistent with the social causation perspective, family stress and parental investments directly predicted G3 adaptive functioning, even after controlling for G2 personality. These results suggest that although G2 personality predicts both family stress and parental investments, the family environment mediates or explains the association between G2 personality and G3 development. Although G2 personality predicted emotional investments and family stress, it did not account for the associations found in prior literature between family environment and child outcomes. The present findings indicate that early parent personality may give rise to later family stress and parenting, but these proximal variables remain salient factors in the G3 child's adaptive functioning. Especially important, significant zero-order associations between G2 personality and G3 adaptive functioning were substantially reduced by these social mediators.

Also important, G2 SES (indexed by education and income) was a significant predictor of only material investments and not of emotional investments or family stress when prior G2 personality was included in the model. This finding is most consistent with investment model predictions regarding the association between SES and child development. That is, SES relates to material aspects of the child's life that promote healthy development, as found in the present study. G2 personality appears to foster greater SES which affects the developing child through investments in learning and a health-promoting physical environment. Interestingly, G2 education and income were about equally promotive of material investments. The finding that SES did not predict family stress or emotional investments suggests that many of the associations in prior literature between SES and parental investments may be spurious, caused by preexisting characteristics of the parent. Should other work replicate this pattern of results, it suggests that SES relates to child functioning through material investments. The only instance in which G2 SES directly predicted G3 adaptive functioning was G2 education predicting higher G3 receptive vocabulary. The fact that SES only showed a unique association with the most cognitively-weighted index of adaptive functioning is consistent with experimental work among this age group which shows that income predicts changes in broad reading scores, but not teacher ratings of classroom behavior or parent reports of positive behavior (Huston et al., 2005). The relationship between parent education and receptive vocabulary may underscore the emphasis that better educated parents place on direct assistance in early child learning.

The Dynamic of Selection and Causation

Consistent with predictions, the findings are most consistent with the interactionist perspective in that both social selection and social causation appear to play a role in development over time. The adaptive functioning of the G3 child was indirectly associated with competent G2 development during adolescence through the family environment created by G2 parents. As we so frequently find with regard to theoretical dichotomies, they are both correct in part. A strength of the interactionist model is the ability to highlight the pathways along which both social selection and social causation may operate. G2 characteristics measured in adolescence predicted later SES and family environment and it was these environmental characteristics that were most directly related to G3 adaptive functioning. The results conform to the expectation that that selection will operate in predicting adult

social circumstances but that, consistent with the social causation perspective, these social characteristics will be associated with later child functioning net of these selection pressures. That is, the influence of social selection appears to affect later child development through social mediation, consistent with the interactionist model.

Unexpected Findings and The Role of G1

G1 SES directly predicted G2 SES. Although the standardized coefficients are larger for education than they are for income, this may be due to G2 SES being assessed at an age when they have yet to reach their full earning potential. At this stage, education may be a more meaningful marker of SES than income. G1 emotional investments in the G2 parent (during adolescence) directly predicted G2 emotional investments in G3. And despite the presence of so many other predictors of G3 adjustment, the time span involved, and the fact that G1 emotional investments were directed toward G2, G1 parenting predicted G3 secure attachment and academic competence. This finding suggests that the beneficial influence of grandparents' parenting (assessed when the parent is an adolescent) on the grandchild's positive adjustment is not fully explained by the G2 variables considered here. Future research will be required to identify mediators of this residual association.

A final unexpected finding was that for G3 females, teacher ratings of academic adjustment were not associated with family stress. Although not predicted, this finding is consistent with prior work showing males to be particularly at risk from family stressors like marital conflict (Cummings, Davies, & Simpson, 1994). That this gender difference was only found for one out of four outcomes suggests it should be interpreted with caution.

Limitations

This study has several limitations that should be noted. One limitation is the ethnic homogeneity of the sample. Although socioeconomically diverse, most of the participants were European American. Replication across other groups will increase our confidence in the generalizability of the findings. Another limitation of the current study is our focus on adaptive child functioning. The support for the interactionist model was consistent across our four G3 outcomes, but it is possible that expanding the range of G3 outcomes to other dimensions may offer less support for the theoretical model. An additional qualification of these findings is that we may have omitted components of family stress, emotional investments, or material investments that would have altered the pattern of results. Finally, although we proposed a causal model explaining the associations among SES, individual development, and family functioning, this nonexperimental design cannot directly address questions of causality.

