

Does Social Connectedness Promote a Greater Sense of Well-Being in Adolescence Over Time?

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This longitudinal study was designed to investigate whether or not social connectedness predicts psychological well-being over time. Structural equation modeling was used to examine the temporal relations between these constructs assessed yearly for 3 years for a sample of 1,774 10- to 15-year-olds (at Time 1). Results indicated that global connectedness (i.e., connectedness combined across the domains of family, school, peers, and neighborhood) predicted well-being, but no reciprocal relation was found. However, reciprocal relations were revealed by analyses that examined connectedness at the domain level, that is, for family and school contexts. The results suggest that youth who reported higher levels of social connectedness at one point in time would subsequently report higher well-being (i.e., life satisfaction, confidence, positive affect, and aspirations).

In the last decade, the construct of social connectedness has received growing attention from researchers of adolescent health and development. Although studies of similar concepts, such as a “sense of belonging,” date back to the early 1990s, a burgeoning interest in connectedness followed the publication of Resnick et al.’s (1997) seminal paper, which found family connectedness and school connectedness to be the most powerful predictors of various indicators of adolescent maladjustment, such as emotional distress, suicidal ideation, violence, and substance use. Since this publication, international adolescent and school health journals have published an increasing number of studies that have documented significant associations between connectedness in a variety of social contexts and an array of indicators of adolescent development. However, singularly lacking are longitudinal studies that simultaneously assess the four main domains of connectedness (i.e., family, school, peers, and community) in relation to positive youth development, and the current project was designed to address this shortcoming in the literature.

The diverse range of adolescent outcomes investigated thus far include indicators of emotional distress, such as depression, stress, and anxiety

(Shochet, Dadds, Ham, & Montague, 2006), behavioral problems and problems at school (Crosnoe & Elder, 2004; Loukas, Suzuki, & Horton., 2006), violent behavior (Brookmeyer, Fanti, & Henrich, 2006; Widome, Sieving, Harpin, & Hearst, 2008), substance use (Bond et al., 2007), sexual behavior (Markham et al., 2010), school dropout (Kearney, 2008), and self-esteem (Boutelle, Eisenberg, Gregory, & Newmark-Sztainer, 2009). The key social domains of connectedness that have been used to study these outcomes are family, school, peers, and community; however, they have seldom been studied together. The pattern of findings has been consistent, with connectedness to these domains positively associated with positive indicators of health and behavior and negatively associated with negative indicators of health and behavior, with the vast majority of studies focusing on the latter. In light of these findings, connectedness has been viewed as a promotive factor in adolescent health and development.

Although the study of the causes of and correlates with youth problems is vital, some researchers have expanded their focus to include positive indicators of well-being, attempting to shift research and policy-making efforts toward the promotion of optimal levels of adolescent health (Cowen, 1991; Norrish & Vella-Brodrick, 2009; Park, 2004; Seligman & Csikszentmihalyi, 2000). This stream of research recognizes that health and well-being are not merely the absence of disease or deviant behavior; instead, we can seek to achieve higher levels of positive outcomes. However, only

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a small number of studies has examined the relation between connectedness and positive indicators of well-being (other than in the academic domain), and these include constructs such as optimism, hope, coping, happiness, and life satisfaction (Anderman, 2002; Camfield, Choudhury, & Devine, 2009; Gillison, Standage, & Skevington, 2008; You et al., 2008).

Even young people who do not exhibit diagnosable problems may not grow up to become happy, well-adjusted, or productive adults (Catalano, Burlingame, Ryan, Lonczak, & Hawkins, 1999). As Larson (2000) has noted, the disenchantment reported by many adolescents is not necessarily indicative of mental illness, but instead may reflect a “deficiency in positive development” (p. 171). In contrast with conceptualizations of health as absence of illness, studies have identified children and adolescents who exhibit few negative psychological symptoms but still have low life satisfaction (Greenspoon & Saklofske, 2001; Suldo & Shaffer, 2008). These students demonstrate lower levels of school achievement, social adjustment, and physical health than youth with low psychopathology and high life satisfaction, suggesting the need for comprehensive models of health that incorporate both negative and positive indicators (Suldo & Shaffer, 2008).

Evidence Linking Connectedness and Positive Indicators of Well-Being in Adolescents

Although researchers study, label, and operationalize connectedness in various ways, there is general theoretical consensus among the diverse array of researchers that a perceived sense of belonging or connectedness is a basic psychological need, and that when this need is satisfied it brings about positive outcomes. Baumeister and Leary (1995) characterize the need to belong or feel connected as “a pervasive drive to form and maintain at least a minimum quantity of lasting, positive and significant interpersonal relationships” (p. 497). They have argued that belonging is a fundamental motivation, functions in a broad variety of settings, and is essential for well-being. In this vein, self-determination theory (SDT) posits that relatedness is one of three basic psychological needs inherent to humans. According to SDT, satisfaction of these basic needs fosters well-being, and support for and satisfaction of each is a necessary condition for a person’s ongoing growth and well-being (Connell & Wellborn, 1991; Deci & Ryan, 2000; Ryan & Deci, 2000; Ryan & Powelson, 1991). Gillison et al. (2008) conducted a longitudinal study across three time

points examining the link between psychological need satisfaction, including relatedness at school, and quality of life (QoL). The authors found that an improvement in QoL from one time point to another was significantly predicted by an increase in relatedness. They also found reciprocal effects, with change in QoL being a significant predictor of change in relatedness.

School Connectedness

Educational research examining students’ school connectedness or sense of belonging to school is one of the few disciplines to examine positive developmental outcomes. School connectedness, using measures tapping perceptions of school climate and quality of teacher–student relationships, as well as feelings of belonging, inclusion, acceptance, and interpersonal support, has been linked to a range of positive academic outcomes, including student engagement, academic achievement, success expectations, self-efficacy, effort, academic motivation, and task goal orientation (Anderman & Anderman, 1999; Centers for Disease Control & Prevention, 2009; Connell & Wellborn, 1991; Crosnoe, 2004; Furrer & Skinner, 2003; Klem & Connell, 2004; Witherspoon, Schotland, Way, & Hughes, 2009; Woolley, Kol, & Bowen, 2009; Zimmer-Gembeck, Chipuer, Hanisch, Creed, & McGregor, 2006).

Research by Anderman (2002) investigated the relation between perceptions of school belonging and optimism. The cross-sectional study showed that higher levels of individual sense of belonging to school were associated with greater optimism. Israelashvili (1997) found that sense of school membership was positively associated with expectations of future success in a sample of 5th–12th grade students. Students’ feelings of being respected and accepted by peers and school staff were seen as important correlates to their future expectations.

