The Link between Self-Esteem and Social Relationships:

A Meta-Analysis of Longitudinal Studies

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Harris, M. A., & Orth, U. (2020). The link between self-esteem and social relationships: A meta-analysis of longitudinal studies. *Journal of Personality and Social Psychology, 119*, 1459-1477. http://dx.doi.org/10.1037/pspp0000265

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This material is based upon work supported by the National Science Foundation Graduate Research Fellowship under Grant No. 1650042. Any opinion, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation. Data and code are available at https://osf.io/xt3u6/.

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Abstract

Theorists have long assumed that people's self-esteem and social relationships influence each other. However, the empirical evidence has been inconsistent, creating substantial uncertainty about whether relationships are in fact an influential factor in self-esteem development and vice versa. This meta-analysis synthesizes the available longitudinal data on the prospective effect of social relationships on self-esteem (48 samples including 46,231 participants) and the prospective effect of self-esteem on social relationships (35 samples including 21,995 participants). All effects controlled for prior levels of the outcomes. Results showed that relationships and self-esteem reciprocally predict each other over time with similar effect sizes (β = .08 in both directions). Moderator analyses suggested that the effects held across sample characteristics such as mean age, gender, ethnicity, and time lag between assessments, except for the self-esteem effect on relationships, which was moderated by type of relationship partner (stronger for general relationships than for specific partners) and relationship reporter (stronger for self-reported than for informant-reported relationship characteristics). Findings support assumptions of classic and contemporary theories on the influence of social relationships on self-esteem and on the consequences of self-esteem for the relationship domain. In sum, the findings suggest that the link between people's social relationships and their level of self-esteem is truly reciprocal in all developmental stages across the life span, reflecting a positive feedback loop between the constructs.

Keywords: self-esteem; social relationships; prospective effects; longitudinal studies; meta-analysis

A longstanding assumption in psychology is that social relationships play a key role in shaping individuals' self-esteem (e.g., Leary, 2012), or the subjective evaluation of their overall worthiness as a person (e.g., see Robins, Tracy, & Trzesniewski, 2008; Rosenberg, 1965). While there is abundant empirical support for the concurrent association between various relationship characteristics and self-esteem (e.g., Cameron & Granger, 2018; McArdle, Waters, Briscoe, & Hall, 2007; Murberg, 2010; Neff & Geers, 2013; Poulsen, Ziviani, & Cuskelly, 2006; Rosario, Schrimshaw, & Hunter, 2011; Schuengel et al., 2006), longitudinal research has produced mixed findings, with some studies finding evidence for longitudinal effects of social acceptance on self-esteem (e.g., Wagner, Lüdtke, Robitzsch, Göllner, & Trautwein, 2018) but other studies finding no support for the effect of close relationships on self-esteem development (e.g., Harris et al., 2015). Adding to the complexity of this empirical association, when individuals are asked to explain the sources of their self-esteem, social relationships are mentioned infrequently, compared to other sources (e.g., achievements, personality traits; Harris, Donnellan, Beer, & Trzesniewski, 2019). As it stands, the inconsistency of the current state of knowledge creates substantial uncertainty about whether social relationships in fact are an influential factor in self-esteem development.

A related question is whether self-esteem has an influence on characteristics of social relationships (e.g., see Murray, Holmes, & Collins, 2006; Srivastava & Beer, 2005; Swann & Read, 1981). According to dynamic interactionism (Asendorpf & Wilpers, 1998; Magnusson, 1990), there are likely to be reciprocal effects between individuals' self-esteem and quality of social relationships. Previous research has found a small meta-analytic effect of self-esteem on social relationships, based on longitudinal studies examining self-esteem at one time point and social relationships at a later time point (Cameron & Granger, 2018). However, the effects

included in the Cameron and Granger (2018) meta-analysis were not controlled for prior assessments of social relationships, and thus, they do not provide much stronger insights than cross-sectional correlations, as the observed effects could simply be carried forward by the stability of the outcomes (Cole & Maxwell, 2003). Furthermore, longitudinal research that has controlled for prior assessments of social relationships has produced mixed findings regarding the effect of self-esteem on later social relationships (e.g., see Brummelman et al., 2015 for support and Klima & Repetti, 2008 for no support). Thus, it is unclear based on the current state of research whether individuals' self-esteem influences characteristics of their social relationships over time.

In the present research, we meta-analytically synthesized the evidence from longitudinal studies to estimate the reciprocal effects between social relationships and self-esteem and tested for moderators of each effect. It should be noted that the two directions of effects are not mutually exclusive and that both processes could operate simultaneously. In addition, we include a broad range of relationship characteristics to maximize statistical power and to test the broad research question of whether there are robust, prospective associations between social relationships and self-esteem. Finally, because the significance of specific relationship partners may vary across age (i.e., beginning with great importance on relationships with parents in childhood, transitioning to the need for peer approval in adolescence, and seeking high regard from romantic partners in adulthood; e.g., Bornstein, Jager, & Steinberg, 2012), we organize our review of existing empirical research below based on ages across the lifespan.

Effect of Social Relationships on Self-Esteem

Theoretical Perspectives

Several theorists have posited that significant relationships influence self-esteem (e.g., Bowlby, 1973; Cooley, 1902; Leary & Baumeister, 2000; Mead, 1934). For example, *sociometer theory* states that the sole purpose of self-esteem is to function as a system for monitoring others' reactions to the self (Leary, 2000, 2004, 2006, 2012; Leary & Baumeister, 2000), which suggests that self-esteem fluctuates along with the level of approval from others. A second major framework, *reflected appraisals theory*, emphasizes the role of perceived appraisals from others for shaping the way individuals come to view themselves (see Cooley, 1902; Harter, 1999; Mead, 1934; Shrauger & Schoeneman, 1979). This theory suggests that the self is *exclusively* experienced indirectly, through the eyes of significant others as well as generalized society (e.g., Yeung & Martin, 2003). *Attachment theory* (see Ainsworth, 1973; Bowlby, 1973, 1980, 1982, 1988; Sroufe, 2002; Thompson, 2006) is a third established perspective that has at the core of its tenets the idea that relationship bonds are directly related to self-esteem. That is, the relationship security with the primary caregiver in infancy is thought to be internalized and impact later relationship experiences with peers and romantic partners (Feeney, Cassidy, & Ramos-Marcuse, 2008; Hazan & Shaver, 1994). Thus, bonds with all close others presumably signal to the self a generalized notion of one's worth as a person – that you are either valued for who you are from these stable, important people in your life, or you are not considered important from these people and are therefore an unworthy person. The common thread across the major theoretical frameworks presented here is that social relationships matter for self-esteem over time (even though nuances such as the type of relationship or process by which they matter may differ across the theories).