Raising Healthy Children: Implications for Policy and Practice

One practical implication of these findings is that while interventions often focus on increasing SES, managing and reducing family stressors, and improving the quality of parenting and other investments, these dimensions are, in a sense, outcomes of earlier phases of development. The current findings suggest that preventive interventions should also target the early development of positive character attributes in youth, as these dispositions are likely to translate into increased education, increased income, increased emotional and material investments in children, and decreased family stress during the adult years. Character-based interventions can target youth and foster G2 traits similar to those included in the current study. For example, Larson (2000) suggests that extracurricular activities provide a context for the development of initiative because adolescents reported elevated levels of intrinsic motivation and concentration during sports and organized youth activities (e.g., 4-H, Girl Scouts and Boy Scouts). Extracurricular activities like these appear to facilitate the development of traits incorporated in the construct of alpha personality.

Clearly, attention to such characteristics early in development may have long-term positive consequences for the healthy development of future families and children.

Acknowledgments

This research is currently supported by grants from the National Institute of Child Health and Human Development, the National Institute on Drug Abuse, and the National Institute of Mental Health (HD047573, HD051746, and MH051361). Support for earlier years of the study also came from multiple sources, including the National Institute of Mental Health (MH00567, MH19734, MH43270, MH59355, MH62989, and MH48165), the National Institute on Drug Abuse (DA05347), the National Institute of Child Health and Human Development (HD027724), the Bureau of Maternal and Child Health (MCJ-109572), and the MacArthur Foundation Research Network on Successful Adolescent Development Among Youth in High-Risk Settings.

References

Bradley, RH.; Corwyn, RF. Age and ethnic variations in family process mediators of SES. In: Bornstein, MH.; Bradley, RH., editors. Socioeconomic status, parenting, and child development. Mahwah, NJ: Erlbaum; 2003. p. 161-188.

Bradley RH, Corwyn RF, McAdoo HP, García Coll C. The home environments of children in the United States: Part I. Variations by age, ethnicity, and poverty status. Child Development. 2001; 72:1844–1867. [PubMed: 11768149]

Christopher JC, Campbell RL. An interactivist-hermeneutic metatheory for positive psychology. Theory & Psychology. 2008; 18:675–697.

Conger RD, Conger KJ. Resilience in Midwestern families: Selected findings from the first decade of a prospective, longitudinal study. Journal of Marriage and Family. 2002; 64:361–373.

Conger RD, Conger KJ, Elder GH Jr, Lorenz FO, Simons RL, Whitbeck LB. A family process model of economic hardship and adjustment of early adolescent boys. Child Development. 1992; 63:526–541. [PubMed: 1600820]

Conger RD, Conger KJ, Elder GH Jr, Lorenz FO, Simons RL, Whitbeck LB. Family economic stress and adjustment of early adolescent girls. Developmental Psychology. 1993; 29:206–219.

Conger RD, Conger KJ, Martin MJ. Social class, family processes, and individual development. Journal of Marriage and Family. in press.

Conger RD, Donnellan MB. An Interactionist perspective on the socioeconomic context of human development. Annual Review of Psychology. 2007; 58:175–99.

Conger RD, Wallace LE, Sun Y, Simons RL, McLoyd VC, Brody G. Economic pressure in African American families: A replication and extension of the family stress model. Developmental Psychology. 2002; 38:179–193. [PubMed: 11881755]

Corcoran, M.; Adams, T. Race, sex, and the intergenerational transmission of poverty. In: Duncan, GJ.; Brooks-Gunn, J., editors. Consequences of growing up poor. New York: Russell Sage Foundation Press; 1997. p. 461-517.

Costa, PT.; McCrae, RR. NEO PI-R. Professional manual. Odessa, FL: Psychological Assessment Resources; 1992.

Cummings EM, Davies PT, Simpson KS. Marital conflict, gender, and children's appraisals and coping efficacy as mediators of child adjustment. Journal of Family Psychology. 1994; 8:141–149.

DeYoung CG. Higher-order factors of the big five in a multi-informant sample. Journal of Personality and Social Psychology. 2006; 91:1138–1151. [PubMed: 17144770]

Digman JM. Higher-order factors of the Big Five. Journal of Personality and Social Psychology. 1997; 73:1246–1256. [PubMed: 9418278]

Duncan, GJ.; Brooks-Gunn, J. Income effects across the life span: Integration and interpretation. In: Duncan, GJ.; Brooks-Gunn, J., editors. Consequences of growing up poor. New York: Russell Sage Foundation Press; 1997. p. 596-610.

Duncan, GJ.; Magnuson, KA. Off with Hollingshead: Socioeconomic resources, parenting, and child development. In: Bornstein, MH.; Bradley, RH., editors. Socioeconomic status, parenting, and child development. Mahwah, NJ: Erlbaum; 2003. p. 83-106.