Multiple Domains of Connectedness

Research has identified links among aspects of adolescent functioning and connectedness to four particular social contexts: family, school, peers, and neighborhood and community. The importance of examining all four of these ecological environments that influence adolescents’ development has been argued by Seidman (1991), and recently reiterated by Urban, Lewin-Bizan, and Lerner (2009). Moreover, ecological approaches acknowledge that adolescents are embedded within multiple social

contexts simultaneously and emphasize that these contexts likely work together to influence adolescent health and adjustment (Bronfenbrenner, 1979). Despite the reality of adolescents experiencing connectedness in multiple social contexts, most of what we know about the relation between connectedness and adolescents' psychological health stems from research that focuses on only one or two of these contexts at a time. Examining the same conditions in multiple contexts enables the investigation of questions such as: "Is connectedness to a particular domain more important than others?"

Libbey, Ireland, and Resnick (2002) conducted one of the few studies to examine all four key social domains (family, friends, school, and neighborhood). Their cross-sectional study found that a greater number of domains of connectedness was inversely associated with emotional distress, with family connectedness having the strongest inverse association, followed by school, neighborhood, and peer connectedness. In another study, McGraw, Moore, Fuller and Bates (2008) examined connectedness (family, peers, and school) and well-being in a large sample of Australian adolescents. Results indicated that connectedness, across all domains, was inversely related to symptoms of depression, anxiety, and stress. Furthermore, connectedness to peers was a particularly strong predictor of well-being. In the present study, examination of multiple domains enabled us to assess whether all four social contexts were predictive of well-being, while also allowing an examination of the relative importance of connectedness to each domain.

Defining the Concepts and Domains of Connectedness

Although many researchers and theorists have increasingly used the construct of connectedness in models and empirical studies, the construct is difficult to operationalize (terms used to describe it include connection, bonding, sense of belonging, sense of community, sense of relatedness, and attachment; see Libbey, 2004, for a review of conceptual and operational definitions of school connectedness). However, despite the considerable variation in definitions across studies and the differing emphasis on elements used to measure connectedness depending on the domain examined, a review of the definitions of the construct highlights overarching themes in the condition or process that connectedness is thought to describe. The majority of definitions of adolescent connectedness usually describe, or infer through measurement, one or

more of the following: the nature, property, or quality of the relationship; the subjective psychological states (affective or cognitive) held by an adolescent about a relationship; and a combination of psychological states and specific behaviors believed to be related or to influence these states (see Barber & Schluterman, 2008, for a review).

Many definitions of connectedness to parents or family focus on the property or nature of the relationship, emphasizing both the quality of the bond between adolescent and parents as well as the mutuality and reciprocity within the relationship (Beyers, Goossens, Vansant, & Moors, 2003; Clark & Ladd, 2000; Lezin, Roller, Bean, & Taylor, 2004; Peterson, Bush, & Supple, 1999). Measures for these definitions often focus on the nature and quality of specific elements (e.g., communication, trust, expressions of affection) of relationship interactions and invariably view connectedness as a dyadic or family construct. Definitions invoking psychological states of being, such as a sense of connectedness, a sense of belonging, or a sense of community, are usually characterized by adolescents' perceptions of the acceptance, respect, care, support, or involvement shown by their families, peers, schools, or communities (e.g., Goodenow, 1993; Whitlock, 2006). Adolescent perceptions of liking, enjoyment, and satisfaction with relationships have also been used (Blum & Rinehart, 1997; Eisenberg, Neumark-Sztainer, & Perry, 2003; Resnick et al., 1997). Many of the measures used for these definitions invoke both the state of being, with items such as "feel close to people at school," "feel a part of my family," "feel I belong to my school," and the specific behaviors purported to influence them, including "teachers treat me fairly," "adults in my town respect what people my age think," "people at this school are friendly to me". Finally, other definitions of adolescent connectedness explicitly convey both adolescents' attitudes toward, and behavioral activity in, their social ecology, and the relationships within it. Karcher and Lee (2002) define connectedness as "one's perception of his or her own involvement in and affection for others, activities, and organizations" (p. 93). This definition reflects the two primary ways of connecting, that is, through activity or involvement and through caring, and it conceptualizes connectedness as something that is not merely received, but reciprocated as well, a view shared by Whitlock (2006, 2007).

In this article, we focus on the concept of connectedness as conceived by Barber, Stolz, and Olsen (2005), who defined it as "a tie between the child and significant other persons (groups or

institutions) that provides a sense of belonging, an absence of aloneness, a perceived bond. Depending on the intimacy of the context, this connection is produced by different levels of consistent, positive, predictable, loving supportive, devoted, or affectionate interaction." The core notion is that a history of positive interactions with specific social partners or institutions leads children and adolescents to construct generalized expectations about the nature of the self in relationships (Furrer & Skinner, 2003).

Defining the Concept of Well-Being

The second construct we focus on is the concept of well-being, which refers to positive psychological functioning and experience. Our operational definition of well-being includes four constructs frequently used in well-being and youth development research on adolescents: life satisfaction, positive affect, confidence, and future orientation. Life satisfaction and positive affect, together with (the lack of) negative affect, form the components of subjective well-being, which refers to individuals' evaluation of the quality of their lives in general (Diener, 2000). Life satisfaction is considered to be a cognitive global appraisal of one's life, whereas positive affect refers to the frequency of pleasant feelings and moods. Life satisfaction is a commonly used indicator of subjective well-being in youth, and is important not only as an indicator of well-being, but also as a predictor and indicator of other important behaviors (Gilman & Huebner, 2003; Park, 2004). Levels of life satisfaction have been used to predict the onset of depression, whereas changes in life satisfaction have been associated with health status, occupational functioning, effective interpersonal relationships, and school dropout (for reviews of life satisfaction research with adolescents, see Gilman & Huebner, 2003; Park, 2004). Confidence and future orientation refer to positive self-regard and a sense of self-efficacy in relation to both the present and future. In the youth development field, confidence is considered one of five key developmental outcomes, and consists of elements including self-esteem, self-concept, self-efficacy, identity, and belief in the future (Lerner, Fisher, & Weinberg, 2000; Roth & Brooks-Gunn, 2003).