Cross-sectional research finds robust support for the concurrent association between self-esteem and the quality of individuals' social relationships, often at about small to medium effect

size (e.g., McArdle, Waters, Briscoe, & Hall, 2007; Murberg, 2010; Neff & Geers, 2013; Poulsen, Ziviani, & Cuskelly, 2006; Schuengel et al., 2006). However, cross-sectional findings cannot inform theories proposing an effect of relationships on self-esteem or theories proposing an effect of self-esteem on relationships. Longitudinal designs allow researchers to come closer to understanding causality (though still do not completely speak to causal relations between variables). However, the available evidence from longitudinal studies on self-esteem and relationships is inconsistent, with some studies reporting effect sizes that are close to zero or nonsignificant and other studies finding substantive and significant effect sizes. In the section below, we review the existing longitudinal research. Special focus is given to the age periods, statistical approaches, and relationship characteristics assessed, as these factors varied considerably across studies.

Longitudinal Evidence

Regarding childhood, recent longitudinal studies support the notion that the degree of parental warmth and support received predicts children's self-esteem not only when assessed later in childhood but even when assessed many years later in adolescence and young adulthood (Harris et al., 2017; Orth, 2018). However, it should be noted that not all studies consistently confirmed this effect. For example, although Brummelman and colleagues (2015) found consistent support for the influence of child-reported parental warmth on children's later self-esteem, there was no influence of parent-reported parental warmth on children's self-esteem (contrasting significant effects of parent reports found in Harris et al., 2017 and Orth, 2018). As for peer relationships, some studies suggest that self- and teacher-reported peer acceptance predict increases in self-esteem in middle and late childhood (Klima & Repetti, 2008; Wagner et

al., 2018). However, when Wagner and colleagues (2018) used liking ratings averaged across multiple classmates, this indicator of peer acceptance was not related to change in self-esteem.

In adolescence, one study testing a range of different longitudinal models suggested that relationship quality with parents does not influence self-esteem development (Harris et al., 2015). Also, in a study that followed adolescents from age 13 to 17 years, perceived social support and the size of adolescents' support network did not predict changes in self-esteem (Marshall, Parker, Ciarrochi, & Heaven, 2014). In contrast, other evidence suggests that both self- and peer-reported social acceptance are related to increases in self-esteem over time (Gruenenfelder-Steiger, Harris, & Fend, 2016), particularly when considering social bonds within one's cultural group (Reitz, Motti-Stefanidi, & Asendorpf, 2016).

With regard to adulthood, research indicates that transitions in romantic relationships during adolescence and young adulthood, as well as the quality of new relationships, influence self-esteem development (Luciano & Orth, 2017; Wagner, Becker, Lüdtke, & Trautwein, 2015). In addition, a study using dyadic data from romantic couples found that partner-reported relationship satisfaction predicted change in self-esteem two years later, but self-reported relationship satisfaction did not have an effect on self-esteem development (Schaffhuser, Wagner, Lüdtke, & Allemand, 2014). This finding is consistent with results from other studies that tested for prospective effects of self-reported relationship satisfaction on self-esteem and did not find supporting evidence (Mund, Finn, Hagemeyer, Zimmermann, & Neyer, 2015; Orth et al., 2012). Finally, research on the lifespan trajectory of self-esteem suggests that people's satisfaction with their relationships, but not their relationship status (i.e., having a partner vs. being single), is related to individual differences in the self-esteem trajectory (Orth, Maes, & Schmitt, 2015). In sum, with regard to all developmental periods reviewed above—childhood,

adolescence, and adulthood—there is inconsistent longitudinal evidence on the question of whether the quality of an individual's social relationships influence his or her self-esteem.

Effect of Self-Esteem on Social Relationships

Theoretical Perspectives

A number of major frameworks provide support for the reverse causal direction, that is, for the hypothesis that people's self-esteem shapes the characteristics of their social relationships (e.g., Erol & Orth, 2013; Murray, Holmes, & Griffin, 2000; Murray, Holmes, & Collins, 2006; Srivastava & Beer, 2005). The *risk regulation model* (Murray, Holmes, & Griffin, 1996, 2000; Murray, Holmes, & Collins, 2006) proposes that self-esteem may impact the perception one has of his or her relationship partner because internal beliefs about worthiness of love are projected onto beliefs about the relationship. Low perceived regard in turn would lead individuals to distance themselves from their partners with the goal of being less vulnerable in case of rejection. Therefore, by the means of perceived regard of a relationship partner, self-evaluations can impact relationship outcomes such as satisfaction, trust, and intimacy. *Self-verification theory* supports the notion that perceived regard plays a role in the association between self-esteem and relationship factors. Specifically, Swann and Read (1981) proposed that individuals would disengage from relationship partners who maintain reflected appraisals that are inconsistent with targets' self-evaluations. So, individuals with low self-esteem would withdraw from relationship partners who view them more positively than how they see themselves. A third line of reasoning is provided by the *self-broadcasting perspective* (see Srivastava & Beer, 2005; Yeung & Martin, 2003; Zeigler-Hill, Besser, Myers, Southard, & Malkin, 2013), which suggests that individuals display observable cues that "broadcast" their internal self-evaluations to others, which in turn shape the functioning of social relationships. For example, if individuals perceive

themselves as having low competence, these beliefs may be expressed through consistent avoidance of relevant tasks and delegation to others (Taylor & Brown, 1988). In addition, others may infer the individual's level of self-esteem through behavioral displays of confidence, curiosity, initiative, and independence as well as adaptive reactions to stress or change (Harter, 2006). Upon noticing self-esteem cues, a relationship partner can then presumably deliberate as to whether they want to become close with a person with low self-esteem, for example, or they may begin to form expectations for what that relationship may be like if they choose to pursue the connection. In these ways, people's self-esteem may influence whether they are successful in initiating and maintaining relationships with romantic partners, friends, and coworkers, and whether they have a strong or weak social support network.

Finally, a specific *relationship behaviors perspective* suggests that self-esteem impacts particular behaviors (more specific than disengagement and withdrawal) that have broader implications for the functioning of social relationships. Sociometer theory contends that when the interpersonal monitor of social acceptance detects cues from relationship partners signaling threat or potential rejection, the resulting negative affect motivates individuals to engage in behaviors that resolve relationship conflicts and reduce the development of dysfunctional relationship patterns or disapproving relationship partners (Leary, 2005). Cues regarding particularly relevant behaviors can be found in research on interpersonal conflict. That is, self-evaluations tend to be associated with the frequency of reported conflicts among dating or married partners (Murray et al., 2000) as well as individual differences associated with strategies individuals take to either resolve, or disengage from, interpersonal conflicts (Diamond, Fagundes, & Butterworth, 2010). For example, individuals low in neuroticism and high in agreeableness – two personality traits that are closely related to self-esteem – are more likely to

display: positive affect during relationship conflicts, accommodating and constructive responses to partner transgressions, affectionate expression, and additional positive behaviors that prevent escalation of negative events and constructive resolution of negative encounters (see Diamond et al., 2010). Finally, there is evidence that attachment-related anxiety and avoidance in a romantic relationship mediate the impact of trait self-esteem on relationship satisfaction (Erol & Orth, 2013); thus, relationship behaviors associated with attachment styles (e.g., proximity and support seeking, responsiveness, effectiveness of support) may be important catalysts through which self-esteem shapes relationships (also see Erol & Orth, 2016). In sum, there are many specific relationship behaviors that may be facilitated by self-evaluations, thus reinforcing the expectation for a link between self-esteem and relationships.