Dunn, LM.; Dunn, LM. Peabody Picture Vocabulary Test-Revised. Circle Pines: MN. American Guidance Service; 1981.

Feinstein L, Bynner J. The importance of cognitive development in middle childhood for adulthood socioeconomic status, mental health, and problem behavior. Child Development. 2004; 75:1329–1339. [PubMed: 15369517]

Furstenberg, FF.; Cook, TD.; Eccles, J.; Elder, GH.; Sameroff, AJ. Managing to Make It: Urban Families and Adolescent Success. Chicago, IL: University of Chicago Press; 1999.

Gleason ET. Review of Strengths-based counseling with at-risk youth. School Social Work Journal. 2007; 32:98–100.

Han WJ. Maternal nonstandard work schedules and child cognitive outcomes. Child Development. 2005; 76:137–154. [PubMed: 15693763]

Haveman, RH.; Wolfe, BS. Succeeding generations: On the effects of investments in children. New York: Sage; 1994.

Hoff E. The specificity of environmental influence: Socioeconomic status affects early vocabulary development via maternal speech. Child Development. 2003; 74:1368–1378. [PubMed: 14552403]

Hoff, E.; Laursen, B.; Tardif, T. Socioeconomic status and parenting. In: Bornstein, MH., editor. Handbook of parenting: Vol 2. Biology and ecology of parenting. 2. Mahwah, NJ: Lawrence; 2002. p. 231-252.

Huston AC, Aronson SR. Mothers' time with infant and time in employment as predictors of mother-child relationships and children's early development. Child Development. 2005; 76:467–482. [PubMed: 15784094]

Huston AC1, Duncan GJ, McLoyd VC, Crosby DA, Ripke MN, Weisner TS, Eldred CA. Impacts on Children of a Policy to Promote Employment and Reduce Poverty for Low-Income Parents: New Hope After 5 Years. Developmental Psychology. 2005; 41:902–918. [PubMed: 16351336]

Jang KL, Livesley WJ, Ando J, Yamagata S, Suzuki A, Angleitner A, Ostendorf F, Riemann R, Spinath F. Behavioral genetics of the higher-order factors of the Big Five. Personality and Individual Differences. 2006; 41:261–272.

Joseph, S.; Linley, PA. Positive therapy: A meta-theory for positive psychological practice. New York, NY, US: Routledge; 2006.

Kohen DE, Brooks-Gunn J, Leventhal T, Hertzman C. Neighborhood income and physical and social disorder in Canada: Associations with young children's competencies. Child Development. 2002; 73:1844–1860. [PubMed: 12487498]

Lerner, RM. What are SES effects effects of? A developmental systems perspective. In: Bornstein, MH.; Bradley, RH., editors. Socioeconomic status, parenting, and child development. Mahwah, NJ: Erlbaum; 2003. p. 231-255.

Linver MR, Brooks-Gunn J, Kohen D. Family processes as pathways from income to young children's development. Developmental Psychology. 2002; 38:719–734. [PubMed: 12220050]

Magnusson, D.; Stattin, H. Person-context interaction theories. In: Damon, W.; Lerner, RM., editors. Handbook of child psychology: Volume 1: Theoretical models of human development. 5. Hoboken, NJ, US: John Wiley & Sons Inc; 1998. p. 685-759.

Markon KE, Krueger RF, Watson D. Delineating the structure of normal and abnormal personality: An integrative hierarchical approach. Journal of Personality and Social Psychology. 2005; 88:139–157. [PubMed: 15631580]

Mayer, S. What money can't buy: Family income and children's life chances. Cambridge, MA: Harvard University Press; 1997.

McLeod JD, Kaiser K. Childhood emotional and behavioral problems and educational attainment. American Sociological Review. 2004; 69:636–658.

McLoyd VC. The impact of economic hardship on Black families and children: Psychological distress, parenting, and socioemotional development. Child Development. 1990; 61:311–346. [PubMed: 2188806]

Melby, JN.; Conger, RD. Iowa Interactional Rating Scale: Instrument summary The. In: Kerig, PK.; Lindahl, KM., editors. Family observational coding systems: Resources for systemic research. Mahwah, NJ, US: Lawrence Erlbaum Associates Publishers; 2001. p. 33-58.

Meredith W. Measurement invariance, factor analysis and factorial invariance. Psychometrika. 1993; 58:525–543.