This study sets out to extend the nascent research investigating the link between social connectedness and psychological well-being by focusing on positive indicators of psychological well-being (hereafter termed well-being), examining connectedness in four key social contexts, and

using a longitudinal design that follows established guidelines for investigating causal effects (Marsh, Byrne, & Yeung, 1999). Using a large sample of adolescents, we conducted a longitudinal assessment of connectedness in four domains (family, school, peers, and community) and well-being (encompassing future orientation, confidence, positive affect, and life satisfaction) over three measurement occasions, each 1 year apart. Using structural equation modeling (SEM), we tested whether or not a temporally predictive relation existed between connectedness and well-being.

Study Predictions

This study is a prospective examination of the relation between connectedness and well-being in adolescents. The primary goal was to investigate whether or not connectedness and well-being would evidence reciprocal influences over time, examining this relation using both a composite measure of connectedness (termed "global connectedness" in this article) as well as individual domains of connectedness (i.e., family, school, peers, and community). We also sought to determine which domains of connectedness had the strongest relation with well-being. Consistent with the proposition that connectedness exerts a causal influence on well-being, we expected connectedness to predict increases in adolescent's well-being across time. Following procedures used by Spinath and Steinmayr (2008) for examining reciprocal relations over time, four aspects of these relations were examined:

1. How strong are the concurrent correlations between well-being and connectedness? The observed medium to strong correlations between connectedness and well-being in previous studies suggest that causal influences between the two constructs may be evident over time. We expected to obtain similar moderate concurrent relations.
2. How stable are connectedness and well-being over time? We predicted that both constructs would be moderately stable over 1 year, allowing for reciprocal relations to be evidenced.
3. Does a path model that includes cross-lagged paths between connectedness and well-being describe the empirical data better than a more parsimonious model featuring correlational paths but no cross-lags? We predicted that the correlational model would be rejected in favor of the cross-lag model, and this result would

support the assumption that connectedness and well-being might share reciprocal, potentially causal effects over time.

4. Would we find a bidirectional relation between connectedness and well-being over time after controlling for prior connectedness and well-being? We predicted that our data would reveal a bi-directional relation over the 3 years of data that we obtained. We expected connectedness in each of the four domains (family, school, peers, and community) to predict changes in well-being, and, based on research evidence from studies that have examined multiple domains of connectedness and, emotional distress, we expected that family connectedness and school connectedness would have the most powerful effects on well-being, followed by peer connectedness, with community connectedness having the least influence.

METHOD

Participants

In 2006, data were collected from an initial sample of 2,174 students (from 78 schools), ranging in age between 10 and 15 years. At this measurement occasion, students were on average 12.21 years old ($SD = 1.75$). Students were recruited by age and placed in one of three age cohorts: youngest (10- and 11-year-olds), middle (12- and 13-year-olds), and oldest (14- and 15-year-olds). Our sample approximated a nationally representative sample of adolescents in New Zealand in several respects. The gender ratio was 52% female students and 48% male students, very close to the average for this age range. In particular, children and adolescents were obtained from a wide range of different types of schools that possessed the full range of socioeconomic scores (SES) in New Zealand. In New Zealand, schools receive a decile score (ranging from 1 to 10, with 10 designating the highest and 1 designating the lowest income catchment areas) reflecting the average socioeconomic status of students' families. The range of schools in our sample included schools at every point along the decile scale, and the average school SES score in our sample was 5.2, very near the national average of 5.0. Students at Time 1 were enrolled in what New Zealand terms Years 6 through 11 (10–15 years old), and in a variety of primary schools, intermediate schools, and high schools (some of which are called “colleges”). During the course of this study, most of the students moved from a

lower school to a higher school, but this age of transition can vary depending on type of school and geographical location.

There were two areas where differences from national norms were noted. First, percentages of participants from urban, suburban, and rural schools were 61%, 33%, and 6%, respectively, which varied somewhat from the national averages of 71%, 15%, and 14%, respectively (Statistics New Zealand, 2001). And second, the project sought to obtain adequate numbers of Maori youth so that this minority culture could be examined in the future, and we were successful in oversampling Maori individuals (but in the process we under-sampled European New Zealand [ENZ] youth). Percentages in the first year were: 52% ENZ (about 75% by census); 30% Maori (about 20% by census); 12% Pacific Islanders; and 6% Other.

Questionnaires were administered once a year over three consecutive years (2006, 2007, and 2008), at the same time during each school year. Due to attrition over this period of time, the number of students declined from 2,174 at Time 1 to 1,961 at Time 2 (9.8% attrition rate between Time 1 and Time 2), and further declined at T3 to 1,809 (7.8% attrition between Time 2 and Time 3), an overall attrition rate of 16.8% between Time 1 and Time 3. A total of 1,774 participants completed all three measurement occasions; all analyses reported herein are based on this sample, and this sample was comprised of 691 10–11-year-olds, 565 12–13-year-olds, and 518 14–15-year-olds. The main sample was compared with the group of adolescents who did not participate in all three measurement occasions ($n = 400$). Participants who dropped out had slightly lower levels of future orientation (sample mean = 4.15; attrition mean = 4.05; $p < .01$) and life satisfaction (sample mean = 4.08; attrition mean = 3.97; $p < .01$) at Time 1, but the two groups did not differ in confidence, positive affect, or perceptions of connectedness in any of the four domains. Boys ($p < .05$) and students from lower decile schools ($p < .05$) were slightly less likely to continue as well.

Procedure

A total of 102 schools were approached in the North Island of New Zealand to recruit the sample and we received approval from 78, a 76.5% agreement rate. Once the school agreed to the procedure, we sent information sheets and consent forms home with the adolescents. Subsequently, we ran data collection sessions with 30 laptop

computers in the schools to obtain the data from adolescents who both returned consent forms signed by a parent and also assented to the procedure. Ethical approval was obtained from a university ethics committee, and all schools and principals agreed to the procedures before data were collected. The computer-administered questionnaire contained questions structured and presented through SurveyPro, so the presentation of questions was similar to that used with internet surveys. Respondents indicated their answers by pointing and clicking, which made the process faster, easier, and more engaging than marking answers with a pencil on paper. At the first time of measurement some of the younger participants needed 1 hr to completely respond to the questionnaire, but subsequently the amount of time required to complete the measures decreased appreciably. Research assistants and teachers were always available to assist in answering queries about particular words or procedure and ensuring confidentiality.

Connectedness Measures

Items for measures were either taken from existing scales or generated for the present study. Two separate pretesting sessions were performed before the first year of data collection occurred to determine that selected items and scales possessed good reliability and validity.