Longitudinal Evidence

In childhood, there is tentative evidence that self-esteem influences parental warmth (Brummelman et al., 2015), but there are few additional studies to draw from regarding the impact of self-esteem on relationships with parents. As for peer relationships, there is one study showing no effect of self-esteem on changes in peer acceptance (Klima & Repetti, 2008).

In adolescence, the majority of relevant studies have not supported the notion that self-esteem influences the quality of social relationships when assessed by peer- rather than self-report (Gruenenfelder-Steiger, Harris, & Fend, 2016; Reitz et al., 2016). Gruenenfelder-Steiger and colleagues (2016) and Marshall and colleagues (2014) have confirmed effects of adolescent self-esteem on later self-reported relationship quality with peers and the broader social support network. As for relationships with parents, one study has examined the longitudinal impact of self-esteem and has not confirmed robust effects on reports by target adolescents, parents, or observers (Harris et al., 2015).

Research on adulthood has mostly examined the impact of self-esteem on romantic relationships. Some evidence suggests that self-esteem has significant prospective effects on relationship satisfaction (Orth et al., 2012; Schaffhuser et al., 2014). However, Mund, Finn, Hagemeyer, Zimmermann, and Neyer (2015) did not confirm this link, and Schaffhuser and colleagues (2014) similarly did not support this association when using an actor-partner model that tests each partner's level of satisfaction individually. Others examining relationship transitions have found prospective effects from self-esteem on starting a long-term romantic relationship (predicted by high self-esteem) and separating from a long-term partner (predicted by low self-esteem), but these effects did not hold for short-term relationships (Luciano & Orth, 2017). Thus, as with the literature on prospective effects of relationships on self-esteem, longitudinal evidence for the reverse causal direction is mixed.

The Present Research

A central conclusion from theory and research reviewed above is that the question of whether and to what extent social relationships are associated with self-esteem is a fundamental issue in the field of self-esteem. Although many empirical studies have examined the longitudinal links between the constructs, the available research has not yet led to any agreement about the direction and strength of effects. In the present meta-analysis, we therefore synthesize the available longitudinal data on prospective effects between social relationships and self-esteem. The meta-analytic method has the advantage of estimating effects with more statistical power than individual studies have on their own and, by aggregating the data across a heterogeneous set of studies, reduces concerns about bias due to idiosyncrasies of the primary studies. Moreover, the heterogeneity of study characteristics in a meta-analytic dataset (e.g., mean sample age, type of relationship partner, time interval between assessments) allows for

tests of study characteristics that moderate the effect under question (Borenstein, Hedges, Higgins, & Rothstein, 2009; Lipsey & Wilson, 2001) and thus can yield insights that can hardly be provided by any single study. We test for moderation of both prospective effects by demographic variables (e.g., gender, ethnicity), study characteristics (e.g., year of data collection, self-esteem measure), and substantive variables that show variation in the literature (e.g., age, relationship partner).

Method

The present meta-analysis used anonymous data and therefore was exempt from approval by the Ethics Committee of The University of Texas at Austin.

Selection of Studies

We conducted a PsycINFO search in the Fall of 2016 for abstracts of English-language journal articles, books, book chapters, and dissertations. We limited the search to articles published in 1990 or later because longitudinal analyses on self-esteem were rare before 1990 (see other meta-analyses of longitudinal studies by Huang, 2010; Sowislo & Orth, 2013; Trzesniewski, Donnellan, & Robins, 2003). We restricted the search to empirical studies, systematic reviews, or quantitative studies, and longitudinal or prospective designs, by using the corresponding limitation options in PsycINFO. We used the following search terms: *self-esteem, self-worth, self-liking, self-view*, self-concept, self-respect, self-regard, self-opinion*, self-perception*, parent*, friend*, sibling*, boyfriend, girlfriend, partner, spouse, wife, husband, mentor*, teacher*, classmate*, coworker*, colleague*, relation*, social support, quality, satisfaction, warmth, accept*,* and *reject**. The asterisk allowed for terms to be included with alternate endings (e.g., *parent** would include *parents, parenting,* etc.). The search resulted in 1,095 journal articles, 105 dissertations, and 20 book chapters. In addition, we coded four

relevant articles that had been published recently and did not appear in the search. Thus, we examined a total of 1,224 articles.

Inclusion criteria in the meta-analysis were as follows: (a) includes assessments of self-esteem and at least one relationship characteristic; (b) the study was longitudinal and at least one of the constructs (i.e., self-esteem or a relationship characteristic) was assessed at two occasions in the same sample; (c) includes a continuous, self-report measure of global, trait self-esteem (i.e., measures of state self-esteem as in Denissen, Penke, Schmitt, & van Aken (2008), Study 1a were excluded); (d) includes a continuous measure of social relationships from the following list: warmth, closeness, intimacy, support, acceptance, rejection, relationship satisfaction, relationship quality, popularity, being liked, involvement, time spent with partner(s), conflict, transgressions, problems, synchrony, relatedness, attachment security/avoidance/anxiety, negative social relationships, reciprocity, sociometric nominations, network size, integration, transitivity, density, centrality, homophily/mutuality; these measures could be reported or rated by self, informant, or observer; (e) reports sufficient effect size information to calculate the longitudinal effects; (f) effect size information is not inconsistent across abstract, text, tables, and figures; (g) sample is not part of an intervention (although results for control groups of intervention studies were included); and (h) model with relevant effect size information does not include moderators or mediators. We included samples of all age and ethnic groups. If two or more studies used the same sample (e.g., the National Longitudinal Study of Adolescent to Adult Health), the study with the largest sample size was retained.

The two most common reasons for exclusion were that studies did not include a relevant measure of either self-esteem or social relationships (53%) and that they were not longitudinal (28%; e.g., Denissen, Penke, Schmitt, & van Aken, 2008, Studies 1b-2). Fourteen percent of

studies did not report sufficient information to calculate the longitudinal effect size (e.g., frequently, authors would include a separate correlation table for variables assessed at each time point but would not report longitudinal effects). The rest of the exclusion criteria were relevant for 2% or less of the original sample of studies.

These criteria left 42 studies eligible for inclusion in the meta-analysis. Of these, 11 studies provided effect size information on two samples each. Thus, the overall number of samples included in the meta-analysis was 53. If studies provided two or more effect sizes for the same sample (e.g., based on different measures of the same construct), these were averaged within studies to ensure there would be no statistical dependencies between effect sizes, as recommended by Lipsey and Wilson (2001). Of the samples, 48 provided information on the cross-lagged effect of social relationships on self-esteem, and 35 on the cross-lagged effect of self-esteem on social relationships.