Mistry RS, Vandewater EA, Huston AC, McLoyd VC. Economic well-being and children's social adjustment: The role of family process in an ethnically diverse low-income sample. Child Development. 2002; 73:935–951. [PubMed: 12038561]

Muthen, LK.; Muthen, BO. Mplus User's Guide. 4. Los Angeles, CA: Muthén & Muthén; 2006.

Parke RD, Coltrane S, Duffy S, Buriel R, Dennis J, Powers J, French S, Widaman K. Economic stress, parenting, and child adjustment in Mexican American and European American families. Child Development. 2004; 75:1632–1656. [PubMed: 15566370]

Rowe DC, Rodgers JL. Poverty and behavior: Are environmental measures nature and nurture? Developmental Review. 1997; 17:358–375.

Sameroff AJ. Environmental risk factors in infancy. Pediatrics. 1998; 102:1287–1292. [PubMed: 9794971]

Sameroff AJ, Seifer R, Barocas R, Zax M, Greenspan S. Intelligence quotient scores of 4-year-old children: socialenvironmental risk factors. Pediatrics. 1987; 79:343–350. [PubMed: 3822634]

Sin NL, Lyubomirsky S. Enhancing well-being and alleviating depressive symptoms with positive psychology interventions: A practice-friendly meta-analysis. Journal of Clinical Psychology. 2009; 65:467–487. [PubMed: 19301241]

Solantaus T, Leinonen J, Punamäki RL. Children's mental health in times of economic recession: Replication and extension of the family economic stress model in Finland. Developmental Psychology. 2004; 40:412–429. [PubMed: 15122967]

Tamis-LeMonda CS, Shannon JD, Cabrera NJ, Lamb ME. Fathers and mothers at play with their 2- and 3-year-olds: Contributions to language and cognitive development. Child Development. 2004; 75:1806–1820. [PubMed: 15566381]

Teachman, JD.; Paasch, KM.; Day, RD.; Carver, KP. Poverty during adolescence and subsequent educational attainment. In: Duncan, GJ.; Brooks-Gunn, J., editors. Consequences of growing up poor. New York: Russell Sage Foundation Press; 1997. p. 382-418.

Vaughn BE, Waters E. Attachment behavior at home and in laboratory: Q-sort observations and Strange Situation classification of one year-olds. Child Development. 1990; 61:1965–1973. [PubMed: 2083508]

Waters, E. Attachment Behavior Q-set (Revision 3.0). State University of New York at Stony Brook, Department of Psychology; 1987. Unpublished instrument

Williams, KT. Expressive Vocabulary Test. Circle Pines, MN: American Guidance Service; 1997.

Williams, KT.; Wang, J. Technical references to the Peabody Picture Vocabulary Test–Third Edition (PPVT-III). Circle Pines, MN: American Guidance Service; 1997.

Yeung WJ, Linver MR, Brooks-Gunn J. How money matters for young children's development: Parental investment and family processes. Child Development. 2002; 73:1861–1879. [PubMed: 12487499]

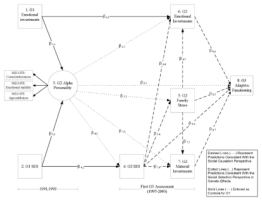

Figure 1.
The Interactionist Model Predicting to Positive Adjustment

Table 1

Correlations, Means, and Variances for Variables Used in Analyses

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. G1 emotional investments	-												
2. G1 education	.40*	-											
3. G1 income	.21*	.33*	-										
4. G2 alpha personality	.29*	.22*	.05	-									
5. G2 education	.25*	.39*	.23*	.42*	-								
6. G2 income	.05	.11†	.22*	.18*	.30*	-							
7. G2 emotional investments	.27*	.11†	.15*	.36*	.28*	.15*	-						
8. G2 family stress	−.03	−.14*	−.14*	−.24*	−.17*	−.12†	−.31*	-					
9. G2 material investments	.20*	.23*	.26*	.25*	.46*	.36*	.29*	−.17*	-				
10. G3 secure attachment	.28*	.15*	.13*	.34*	.28*	.19*	.38*	−.28*	.22*	-			
11. G3 observed prosociality	.07	.09	.10	.20*	.14*	.16*	.16*	−.13*	.21*	.19*	-		
12. G3 academic competence	.34*	.22*	.31*	.09	.33*	.27*	.28*	−.24*	.29*	.31*	.08	-	
13. G3 receptive vocabulary	.11	.25*	.14*	.20*	.31*	.19*	.23*	−.10	.25*	.24*	.24*	.36*	-
Mean	0.54	13.12	8.43	3.27	14.12	17.79	0.74	0.24	0.80	0.36	0.05	3.63	98.27
Variance	0.05	2.26	41.36	0.17	3.43	216.57	0.04	0.09	0.05	0.02	0.97	0.86	236.54