Family connectedness. This 11-item scale included five family cohesion items, two family identity items, and four family mutual activities items (see the Appendix for the list of all connectedness and well-being items). The family cohesion

and family identity items were influenced by items in the FACES II instrument (Olson, Portner, & Bell, 1982), while the family identity items were generated for this study. Participants were asked how often a range of statements applied to them and their family, such as "it means a lot to be a member of my family," "for my family, spending time together is very important," and "do you and your family have meals together?" Responses were given on a 5-point scale, ranging from 1 ("never/almost never") to 5 ("always/almost always"). All items within a scale were summed and averaged to produce a single score. Table 1 gives the reliabilities for each variable for each wave of data. The average internal reliability for family connectedness over the three measurement occasions was .91.

School connectedness. Six items adapted from the Psychological Sense of School Membership scale (Goodenow, 1993) and the School Connectedness Scale (Blum, McNeely, & Rinehart, 2002) were used to assess the level of connectedness to school. The scale comprised three items assessing student relationships with teachers (e.g., "I always get an opportunity to talk with my teacher(s)") and three sense of-school community items (e.g., "I feel proud about my school"). The six items were scored on a 5-point scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"). School connectedness scores were computed by averaging the six items, with higher scores indicating greater connectedness. Internal consistency averaged over the three measurements was .87.

Peer connectedness. Seven items examining relationships with peers at school, happiness with number of close friends, and support from friends

TABLE 1
Means, Standard Deviations, Sample Sizes (*n*), and Reliabilities (α) for Connectedness (four domains) and Well-Being (four indicators) for All 3 Years

	Time 1			Time 2			Time 3		
	M (SD)	<i>n</i>	α	M (SD)	<i>n</i>	α	M (SD)	<i>n</i>	α
Connectedness									
Family	3.90 (0.73)	1,758	.90	3.75 (0.78)	1,684	.91	3.69 (0.79)	1,694	.92
School	3.72 (0.78)	1,763	.85	3.66 (0.74)	1,706	.85	3.65 (0.78)	1,687	.90
Peer	4.21 (0.53)	1,494	.79	4.21 (0.53)	1,467	.78	4.22 (0.54)	1,509	.81
Community	3.67 (0.80)	1,754	.71	3.74 (0.77)	1,709	.74	3.75 (0.77)	1,714	.77
Well-being									
Aspirations	4.15 (0.62)	1,769	.74	4.07 (0.66)	1,758	.78	4.03 (0.69)	1,753	.81
Confidence	4.18 (0.62)	1,768	.79	4.11 (0.66)	1,743	.83	4.10 (0.68)	1,750	.86
Positive affect	3.13 (0.78)	1,762	.69	3.06 (0.81)	1,716	.71	3.06 (0.80)	1,730	.73
Life satisfaction	4.08 (0.74)	1,770	.71	4.04 (0.80)	1,756	.80	4.03 (0.80)	1,759	.83

were used to assess peer connectedness. All items were generated for this study. The two school peer relationship questions asked how well students got on with their classmates and other students in the school. Item response options ranged from 1 ("not at all well") to 5 ("really well"). The two questions relating to happiness with number of close friends used a 5-point scale ranging from 1 ("very unhappy") to 5 ("very happy"). The three peer support questions (e.g., "I can trust my friends with personal problems") used a 5-point Likert scale. The average alpha coefficient over the three waves was .79.

Community connectedness. Four items adapted from the Sense of Community Index (Chipuer & Pretty, 1999) were used to tap community connectedness. A 5-point Likert response scale was used to assess agreement to statements such as "my family and I know at least some of the people who live in our street." The mean of these four items was used to create a score for community connectedness. The average reliability coefficient over the three time periods was .74.

Measurement Model of the Connectedness Variables

Models using global connectedness. The latent variable of global connectedness used the four key domains of connectedness as indicators: family, school, peers, and community. The mean of each summed scale was used to provide the four observed indicators at each time period. A confirmatory factor analysis yielded a good fit for each of the 3 years (comparative fit index [CFI] = .98, .99, and .98; and root mean square error of approximation [RMSEA] = .04, .03, and .05). Over the three measurement occasions, the standardized path coefficients from the second order latent connectedness variable to the observed domains of connectedness ranged from .67 to .72 (family), .75 to .82 (school), .54 to .61 (peers), and .44 to .51 (community).

Models using domains of connectedness. To ensure that models in SEM are not under-identified or over-identified, it has been recommended that latent variables have at least three measured indicators (Little, Cunningham, Shahar, & Widaman, 2002). For each domain of connectedness, individual items were randomly assigned to one of three parcels and then averaged (see the Appendix for list of items in each parcel). After random assortment of items into parcels occurred, it was

observed that one parcel for peer connectedness comprised two items that both addressed peer relationships at school: "how well do you get on with your classmates?" and "how well do you get on with other students in your school?" Theorizing that this parcel might also be correlated with school connectedness, two confirmatory factor analyses of the four correlated connectedness factors (domains of connectedness) were conducted with SEM: the first with this parcel loading only on peer connectedness and the second with loadings from this parcel to both peer connectedness and school connectedness. Although both models adequately fitted the data, a chi-square difference test showed significant model fit improvement when both loadings were included ($p < .0001$ for all three measurement occasions). The standardized path coefficients from this parcel to the latent school connectedness variable were small (.20, .23, and .27), but consistent, and given the theoretical link between the items in this parcel to school connectedness, this double-loading was retained in subsequent model analyses. This model showed adequate model fit at all three measurement occasions (CFIs = .98, .99, and .98; RMSEAs = .04, .03, and .05). Over the three measurement occasions, the other standardized path coefficients from the latent connectedness factors to the observed parcels ranged from .86 to .90 (family), .78 to .87 (school), .38 to .94 (peers), and .46 to .98 (community).

Well-Being Measures

The latent variable of well-being (see the Appendix) was constructed from four measured indicators: future orientation (four items), confidence (four items), life satisfaction (three items), and positive affect (three items). Future orientation, confidence, and life satisfaction items were measured on a 5-point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"). The questions on future orientation were adapted from the Ryff Well-being Scale (Ryff & Keyes, 1995). Students responded to items such as "I am serious about working hard now so that I have a good future" and "I often think about my future (what I want to do with my life)." The three questions for confidence were adapted from both the Ryff Well-being Scale and the Rosenberg Self-Esteem scale (Rosenberg, 1965). Items included "I am proud of who I am" and "I feel I am able to do things as well as most people." The life satisfaction items were adapted from the Subjective Well-Being Scale (Diener, Emmons, Larsen, & Griffen, 1985) and

included “I am happy with my life” and “so far I have the important things I want in life.” Positive affect was measured by asking participants how many days in the last week they had felt: “happy,” “hopeful about the future,” and “enjoyed life.” The response range was 1–4, with 1 (“less than 1 day”) to 4 (“5–7 days”). The three items for positive affect were adapted from positive items on the CES-D instrument (Radloff, 1977). All items for each well-being indicator were averaged to form respective summed scores for use as measured indicators of the SEM latent well-being construct. Averaged over the three measurement occasions, the reliabilities for the well-being subscales were acceptable: $\alpha_s = .78$ (future orientation), $.83$ (confidence), $.78$ (life satisfaction), and $.71$ (positive affect).