Coding of Studies

We coded the following characteristics for each sample: mean age of sample at Time 1, proportion of female participants, ethnicity (i.e., greater than 60% White, African American/African, Hispanic/Latino/a, other ethnicity, mixed/none more than 60%, or unknown), sample size at Time 1, year of data collection at Time 1, time lag between Time 1 and Time 2 assessments, presence of control variables in model reporting effect sizes of interest, type of publication (i.e., journal article or dissertation), type of sample (i.e., nationally representative for the age group under investigation or non-representative), procedure used to assess the relationship variable (i.e., self-, informant, or observer report), self-esteem measure, relationship partner, and effect sizes.

Some authors did not report explicit information on ethnicity, but we coded the samples' ethnicity based on the country in which data were collected (e.g., if a study reported on a representative sample from Germany, we coded ethnicity as "greater than 60% White"). Some authors did not report the exact age of the sample or the year of data collection. If age was not reported but the sample was sufficiently labeled, we estimated the mean age based on the following guidelines: kindergarten = age 5, 1st grade = age 6, increasing age by one year for each subsequent grade until high school/adolescence, which was assigned age 15.5 (average of ages 14-17), college = age 19.5 (average of ages 18-21), emerging adulthood = age 23.5 (average of ages 22-25), early adulthood = age 30.5 (average of ages 26-35), adults/middle adulthood = age 50 (average of ages 36-64), and older adulthood = age 82.5 (average of ages 65-100). Age was used as a continuous variable in all analyses. If the sample size at Time 1 was not reported, we coded the overall sample size. If the year at Time 1 was not reported, we first searched for this information in associated studies or websites. If there were no other resources specifying the year of data collection, we estimated the year by subtracting the time lag between the first and the last assessment and three years (an approximation of the lag between completion of data collection and publication) from the publication year.

To code effect sizes, we directly recorded standardized regression coefficients that controlled for the previous assessments of the constructs (e.g., the effect of the Time 1 relationship variable on Time 2 self-esteem, controlling for Time 1 self-esteem). However, in most studies, regression coefficients were not available, and only zero-order correlations among the Time 1 and Time 2 assessments of self-esteem and relationship variables were reported. In these cases, we calculated the effect sizes using the following formula for two independent variables from Cohen, Cohen, West, and Aiken (2003):

$$\beta_{Y1.2} = \frac{r_{Y1} - r_{Y2} * r_{12}}{1 - r^2_{12}},$$

where $\beta_{Y1.2}$ is the standardized regression coefficient of a relationship characteristic predicting self-esteem change over time, r_{Y2} is the stability correlation for self-esteem, r_{Y1} is the correlation across time between the relationship characteristic at Time 1 and self-esteem at Time 2, and r_{12} is the concurrent correlation at Time 1 between self-esteem and the relationship characteristic. The standardized regression coefficients of self-esteem predicting a relationship characteristic over time (i.e., the effect in the reverse causal direction) were calculated correspondingly. If a study reported both regression and correlation coefficients, we coded and used the correlation coefficients to compute the effect sizes because we were also interested in the concurrent correlation between the constructs at Time 1.

The first author assessed all studies in full text to determine inclusion in the meta-analysis. Halfway through this coding process for inclusion, a reliability check was conducted to ensure the inclusion criteria specified in the codebook were clear and objective. The second author rated a random sample of 10 studies (14 samples) determined by the first author to be eligible for inclusion. Scores were compared, consensus was reached on discrepant ratings, and adjustments were made to the codebook. The first author coded the remaining eligible studies for inclusion and then coded the study characteristics of all eligible studies. To conduct a formal interrater reliability test, the second author coded the study characteristics of a random selection of 25 studies (32 samples) eligible for inclusion. Reliability was acceptable for continuous ($r \geq$ .77; range: .77-1.00) and categorical variables ($\kappa \geq .81$; range: .81-.86). Consensus was reached on all discrepant ratings. There was one variable that originally had poor reliability: the type of sample (i.e., representative vs. non-representative). The definition in the codebook was adjusted,

and then both authors coded the variable again for the full set of eligible studies and reached consensus on any discrepant ratings.[1]

Meta-Analytic Procedure

For all computations, we used Fisher's z_r transformations and study weights of $n - 3$ as recommended by Lipsey and Wilson (2001). We used SPSS and the SPSS macros by David Wilson (see Lipsey & Wilson, 2001, Appendix D; Wilson, 2010).

We tested for the presence of statistical outliers for each meta-analytic effect size by (a) comparing the observed mean scores with the trimmed mean scores after eliminating the 5% highest and lowest scores and (b) examining boxplots of each effect size (Hodge & Austin, 2004; Sim, Gan, & Chang, 2005). Next, we used two methods to examine publication bias, which would indicate that studies with nonsignificant or small effect sizes would be less likely to be published or reported. We did not expect to find publication bias for any of the effect sizes because many studies included in this meta-analysis were not originally intended to study the associations that were of interest to us (frequently, the relevant effect size information was reported along with intercorrelations of other measures). First, we calculated Egger's linear regression (Egger, Smith, Schneider, & Minder, 1997) as a test of funnel plot asymmetry. We expected the regressions to be nonsignificant, which would speak against the likelihood of bias due to small-study effects (Sterne & Egger, 2005). Then, we created funnel graphs to examine the association between the sample size and effect size for each tested effect (Sterne, Becker, & Egger, 2005; Sutton, 2009). We expected the graphs to show the symmetric shape of a funnel, with more variance in effect sizes among smaller samples and less variance among larger

[1]The first author had a Bachelor's degree in psychology and was a doctoral candidate in the final year of a human development PhD program, and the second author had a PhD in psychology.

samples. This would indicate that smaller samples are well-represented in the meta-analysis, and thus, speak against publication bias.

For all computations, we used random-effects models (Borenstein et al., 2009; Raudenbush, 2009) because we expected the effects to vary across our proposed moderators (i.e., we did not assume there would be only one true effect size across all studies, as in a fixed-effects model). The first step of our analysis was to reverse-score effect sizes for variables with negative valence (e.g., relationship conflicts). Next, we computed weighted mean effect sizes. In the moderator analyses, we used mixed-effects meta-regression models for dichotomous and continuous variables (e.g., type of sample, age) and mixed-effects analysis of variance (ANOVA) for categorical moderators (e.g., type of relationship partner).

Results

Description of Studies

The meta-analytic dataset consisted of 53 samples, including 52 samples from journal articles and one sample from a dissertation (books and book chapters did not provide relevant data). The studies were published between 1993 and 2016 (*Mdn* = 2012), and data were collected between 1979 and 2011 (*Mdn* = 2003). Sample sizes ranged from 33 to 13,401 (*M* = 899.6, *SD* = 1,836.9, *Mdn* = 478). The mean age was 21.0 years (*SD* = 15.3; range = 4.1-76.6). In sum, the studies included data from 47,676 participants. The mean time lag between the first and second assessments was 2.3 years (*SD* = 2.5; *Mdn* = 1.0; range = 0.08-11.0). On average, the samples included 54% female participants (*SD* = 31%; range = 0-100%). Regarding ethnicity, 60% of the samples were predominantly White, 2% were predominantly Hispanic/Latino/a, 12% were predominantly of another ethnicity, and 19% were of mixed ethnicities; for 8% of the samples, information on ethnicity was not available. Thirty samples were from the United States, four

from Switzerland, three from Germany, and two each from China, Korea, and the Netherlands. There was one sample from each of the following countries: Australia, Belgium, Canada, Finland, Greece, Russia, and Sweden. Three of the 53 samples were nationally representative.