*Note: $p < .05$,

†$p < .10$

Table 2

Fit of Nested Structural Models Testing the Interactionist Model Across Indices of Positive Child Adjustment

	Secure attachment					Observed prosociality					Academic competence					Receptive vocabulary				
Model	χ^2	***df***	$\Delta\chi^2$	Δdf	***p***	χ^2	***df***	$\Delta\chi^2$	Δdf	***p***	χ^2	***df***	$\Delta\chi^2$	Δdf	***p***	χ^2	***df***	$\Delta\chi^2$	Δdf	***p***
1a	414.03	122	-	-	<.001	378.01	122	-	-	<.001	402.27	123	-	-	<.001	391.75	123	-	-	<.001
1b	90.89	78	323.14	44	<.001	86.83	78	291.18	44	<.001	106.52	79	295.75	44	<.001	101.73	79	290.02	44	<.001
1c	83.91	76	6.98	2	.030	-	-	-	-	-	95.71	77	10.81	2	.004	-	-	-	-	-
1d	100.92	102	17.01	26	.91	112.39	103	25.56	25	.43	134.06	103	38.38	26	.056	112.81	104	11.08	25	.99
1e	-	-	-	-	-	-	-	-	-	-	120.32	101	13.74	2	.001	-	-	-	-	-
1f	111.50	112	10.58	10	.39	128.31	114	15.92	11	.14	136.52	112	16.20	11	.13	122.21	115	9.40	11	.58

Note: Model 1a = Strict invariance on alpha personality, and within-time correlations, 1b = Model 1a, plus all paths specified by theoretical model, Model 1c = Model 1b, plus path from G1 emotional investments to G3 adaptive functioning (for secure attachment and academic competence), 1d = Model 1c, equating all structural paths across groups, 1e = Model 1d, freeing up paths 8.5 and 8.6 (for academic competence), 1f = Setting to zero nonsignificant paths in Model 1c (for observed prosocial behavior and PPVT scores), Model 1d (for secure attachment), and Model 1e (for academic competence), for Model 1a, the probability of the overall model is given, while in Models 1b–1f, the probability corresponds to the change in χ^2.

Table 3

Standardized Coefficients from Model 1f for G3 Positive Functioning (Standard Errors in Parentheses)

Paths from Figure 1	Secure attachment	Observed prosociality	Academic competence	Receptive vocabulary
3.1. G1 emotional investments to G2 personality	.33(.08)	.31(.08)	.31(.08)	.32(.08)
4.2. G1 to G2 education	.36(.07)	.37(.07)	.37(.07)	.38(.07)
4.2. G1 to G2 income	.17(.04)	.17(.04)	.17(.04)	.17(.04)
4.3. G2 personality to G2 education	.46(.08)	.45(.08)	.44(.08)	.44(.08)
4.3. G2 personality to G2 income	.17(.06)	.16(.06)	.16(.06)	.16(.06)
5.3. G2 personality to G2 family stress	−.24(.07)	−.26(.08)	−.23(.08)	−.25(.07)
6.1. G1 to G2 emotional investments	.18(.06)	.17(.06)	.18(.06)	.16(.06)
6.3. G2 personality to G2 emotional investments	.38(.08)	.33(.08)	.36(.08)	.33(.08)
6.5. G2 family stress to G2 emotional investments	−.26(.06)	−.25(.06)	−.26(.06)	−.25(.06)
7.4. G2 education to G2 material investments	.26(.02)	.33(.05)	.30(.06)	.30(.06)
7.4. G2 income to G2 material investments	.32(.06)	.28(.07)	.25(.06)	.27(.07)
7.5. G2 family stress to G2 material investments	−.11(.06)	−.15(.07)	−.12(.06)	−.11(.06)
8.1. G1 emotional investments to G3 functioning	.18(.07)	-	.33(.11)	-
8.3. G2 personality to G3 functioning	.19(.08)	-	-	-
8.4. G2 education to G3 functioning	-	-	-	.21(.06)
8.5. G2 family stress to G3 functioning	−.14(.06)	-	−.22(.09)[A]	-
8.6. G2 emotional investments to G3 functioning	.19(.06)	.14(.03)	.12(.05)	.12(.04)
8.7. G2 material investments to G3 functioning	-	.16(.04)	.13(.06)	.13(.05)

[A] Note. significant for boys only, paths 3.2, 5.4, 6.4, and 7.3 not significant, all paths significant at $p < .05$ (one-tailed)