A confirmatory factor analysis of the well-being latent variable structure yielded an adequate model fit at all three measurement occasions (CFIs = $.95$, $.95$, and $.94$; RMSEAs = $.06$, $.06$, and $.07$). Across the three measurement periods, standardized path coefficients from the latent well-being factor to the measured variables ranged from $.41$ to $.83$ (future orientation), $.63$ to $.80$ (confidence), $.58$ to $.86$ (life satisfaction), and $.51$ to $.83$ (positive affect).

Statistical Analyses

Missing data. Analyses were conducted on the 1,774 participants who completed all three measurement occasions. However, within each measurement occasion there were instances of missing data resulting from particular items not being completed by participants. Table 1 gives information about how many participants provided information for each of the connectedness and well-being variables across the three waves of data (n). Apart from items used for the peer connectedness variable, only small amounts of missing data for individual items were noted (less than 3.6%). Missing values were accounted for by means of full information maximum likelihood (FIML) estimations in the SEM analyses. We did so for two reasons. First, to maximize statistical power it is desirable to include as many cases as possible in the analyses. Second, in longitudinal studies, it is difficult to show that data are missing at random. Studies indicate that even if data are not missing at random, FIML is still a more effective way of handling missing data than traditional procedures, such as list wise deletion or single- or two-way imputation (Enders, 2001; Newman, 2003).

SEM. Data were analyzed by computing longitudinal SEM with Amos 16.0 (Arbuckle, 2007). For

both global connectedness and connectedness by domain, we created three competing models to describe the empirical data: a fully cross-lagged model (with T1–T2, T2–T3, and T1–T3 cross-lagged paths; see Figure 1), a partial cross-lagged model (no T1–T3 cross-lag paths), and a correlational model (no cross-lags). The two latent constructs of global connectedness and well-being were indicated by four indicators each at each measurement occasion. When analyzing data at the domain level of connectedness, each model comprised all four domains of connectedness (family, school, peers, and community), with the latent constructs of connectedness to each domain indicated by three parcels each at each measurement occasion, whereas well-being was again indicated by four indicators at each measurement occasion. To model autocorrelations between the different measurement occasions, we estimated covariances between error terms between all corresponding parcels collected at subsequent measurement occasions (T1–T2, T2–T3, and T1–T3).

Figure 1 depicts the hypothesized fully cross-lagged effects model. This model allowed for testing other theoretically plausible models nested within it. The partial cross-lagged model (paths between adjacent time periods only) was modeled by constraining the T1–T3 cross-lagged paths to zero. The correlational model was modeled by constraining all cross-lagged paths to zero. The more parsimonious model should be preferred over the more complex model provided that omitting the cross-paths does not lead to significant deterioration of the model fit (Schermelele-Engel, Moosbrugger, & Müller, 2003). Differences in fit between nested models were tested using the χ^2 difference test. For the evaluation of overall model fit, three different fit indicators were used: chi-square/df ratio value, RMSEA, and CFI. Although there is no established cut-off for the ratio value, most researchers assert

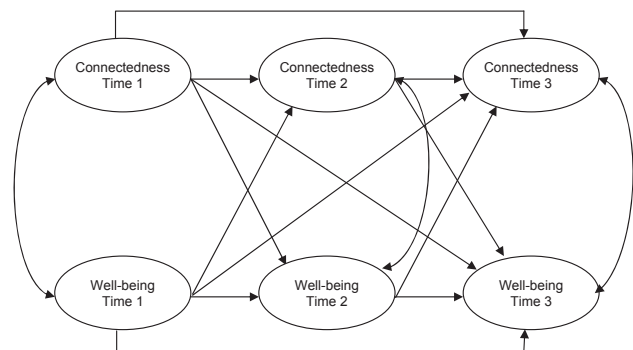


FIGURE 1 The Hypothesized Fully Cross-Lagged Model.

that a value below 3.0 indicates good model fit. According to Browne and Cudeck (1993), an RMSEA \leq .05 indicates a very good model fit and a CFI \geq 0.95 indicates good model fit.

RESULTS

Descriptive Statistics

Means, standard deviations, and reliabilities are shown in Table 1. Means of all scales fell above the midpoint, which signals a potential violation of the normal distribution assumption used in SEM. We tested for kurtosis and skewness (Tabachnick & Fidell, 2001) at both the item and parcel level. Two individual items were slightly kurtotic, although none were skewed. There was no evidence of kurtosis or skewness at the parcel level. These minor violations should not affect present analyses because maximum likelihood estimations are robust against such violations in the case of large samples, that is, $N > 400$ (see Schermelleh-Engel et al., 2003).

Mean Group Differences by Age, Gender, and SES

To examine the data further, a three-way repeated measures MANOVA was performed using age (three cohort groups), gender, and SES (high vs. low) as the independent variables on the outcomes of the four domains of connectedness and well-being. Gender yielded a multivariate main effect, and at the univariate level male participants were found to report higher levels of family and community connectedness as well as well-being, but female participants reported higher levels of peer connectedness. The main effect for cohort group was explained by a decreasing linear trend by age for all variables except community connectedness, which manifested about equal levels across the three age groups. SES predicted only one outcome: students from higher decile schools reported higher community connectedness. Gender by cohort group interactions were found for family and school connectedness, and well-being. In all three cases, female participants displayed a sharper decline than male participants with increasing age. Results for time reflected the cohort group results, namely, over time all outcomes decreased except community connectedness, which increased. These results largely corroborate the findings in the literature, which shows that middle adolescents report higher levels of maladjustment and lower levels of

positive adjustment than young adolescents (Hankin et al., 1998; Nolen-Hoeksema, 1994). In contrast, it seems that community connectedness was the only measure which increased over these 3 years.

Structural Equation Modeling

Before interpreting the SEM results with respect to each of our research questions, an evaluation of the fit of the models to the empirical data was required. Fit indices for all models were examined to determine their fit with the data (see Table 2). The models using global connectedness yielded a good chi-square ratio, and CFI and RMSEA fit indices indicated a good level of fit as well. For the models that included all four domains of connectedness, the chi-square ratio, CFI, and RMSEA fit indices were also very good for all specified models.