Forty-three studies used self-report measures of social relationships; the remaining 10 studies used informant-report, observer-report, or a combination of reporters. The relationship partner was parents in 16 studies, peers in 10 studies, romantic partners in 5 studies, general others (e.g., "there is someone who helps me," sense of community) in 13 studies, and either a different partner (e.g., coworkers) or a combination of two or more partners in 9 studies. Thirty-four studies used the Rosenberg Self-Esteem scale (Rosenberg, 1965), 10 studies used one of the Harter Self-Perception Profiles (e.g., Harter, 2012), three studies used one of the Marsh Self-Description Questionnaires (e.g., Marsh, 1990), and the remaining six studies used other measures of self-esteem. Social relationships were assessed using established questionnaires (e.g., Social Support Questionnaire; Sarason, Sarason, & Shearin, 1986) and ad hoc measures of perceived social acceptance, support, and closeness. Table 1 provides detailed information on the relationship measures for each study included in the meta-analysis as well as descriptive statistics and effect sizes.

Preliminary Analyses

Boxplots revealed three outliers for the cross-lagged effect of social relationships on self-esteem and four outliers for the effect of self-esteem on social relationships. However, the trimmed means did not differ by more than 0.10 units from the observed means, suggesting that the data points were not separate from the main cluster (Hodge & Austin, 2004). Therefore, no studies were eliminated based on outlier analyses.

For four of the five effect sizes, Egger's regression tests were nonsignificant, whereas the test was significant for the stability effect of self-esteem ($z = 2.77$, $p < .001$). This indicates that the meta-analytic effect of self-esteem stability may be biased by studies containing smaller samples sizes. However, we believe that the evidence for publication bias in the stability effect of self-esteem is not strong because there was no a priori reason to expect publication bias in this effect. As noted above, frequently the relevant effect size information was reported simply as part of a correlation table, but not relevant to the research questions of the primary studies. In addition, the funnel graphs were roughly symmetrical for all five effect sizes, including self-esteem stability, and did not suggest that effect sizes around zero were underrepresented among studies with small sample sizes (Figure 2). In any case, with regard to the cross-lagged effects—which are the key effect sizes in the present research—there was no evidence for presence of publication bias.

Effect Size Analyses

We computed weighted mean effect sizes for the concurrent (at Time 1) and cross-lagged associations between self-esteem and social relationships as well as for the stability coefficients for each variable (Table 2). Both cross-lagged effects were in the expected direction, of small magnitude, and differed significantly from zero. The cross-lagged effects were of similar size (both were .08). Because the samples on which these two effects were based overlapped partially, no formal test of the difference between the effects is available (see Cohen, Cohen, West, & Aiken, 2003). However, the 95% confidence intervals of the weighted mean effect sizes overlapped strongly, clearly indicating that the two effects did not differ significantly. Thus, the findings suggest that self-esteem and social relationships have reciprocal prospective effects on each other and that the effects are of similar size. Stability coefficients for both variables were

large (.57 for self-esteem and .60 for social relationships), also with overlapping confidence intervals, and the concurrent correlation was of about medium size (.28).

Table 2 also displays the heterogeneity statistic *Q* for each of the effect sizes. Significant *Q* values indicate that the variability in the distribution of the effect size is greater than that which could be attributed to chance alone. The analyses revealed that all meta-analytic effect sizes were heterogeneous (also see Figures 3A and 3B for the distributions of both prospective effects), suggesting that moderating factors account for systematic between-study differences in effect sizes.

Moderator Analyses

For both cross-lagged effects, we tested the same set of moderators (see Table 3 for intercorrelations among moderator variables). We computed both zero-order correlations and mixed-effects meta-regression analyses (to control for multicollinearity among the moderators) between the cross-lagged effect sizes and the moderator variables.[2] Ethnicity (White vs. all others), self-esteem measure (Rosenberg vs. all others), presence of control variables, year at Time 1, age at Time 1, time lag between assessments, and gender were not related to either cross-lagged effect (see Table 4). We graphed the associations between the prospective effects and mean age of the samples to illustrate that the reciprocal effects between self-esteem and social relationships held across the observed age range (see Figures 3A and 3B).

The variables relationship partner (general) and reporter (self vs. other) significantly moderated the effect of self-esteem on social relationships (see Table 4). To further understand the moderating effect of relationship partner, we conducted mixed-effects ANOVAs for both

[2] We could not test sample type or publication type as moderators due to low variance in these variables.

cross-lagged effects (for completeness) using the full set of relationship partner categories. The effect of self-esteem on social relationships was significantly stronger for general others (.14) than for any other relationship partner, but the other relationship partners did not significantly differ from each other (i.e., they displayed overlapping confidence intervals ranging from .05 to .08; see Table 5). This finding suggests that individuals' generalized perceptions of all of their social relationships are more strongly influenced by their self-esteem than are characteristics of specific relationships, such as relationships with parents, peers, and romantic partners. There was also significant moderation of the self-esteem effect on social relationships by relationship reporter such that the effect was significantly stronger for self-reports than for informant-reports (see Table 6), but there were no effects of any of the other moderators on the prospective effect of self-esteem on social relationships (see Table 4).

With regard to the prospective effect of social relationships on self-esteem, there was no significant moderation by any moderator variable tested (see Table 4). Specifically, the effects of all types of relationship partners ranged from .05 to .09 (see Table 5), with the strongest effect being for parents (.09). All confidence intervals overlapped strongly, suggesting that the categories did not differ significantly from each other. Furthermore, Table 6 indicates that the effect of social relationships on later self-esteem was similar in size for both self- and informant-reported social relationships.

In sum, the moderator analyses suggest that the prospective effect of social relationships on self-esteem is robust and holds across samples that differ with regard to ethnicity, assessment of self-esteem, control variables, year of assessment, age, prospective time interval, gender, and type and assessment of social relationships. In contrast, relationship partner and relationship reporter significantly predicted variability in the self-esteem effect on social relationships, but

none of the other moderators were related to the prospective effect of self-esteem on social relationships.

Discussion

The goal of the current study was to comprehensively meta-analyze the available longitudinal data on prospective effects between social relationships and self-esteem. For the social relationships effect on self-esteem, the analyses were based on 48 samples with 46,231 participants, and analyses for the self-esteem effect on relationships were based on 35 samples with 21,995 participants. The samples were comprised of individuals from a variety of countries around the world representing major ethnic groups. Samples also varied considerably in age, ranging from early childhood (age 4 years) to late adulthood (age 76 years). The meta-analytic results supported the assumptions of prominent theories regarding the role of social relationships in the development of self-esteem. More precisely, social relationships had a significant prospective effect on self-esteem that held across all sample characteristics examined (e.g., mean age at Time 1, gender). In addition, there was a significant prospective effect in the reverse direction – that is, from self-esteem to social relationships. This effect was robust across most sample characteristics examined (i.e., we tested the same set of moderators for both directions of effects), with the exception of type of relationship partner (i.e., the effect was stronger for general assessments of all relationships compared to assessments of specific relationships) and type of relationship reporter (i.e., the effect was stronger for self-reported compared to informant-reported relationship characteristics).

Implications of the Findings

Effect of social relationships on self-esteem. The meta-analytic finding that social relationships have a prospective effect on self-esteem provides support for central theories in the

field of self-esteem, such as sociometer theory (Leary, 2004, 2012; Leary & Baumeister, 2000), reflected appraisals theory (Cooley, 1902; Mead, 1934), and attachment theory (Bowlby, 1973, 1982, 1988). As outlined in the introduction, all of these theories highlight the key role of positive social relationships, social support, and social acceptance in shaping the development of self-esteem in all phases of the human lifespan. The present finding is important because previous research had yielded an inconsistent pattern of results. While some primary studies reported supporting evidence, for example with regard to parent and peer relationships in childhood (Harris et al., 2017; Orth, 2018), peer relationships in adolescence (Gruenenfelder-Steiger et al., 2016; Reitz et al., 2016), and romantic relationships in adulthood (Luciano & Orth, 2017; Orth et al., 2015; Wagner et al., 2015), other studies had failed to find a prospective effect of social relationships on self-esteem (Harris et al., 2015b; Marshall et al., 2014; Mund et al., 2015; Orth et al., 2012). Of note, the present meta-analytic estimate is based on longitudinal data from a large set of studies (specifically, 48 studies with more than 46,000 participants), which ensured high precision of the estimate. Moreover, the fact that the effect did not differ significantly between studies with different sample characteristics further strengthens confidence in the robustness and generalizability of the relationship effect on self-esteem.

There is currently no integrated theory outlining which social relationships might be most impactful for self-esteem and at which ages. The present findings offer no evidence that relationships become less important for self-esteem as people age (Figure 3). While a common assumption is that the significance of specific relationship partners shifts across the lifespan (i.e., beginning with parents in childhood, transitioning to seeking peer approval in adolescence, and shifting to valuing high regard by romantic partners in adulthood; e.g., Bornstein, Jager, & Steinberg, 2012), it is also possible that past significant relationships do not decline in

importance as individuals go through life and that experiences in relationships accumulate to have enduring effects across one's life (e.g., Fraley, Roisman, & Haltigan, 2013; Roberts & Bengtson, 1993). For example, a break-up with a long-term romantic partner continues to predict self-esteem up to one year after the relationship has ended (Luciano & Orth, 2017). While some researchers have begun to test the differential importance of certain relationship partners within developmental periods (e.g., Birkeland, Breivik, & Wold, 2014), the field is in need of more empirical work on age-related changes in the influence of specific relationships.

Effect of self-esteem on social relationships. In terms of the prospective effect of self-esteem on social relationships, the present research supports the assumptions of Murray and colleagues' (2000) risk regulation model, the self-broadcasting perspective (Srivastava & Beer, 2005; Zeigler-Hill et al., 2013), and the relationship behaviors perspective. As described in the introduction, all of these theoretical perspectives suggest that people's levels of self-esteem have consequences for their social relationships. Again, this meta-analytic result is important because prior research had yielded inconsistent findings. While some primary studies suggested that self-esteem leads to positive change in relationships with parents (Brummelman et al., 2015), peers (Marshall et al., 2014), and romantic partners (Luciano & Orth, 2017; Orth et al., 2012), other studies did not find evidence of a self-esteem effect on relationships (Harris et al., 2015; Klima & Repetti, 2008; Mund et al., 2015). In addition, we extended the findings of Cameron and Granger (2018) by examining prospective effects that were controlled for prior levels of the outcomes. Again, the meta-analytic estimate found in the present study was based on a large number of studies (specifically, 35 studies with almost 22,000 participants), allowing for high precision of the estimate.

Yet, it is important to note that the effect of self-esteem on relationships was moderated by the type of relationship reporter (i.e., self vs. informant). While the self-esteem effect was .10 when relationships were reported by target participants, the effect was smaller (.04) and nonsignificant in the group of studies that used informant-reports (e.g., observers or the relationship partner) to assess relationships. One possible interpretation is that the effect is nonexistent when relationships are assessed by third-party reports, which might provide for less subjective, and potentially more valid, information on the quality of relationships. However, we caution against this interpretation for several reasons. First, the *p* value for the effect of self-esteem on informant-rated relationships was marginally significant ($p = .097$). Considering this along with the relatively low number of studies ($k = 7$), it is possible that the effect would be significant if data from a larger number of studies were available. Second, although a prospective effect of .04 can be considered a small effect, it was not zero and was still in the expected direction. Third, six of the seven studies that used informant ratings relied on classmates' sociometric ratings of the target's popularity or acceptance. Thus, it is possible that the smaller effect size in this group of studies resulted from particularities of the specific method of assessment (i.e., sociometric ratings) and does not reflect the general size of the self-esteem effect when assessed with other types of informant ratings, peer report, or objective measures of relationship quality. Fourth, it is important to emphasize that the significant effect of self-esteem on later self-reported social relationships cannot simply be attributed to shared method variance because this is already controlled for in the autoregressive effect (more precisely, most of the self-report bias in the Time 2 relationship variable is controlled for by the self-report bias included in the Time 1 relationship variable). In sum, the current meta-analysis suggests that self-esteem influences targets' ratings of social relationships over time, but more longitudinal

studies are needed to understand whether the effect holds across partners' ratings of social relationships.

In the introduction, we described a *relationship behaviors perspective* proposing that people's concrete actions might explain how high versus low self-esteem might lead to positive versus negative changes in people's relationships. For example, using accommodating and constructive strategies in resolving interpersonal conflicts, showing physical affection, and exerting other positive behaviors are associated with self-esteem (Diamond et al., 2010), and they also predict changes in both relationship satisfaction (Johnson et al., 2005) and self-esteem (Roberts & Bengtson, 1993). While it was not the goal of the current meta-analysis to identify mediating mechanisms of the prospective effects (and, moreover, the primary studies included in the meta-analysis would not have typically provided data related to potential mediators), we believe this is an important direction for future research. In addition to testing for mediation of the effect of self-esteem on social relationships by accommodating, constructive, and affectionate relationship behaviors, we encourage researchers to explore specific cues broadcast by individuals with high (or low) self-esteem that impact the functioning of close relationships. Some possibilities include direct eye contact (Zeigler-Hill et al., 2013), speaking confidently (Harter, 2006), attentive listening, and supportive elaboration upon feelings shared or memories recalled by relationship partners (Fivush, Haden, & Reese, 2006).