Examination of the Underlying Conditions Required for Investigating Causal Relations Between Connectedness and Well-Being

Concurrent correlations between connectedness and well-being are of interest because previously observed strong associations between the two constructs (primarily with indicators of maladjustment) suggest that mutual influences may exist. In the present data, concurrent correlations between connectedness and well-being were highest for global connectedness (.79–.88), illustrating the stronger relation that global connectedness has with well-being compared with connectedness in any single domain. Within the individual domains of

TABLE 2
Fit Indices for the Correlational, Partial Cross-Lagged (T1–T2 & T2–T3), and Fully Cross-Lagged (T1–T2, T2–T3, T1–T3) Models Incorporating All Measurement Occasions

	Fit indices				
	χ^2 value	df	Ratio	RMSEA	CFI
Models using global connectedness					
Correlational	707.11	219	3.23	.04	0.98
Partial cross-lagged	646.59	215	3.00	.03	0.98
Fully cross-lagged	639.51	213	3.00	.03	0.98
Models using domains of connectedness					
Correlational	2,218.82	984	2.26	.03	0.98
Partial cross-lagged	2,066.14	968	2.13	.03	0.98
Fully cross-lagged	2,055.29	960	2.14	.03	0.98

Note. T = measurement occasion; ratio = chi-square/df; RMSEA = root mean square error of approximation; CFI = comparative fit index.

connectedness, concurrent correlations with well-being were highest for family connectedness (.51–.62) and school connectedness (.53–.65), somewhat lower for peer connectedness (.37–.55), and lowest for community connectedness (.22–.34), with all correlations statistically significant across all three measurement occasions. A related issue was the degree to which the four domains of connectedness intercorrelated with each other at the three time points. Correlations varied between .51 (family and school) and .30 (peer and community) at T1, and were similar at T2 (between .44 and .24) and T3 (between .40 and .19). It is important to note that no high correlations were obtained, and all four domains were moderately intercorrelated, as was expected.

Next, we turn to the question of how stable the domains of connectedness and well-being were over time. Over the time-span of 1 year, stabilities were moderately high (ranging from .40 to .74). The knowledge that global connectedness, each of the domains of connectedness, and well-being are only moderately stable over time is important because it provides significant leeway for reciprocal effects between the two constructs to occur.

Finally, the correlational models were tested against the saturated, fully cross-lagged models to determine whether the more complex cross-lagged models provided a better fit to the data than the more parsimonious correlational models. First, we describe the results for the analyses using global connectedness including all three measurement occasions. The correlational model for global connectedness, which omits all the cross-lagged paths from the model, showed a significant ($p < .0001$) deterioration in model fit compared to the fully cross-lagged path model. Having established that a fully cross-lagged model fitted the data better than a correlational model, we then examined the χ^2 difference in model fit between the fully cross-lagged model and a partial cross-lagged model that did not have T1–T3 cross-lags. The difference in χ^2 was much smaller, although still significant ($p < .03$), however, given our large sample size ($n = 1,774$), this may only be a trivial difference in model fit. As Schermelleh-Engel et al. (2003) note, the χ^2 difference test is directly affected by sample size, and in large samples trivial differences may become significant. Consequently we considered the possibility that T1–T3 paths should be included in the final model.

Turning to the models using domains of connectedness, we noted a significant deterioration in fit again between the correlational model and the

fully cross-lagged model. Therefore, a cross-lagged path model should be preferred. When comparing the fully cross-lagged model to the partial cross-lagged model, omission of the T1–T3 cross-lagged paths did not lead to deterioration in model fit. Given that the fit of the partial cross-lagged model is not significantly worse than the fit of the fully saturated cross-lagged model, the more parsimonious model should be favored. All eight of the T1–T3 cross-lagged paths in the fully cross-lagged model were non significant, suggesting that any effects between domains of connectedness and well-being in non adjacent years were fully mediated by the measurement of these variables in the intervening year.

Taken together, the comparison of model fits of the correlational, partial cross-lagged, and fully cross-lagged models suggests that when examining the relation between well-being and global connectedness, the cross-lagged path models are the more appropriate way to describe the data, although the small but significant change in model fit suggests that the fully cross-lagged model may fit the data better than the partial cross-lagged model. In the models using domains of connectedness, the cross-lagged path models provided superior fit to the correlational model; however, of the two cross-lagged models, the partial (T1–T2 & T2–T3) cross-lagged model seems to be the most appropriate model to describe the empirical data.

Examination of the Cross-Lagged Effects Between Connectedness and Well-Being

A consideration of Table 3 (see also Figure 2) reveals that for the model using global connectedness, two of the possible four 1-year cross-lag paths reached significance, and both these paths flowed from connectedness to well-being. Neither of the cross-lags from well-being to connectedness was significant.

An examination of the models using individual domains of connectedness, however, revealed that significant cross-lag paths were found to occur in both directions for some domains. Among the cross-lag paths from connectedness to well-being, four of the eight paths reached significance. Family connectedness and school connectedness were found to be significant predictors of subsequent well-being for the paths between Time 1 and Time 2 and also for Time 2 and Time 3. No significant cross-lagged path was identified from either peer connectedness or community connectedness to well-being. Among the cross-lagged paths in the

TABLE 3
Estimated Coefficients for Cross-Lagged Path Coefficients for Both the Global Connectedness and Domains of Connectedness Path Models

	Conn T1 to WB T2	Conn T2 to WB T3	WB T1 to Conn T2	WB T2 to Conn T3
Global Conn	.38***	.20*	-.03	.08
Family	.12***	.06*	.15***	.04
School	.06*	.08**	.19***	.13***
Peer	.03	-.00	.08*	.06
Community	-.05	.02	.12***	.02

Note. T = measurement occasion; Conn = connectedness; WB = well-being.
* $p < .05$; ** $p < .01$; *** $p < .001$.