Reciprocity of the link between social relationships and self-esteem. The average size of both prospective effects—that is, the relationship effect on self-esteem and the self-esteem effect on relationships—was not large, but estimated at .08. However, it is important to note that the effect size conventions by Cohen (1992), such as those for correlation coefficients (e.g., with .10 indicating a small effect), do not apply to prospective regression coefficients that control for

the stability of the outcome variables (Adachi & Willoughby, 2015). Rather, effect sizes of .08 may be practically meaningful when considering the context of the research, as recommended by Fritz, Morris, and Richler (2012). Importantly, the stabilities of both constructs were quite substantial (i.e., .57 for self-esteem and .60 for social relationships), and previous levels of psychological outcomes are often the strongest predictors of later assessments of the same constructs (Adachi & Willoughby, 2015). Also, outcomes such as self-esteem and relationship characteristics are influenced by a multitude of factors (e.g., genetics, economic factors, physical health, other personality characteristics; see Bradbury, Fincham, & Beach, 2000; Donnellan, Trzesniewski, & Robins, 2011); thus, it is not surprising that the prospective effects were not large. Moreover, it is useful to note that the magnitude of the present effect sizes is similar to effect sizes determined in meta-analyses of prospective effects in other fields such as positive emotionality and depression (Khazanov & Ruscio, 2016), peer victimization and internalizing problems (Reijntjes, Kamphuis, Prinzie, & Telch, 2010), and self-esteem, depression, and anxiety (Sowislo & Orth, 2013). Finally, the reciprocity of the prospective effects between self-esteem and social relationships potentiates the occurrence of repetitive, cumulative effects between the two constructs. Thus, even small effects can result in a larger impact over the life course. Taking all of this into account, we argue that the prospective effects between social relationships and self-esteem are larger than the “small” effects discussed by Cohen (1992) and that they have practical significance.

The prospective effects between social relationships and self-esteem both had a positive sign, indicating a positive feedback loop between the constructs. We believe that this pattern of results has two important implications. First, the meta-analytic estimates of the effect sizes take on even more practical significance, because the positive feedback loop implies that relationship

effects and self-esteem effects accumulate over time. Given that the effects did not become smaller with increasing age, the findings suggest that the aggregated effects could ultimately be substantial as people go through life. Specifically, positive relationships with parents may strengthen self-esteem among children, which leads to more positive peer relationships in adolescence, which may further strengthen the self-esteem of the emerging adult, and so on. Second, the positive feedback loop is theoretically important because it supports the corresponsive principle of personality development (Roberts, Wood, & Caspi, 2008). According to this principle, life experiences often deepen those personality characteristics that lead individuals to these experiences in the first place, a pattern that has been observed with regard to Big Five traits and social relationships (Mund & Neyer, 2014), work experiences (Roberts, Caspi, & Moffitt, 2003) and life events (Lüdtke, Roberts, Trautwein, & Nagy, 2011), for example. It should also be noted that the positive feedback loop between relationships and self-esteem also implies that there may be a vicious cycle for those children, adolescents, and adults who develop low self-esteem or poor social relationships. For example, children and adolescents with low self-esteem are likely to experience less social support and more negative relationship experiences over time, which in turn may compromise their self-esteem even further. This possibility emphasizes the importance of clinical interventions that can offset the feedback loop for individuals in either of these groups. Fortunately, most individuals gradually improve their self-esteem as they grow up and become adults (Orth et al., 2018), so this normative upward trend in self-esteem from childhood to adulthood may also be beneficial for mean-level trends in the quality of people's social relationships.

Even though the prospective effects were of the same magnitude in both directions (i.e., from relationships to self-esteem, and vice versa), a model-based meta-analytic approach (e.g.,

see Becker, 2009) would have permitted a more formal comparison of the effect sizes through the use of path constraints. In addition, the mediating mechanisms explaining the two effects could be completely different. Therefore, two directions for future research will be to use structural equation modeling in the estimation of meta-analytic effects between self-esteem and relationships and to identify specific actions people may take that foster the self-esteem of their partners, children, friends, coworkers, and other relationship partners. Referring back to prominent theories on self-esteem development, it is likely that actions that signal approval (versus disapproval), availability for support provision, or ability to be a secure base are important for fostering self-esteem in interaction partners. Note that such behaviors likely have nuanced associations with psychological outcomes. For example, self-esteem is not necessarily raised by direct, positive feedback, as suggested by the finding that praise is related to *lower* self-esteem when it is exaggerated (Brummelman, Nelemans, Thomaes, & Orobio de Castro, 2017). Similarly, emotional support is most effective at reducing anxiety when unnoticed by the recipient (Bolger, Zuckerman, & Kessler, 2000). Rather, indirect feedback such as making time for one's spouse, offering validating comments through verbal and nonverbal confirmations of experiences shared by one's friend, and showing interest in and excitement for the activities of one's child, are likely to bolster targets' self-esteem (also see Brummelman et al., 2017 for similar arguments). Therefore, we recommend careful hypothesis-formation and creative designs of both observational and experimental studies to form a potentially rich database of behavioral mechanisms by which relationship partners influence an individual's self-esteem development.

Limitations

Even though the meta-analysis was based on longitudinal data, one limitation is that that the analyses do not allow for strong causal conclusions about the link between social

relationships and self-esteem. The reason is that the prospective effects between the constructs could be confounded by third variables that were not controlled for (Finkel, 1995; Little, Preacher, Selig, & Card, 2007). For example, stressful life experiences such as unemployment and chronic diseases could influence both people's self-esteem (Orth & Luciano, 2015; Tetzner, Becker, & Baumert, 2016) and the quality of their relationships (Bradbury et al., 2000) and possibly account for the link between the constructs. Nevertheless, longitudinal analyses are useful because they can provide information about whether the data are consistent with a causal model by ruling out some (but not all) competing hypotheses. Moreover, it is worth emphasizing that all prospective effects examined in this research controlled for previous levels of the outcomes, which substantially improved the validity of the conclusions.

Although this meta-analysis was based on data from more than 50 studies, ideally more studies would have been available that focused on self-esteem in adult romantic relationships. Also, there is virtually no research on self-esteem in the context of parent and peer relationships in adulthood. Moreover, relatively few studies used measures other than self-report to assess relationships characteristics. Thus, it would be desirable if future research in this field would utilize informant reports (e.g., peer and partner ratings), behavioral observation, and objective measures to collect information about the quality of social relationships. Also, future research on the link between self-esteem and relationships should more often focus on adult samples. For example, researchers could examine whether friendships can buffer the decline of self-esteem in old age and whether low self-esteem has detrimental consequences for social inclusion and social support in old age (see Orth et al., 2018).

It is possible that more studies would have been included in the present meta-analysis if efforts had been made to collect unpublished data from sources other than dissertations (e.g.,

publishing announcements on relevant listservs or websites, contacting authors in the field for their unpublished data). However, these steps were not taken, and attempts to collect unpublished data were limited to the search for dissertations. Thus, generalizability of the results may be restricted to published studies on the associations of interest rather than the associations themselves, despite the nonsignificant tests for publication bias.