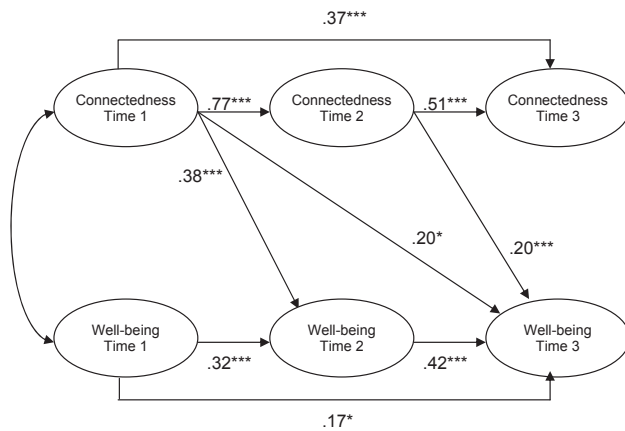


FIGURE 2 Standardized Structural Equation Modeling Maximum Likelihood Estimates for the Fully Cross-Lagged Model Using Global Connectedness (also see Table 3). Note. Fit statistics: χ^2 (213, $N = 1,774$) = 639.51, $p < .001$, comparative fit index = .98, root mean square error of approximation = .037. * $p < .05$; *** $p < .001$.

opposite direction, from well-being to domains of connectedness, five of the eight paths proved to be statistically significant. All four paths in the interval between the first two measurement points were found to be significant, although only the path to school connectedness reached significance in the interval between the second and third measurement points. This asymmetry may mean that the well-being to connectedness relation wanes with increasing age. The magnitude of the significant cross-lag paths from global connectedness to well-being was moderate in size, although at the domain level of analysis, the magnitudes were smaller, with the cross-lag paths from well-being to connectedness larger than those from connectedness to well-being. Together, these results suggest that when investigating connectedness at a global

level, connectedness influences subsequent well-being, but not vice versa. However, when investigating linkages at the domain level of connectedness, there seem to be some reciprocal influences, in particular between well-being and both family and school domains of connectedness.

Possible Moderators of Age, Gender, and Socioeconomic Status

Although not predicted, it was possible that important demographic variables might have functioned as moderators of the relationships identified above. Equality constraints were employed to examine whether age, gender, and socioeconomic status differences could be identified. No gender differences were noted for the overall connectedness model, and only a single result was obtained for the domains of connectedness model after adopting a Bonferroni adjustment for the number of analyses performed: peer connectedness at T2 predicted well-being at T3 more strongly for male participants, χ^2 ch(1) = 9.5, $p < .001$, males = .10 and females = -.06. No differences were noted for socioeconomic status in either model.

On the other hand, several age differences were identified. For both models, stability of well-being was found to be stronger for the older cohorts: between T1 and T2, χ^2 ch(2) = 20.5, $p < .001$, youngest cohort = .39, middle cohort = .48, and oldest cohort = .79; and between T2 and T3, χ^2 ch(2) = 23.0, $p < .001$, youngest cohort = .36, middle cohort = .66, and oldest cohort = .62. No age differences were noted for the overall connectedness model, but one finding was identified for the domains of connectedness model: well-being at T2 predicted peer connectedness at T3 most strongly for the youngest cohort, χ^2 ch(2) = 11.4, $p < .001$, youngest cohort = .21, middle cohort = -.03, and oldest cohort = .04. In sum, these three moderators had little influence on the basic relations identified in the models run on the overall sample.

DISCUSSION

The chief aim of this investigation was to determine whether or not social connectedness and psychological well-being exhibited a reciprocal relation over time for adolescents. Longitudinal data were collected over a 3-year period from a large sample of adolescents, and SEM analyses were used to investigate this relation. To answer our primary research question, we first investigated the underlying conditions required to conduct this analysis.

Specifically, we were interested in concurrent correlations between connectedness and well-being, the stability of these constructs over time, and the path model that best described the temporal relation between these phenomena.

Regarding concurrent correlations, results were congruent with predictions that a moderate relation would be found. Significant correlations were found between global connectedness, domain-specific connectedness, and well-being. These findings confirm that a significant association exists between measures of connectedness and well-being in young people concurrently. The positive association between connectedness and well-being has been reported by several other authors (e.g., Witherspoon et al., 2009; Woolley et al., 2009; Zimmer-Gembeck et al., 2006); however, the present study is one of the few investigations incorporating multiple indicators of connectedness and well-being over time. The relative sizes of these relations indicated that family and school connectedness were more strongly associated with well-being than peer or community connectedness.

The next issue investigated was that of construct stability. Our data showed that, consistent with predictions, connectedness and well-being were moderately stable over time. The level of stability of these phenomena is important, as it constrains to what degree researchers can investigate the relations between these constructs longitudinally. Our results also indicated that cross-lagged path models fitted the data better than a correlational model.

Having satisfied underlying conditions, we then examined the temporal relation between connectedness and well-being. When connectedness was conceptualized at a global level, a reciprocal relation was not supported by the data; global connectedness was found to predict well-being but not the reverse. In contrast, support for a bi-directional relation emerged when connectedness was measured at the domain level, specifically for family and school connectedness. Why this apparent inconsistency between molar and molecular viewpoints? The global connectedness latent construct captures the common variance across these four domains and thus presents a different picture of these relations than do the four individual domains. The global construct is useful in that it presents a more general picture of the nature of connectedness in relation to well-being, but the domain view is *also* useful because it conveys the nature of the more particular relations tied to specific types of connectedness. We argue that both perspectives, despite their apparent contradiction,

have value and should be recognized for what they say. We believe that the statistical discrepancy is caused by the fact that the global connectedness construct is a mathematical combination of three connectedness domains that do not evidence consistent reciprocation over time, with a single connectedness domain (i.e., school) that does evidence consistent reciprocation over time. Conceptually, we feel that these results suggest that well-being is somehow more stimulative of behaviors that tie adolescents to schools (and to families) over time, more so than for connections to peers and communities. It seems that engaging with schools is a qualitatively different experience for adolescents than engaging with peer groups and communities, and we see this issue a useful direction for future research.

Current findings for school connectedness are congruent with previous studies that have found positive effects on well-being (Anderman, 2002; Gillison et al., 2008; Israelashvili, 1997; You et al., 2008). The present study also found that family connectedness had a particularly strong role to play in the subsequent well-being of young people as well, similar to the findings of Libbey et al. (2002). In contrast, we did not find that peer connectedness was especially influential, as McGraw et al. (2008) have found. Researchers have noted that the influence of peer connectedness may be two-edged: beneficial when peer norms are positive and deleterious when peer norms are negative (e.g., Mounts & Steinberg, 1995). This information is important to those working in the area of positive youth development with an intention to foster well-being. These findings suggest that enhancing youth connectedness within various social domains can have positive benefits for overall well-being, and this is especially the case for relations with family and schools. The results also indicate that feeling good about oneself (well-being) in some cases might lead one to become better connected to people in different contexts (see Table 3: well-being at T1 predicted higher connectedness in all four domains at T2). This well-being-to-connectedness path is consistent with a robust finding identified in the literature on happiness, which is that happy people tend to have better interpersonal relationships over time than do their less happy peers (Lyubomirsky, King, & Diener, 2005).

Another important result from the current study is that examining effects over a 2-year timeframe suggests that the positive impact of domain-specific connectedness diminishes over time (any impact between domain-specific connectedness at T1 and

well-being at T3 was found to be fully mediated by domain-specific connectedness at T2). Therefore, to maintain positive impacts on well-being enduringly, interventions aimed at improving connectedness should try to focus on enhancing adolescents' abilities to maintain connectedness over time, for example, by building individual capabilities for developing meaningful relationships such as practicing acts of kindness, making time for others, expressing appreciation and affection, managing conflict, communicating through honest self-disclosure, and being supportive and loyal (Catalano et al., 1999; Larson, 2000; Park, 2004; Roth & Brooks-Gunn, 2003). Simply offering isolated opportunities for connection, without fostering long-lasting capability-enhancing strategies and techniques, is unlikely to yield long-term benefits.

The findings also raise the possibility that important differences may exist between social systems in terms of their impact upon the relation between connectedness and well-being. Our data suggest that the familial and school environments, for instance, may be more salient for positive aspects of functioning over time. Although the literature discusses the increasing importance of peers during this period of adolescence (Steinberg, 2010), our results show the primacy of family connections in predicting adolescent well-being outcomes. Also, it is notable that many of the school connectedness items used in this study (see Appendix) refer to the perceived relationship with one's teacher or teachers, so one tentative interpretation of our findings could be the critical importance of connectedness to a significant adult who cares for and respects the teenager (e.g., Persson, Kerr, & Stattin, 2007). Peer and community contexts, by contrast, may play key roles in other outcomes or later in life.

The larger values for both concurrent correlations and estimated cross-lagged path coefficients between global connectedness and well-being compared with domain-specific connectedness and well-being suggest that there may be additive, complementary, or potentially multiplicative effects across domains. Adolescents who report high connectedness across several or all domains may derive additional positive effects on well-being beyond those associated with domain-specific effects. Furthermore, global connectedness could in part be capturing the ability (or perception thereof) of the individual to establish and maintain meaningful relationships across widely varying contexts. Future analyses of our data will help to elucidate these pathways. What is clear at this juncture,

however, is that an overall sense of belonging to key domains in one's life predicts well-being in important ways.

How generalizable are these results? Examination of three important demographic moderators (age, gender, and SES) suggests that the above-mentioned findings are broadly applicable to boys and girls of early and middle adolescence across different income levels in New Zealand. The few significant findings indicate that peer relationships may function somewhat differently for male students than female students, and it seems, as one would expect, that well-being is more changeable over time for younger adolescents. On balance, however, it seems that the basic cross-lag relationships that we identified previously seem to function very similarly across age, gender, and SES boundaries. Other potential moderators such as geographical region (e.g., rural vs. urban) and ethnic group membership should be investigated in the future as well.

The findings should be considered within the context of several limitations in the methodology. First, since there is a lack of consensus in the field concerning how to measure social connectedness, some of the present measures—that is, those specifically created for this study—may not map onto other researchers' measures very well. We agree with Barber and Schluterman (2008) that greater uniformity of connectedness measures will be helpful in moving the field forward. Second, we created connectedness measures with varying numbers of items, and this fact might have contributed to the finding that community connectedness, for example, with four items, did not predict well-being as well as other types of connectedness measured with a greater number of items. On this point, what Chipuer and Pretty (1999) refer to as "community" connectedness might better be termed "neighbourhood" connectedness given the content of their items, and future work would do well to differentiate the effects of neighborhoods and communities. Third, although adequate internal reliabilities were obtained on all measures across the age-span tested here, older participants probably experienced less difficulty in reading and reliably interpreting all of the measures than the youngest participants. And fourth, a multimethod approach to youth connectedness, using informants other than the young person such as parents, teachers, and peers, would be helpful in substantiating validity of these self-report measures.

An important implication of these findings is that well-being seemingly can be improved indirectly,

and perhaps lastingly, by fostering positive relationships of youth within families and schools, and to a certain degree with communities and peers as well. Well-being would seem to be based on a foundation of reciprocal, caring, and responsive relationships that teenagers participate in within the important ecological domains of their lives. Satisfying the need to be connected with others (Baumeister & Leary, 1995; Ryan & Deci, 2000) seems to provide adolescents a substantial basis for feeling positive about themselves and their future; consequently we recommend that interventions and youth programs include a component that encourages healthy connectedness with stimulating and supportive programs and caring adults and peers.

APPENDIX

Parceling for Latent Variables

	<i>SEM Parcel</i>
Family connectedness	
Do family members watch you play sport or perform in other areas?	1
For my family, spending time together is very important	1
My family asks each other for help	1
My family likes to spend free time together	2
It means a lot to be a member of my family	2
We are proud to be members of our family	2
Do you and your family have holidays together?	2
We like to do things just as a family	3
We can easily think of things to do together as a family	3
Do you and your family have meals together?	3
Do you and your family spend time going out together?	3
School connectedness	
I feel that my teacher(s) respect me	1
My teacher(s) understand me	1
I like going to school	2
I always get an opportunity to talk with my teacher(s)	2
I feel proud about my school	3
I feel I am treated with as much respect as other students	3
Peer connectedness	
How well do you get on with your classmates?	1
How well do you get on with other students in your school?	1
How happy are you with the number of close friends you have outside of school (not school mates)?	2
I can trust my friends with personal problems	2
How happy are you with the number of close friends you have in school?	3

(Contd.)

	<i>SEM Parcel</i>
My friends understand and accept me for who I am	3
My friends and I help each other out	3
Community connectedness	
My family and I know at least some of the people who live in our street	1
My neighborhood is a good place for young people to grow up in	2
My family and I can count on our neighbors for help	2
I feel safe walking around my neighborhood at night	3
Future orientation	
I am serious about working hard now so that I have a good future	1
I often think about my future (what I want to do with my life)	1
I set goals and work hard to achieve them	1
I work hard now for a good future	1
Confidence	
I am proud of who I am	2
I feel I am able to do things as well as most people	2
I am confident and positive	2
I have many good qualities	2
Life satisfaction	
I am happy with my life	3
So far I have the important things I want in life	3
I wouldn't change my life	3
Positive affect	
Happy	4
Hopeful about the future	4
Enjoy life	4

Note. SEM = structural equation modeling.

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