A strength of the meta-analytic method is the aggregation of data across a heterogeneous set of studies, yielding robust estimates of the effects of interest due to the peculiarities of individual studies cancelling each other out. However, critics have argued that aggregation across a mix of individual studies can also be a weakness if individual study findings are incomparable (see Borenstein et al., 2009; Lipsey & Wilson, 2001). In the present meta-analysis, the individual studies measured a range of relationship characteristics (e.g., support, closeness, satisfaction). The decision to include this set of relationship variables was based on the assumption that all of these variables are indicators of the same broad construct, that is, quality of social relationships. Researchers have proposed that one central principle organizes many concepts studied in relationship science (e.g., trust, acceptance, support, perceived regard; Reis, 2007). Furthermore, even when different relationship indicators (e.g., social acceptance, relationship quality) are examined individually, they show similar concurrent associations with self-esteem as an aggregate score of multiple relationship indicators (Cameron & Granger, 2018). Still, different relationship characteristics could have different effects on self-esteem over time. For example, satisfaction with a relationship may have a different meaning than perceived support from a partner and, consequently, the prospective effect sizes could differ between the two relationship characteristics. Testing for moderation by relationship characteristic was not possible in the present meta-analysis due to insufficient power (we coded 15 different types of

relationship characteristics). However, differential effects of social relationship variables on self-esteem is a possibility that should be explored by future research and further emphasizes the need for integrative theoretical frameworks in both the self-esteem and relationship literatures (also see Reis, 2007; Reis, Collins, & Berscheid, 2000; Robins & Trzesniewski, 2005).

Conclusion

This meta-analysis provides the first synthesis of research findings on a key question in the field of self-esteem research – that is, whether and to what extent a person's social relationships influence his or her self-esteem. Although many classic and contemporary theoretical perspectives have discussed the effect of close relationships on the development of self-esteem, and although assumptions about the effect are widespread in the lay public, no systematic review or meta-analytic synthesis was available that provides firm knowledge on whether social relationships actually influence self-esteem, how strong the effect is, and whether the effect is moderated by characteristics such as age, gender, and type of relationship. Consequently, the meta-analytic findings advance the field, by providing robust support for this central claim of theories on self-esteem.

Moreover, the present meta-analysis provides robust evidence with regard to questions about the reverse direction of the link between social relationships and self-esteem – that is, whether and to what extent people's levels of self-esteem influence the quality of their social relationships. The present findings suggest that high self-esteem does lead to improvements in a person's social relationships. Moreover, the weighted mean effects were of similar size in both directions, suggesting that the link between social relationships and self-esteem is truly reciprocal in all developmental stages across the life span, reflecting a positive feedback loop between the constructs.

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*Asterisks indicate studies included in the meta-analysis.

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Table 1

Sample Characteristics and Effect Sizes for Studies Included in the Meta-Analysis

	Sample characteristics								Effect sizes					
Study	*N*	Proportion female	Mean age (years)	Time lag (years)	Relation-ship partner	Relation-ship reporter	Measure of self-esteem	Measure of relationship characteristic	$r_{REL,SE1}$	$r_{REL,SE2}$	$\beta_{REL \rightarrow SE}$	$\beta_{SE \rightarrow REL}$	$\beta_{SE \rightarrow SE}$	$\beta_{REL \rightarrow REL}$
Berenson, Crawford, Cohen, & Brook (2005), males	353	.00	16.2	6.0	Parent	Informant	Other	Acceptance	.21			.06	.38	
Berenson, Crawford, Cohen, & Brook (2005), females	361	1.00	16.2	6.0	Parent	Informant	Other	Acceptance	.20			.06	.31	
Borelli & Prinstein (2006)	478	.51	12.7	0.9	Peer	Multiple	Harter	Low criticism & preference averaged	.17		.03			.48
Boutelle, Eisenberg, Gregory, & Neumark-Sztainer, (2009), males	1,130	.00	14.3	5.0	Parent	Self	Rosenberg	Connectedness			.05	.07		
Boutelle, Eisenberg, Gregory, &	1,386	1.00	14.3	5.0	Parent	Self	Rosenberg	Connectedness			.07	.05		

	Sample characteristics								Effect sizes					
Study	*N*	Proportion female	Mean age (years)	Time lag (years)	Relation-ship partner	Relation-ship reporter	Measure of self-esteem	Measure of relationship characteristic	$r_{REL,SE1}$	$r_{REL,SE2}$	$\beta_{REL \rightarrow SE}$	$\beta_{SE \rightarrow REL}$	$\beta_{SE \rightarrow SE}$	$\beta_{REL \rightarrow REL}$
Neumark-Sztainer, (2009), females														
Brummelman et al. (2015), fathers	565	.54	9.6	0.6	Parent	Self	Harter	Warmth			.08	.11		
Brummelman et al. (2015), mothers	565	.54	9.6	0.6	Parent	Self	Harter	Warmth			.06	.06		
Chen, He, & Li (2004)	506	.51	12.4	2.0	Peer	Informant	Harter	Preference	.19	.20	.03	.11	.34	.50
Doyle & Markiewicz (2005)	175	.63	13	2.0	Parent	Self	Marsh	Warmth, low anxiety, & low avoidance averaged	.34			.18		
Fincham & Bradbury (1993), wives	130	1.00	32.0	1.0	Romantic partner	Self	Rosenberg	Relationship satisfaction	.22					
Fincham & Bradbury (1993), husbands	130	.00	34	1.0	Romantic partner	Self	Rosenberg	Relationship satisfaction	.31					
Foynes, Smith, & Shipherd (2015), males	1,624	.52	20.3	11.0	General others	Self	Rosenberg	Support	.44			.03	.30	

	Sample characteristics								Effect sizes					
Study	*N*	Proportion female	Mean age (years)	Time lag (years)	Relation-ship partner	Relation-ship reporter	Measure of self-esteem	Measure of relationship characteristic	$r_{REL,SE1}$	$r_{REL,SE2}$	$\beta_{REL \rightarrow SE}$	$\beta_{SE \rightarrow REL}$	$\beta_{SE \rightarrow SE}$	$\beta_{REL \rightarrow REL}$
Foynes, Smith, & Shipherd (2015), females	1,624	.52	20.3	11.0	General others	Self	Rosenberg	Support	.41			-.04	.18	
Gest, Domitrovich, & Welsh (2005)	400	.44	9	0.6	Peer	Self	Harter	Social self-concept	.52	.54	.17	.18	.56	.59
Goodvin, Meyer, Thompson, & Hayes (2008)	33	.48	4.1	1.0	Parent	Observer	Other	Attachment	.06		.30			.52
Gupta et al. (2013), Americans	446	.00	11.4	1.0	Peer	Self	Rosenberg	Support	.19	.31	.16	.05	.57	.44
Gupta et al. (2013), Chinese	368	.00	12.2	1.0	Peer	Self	Rosenberg	Support	.21	.23	.08	.06	.51	.34
Harris et al. (2015), Americans	451		13	1.0	Parent	Self	Rosenberg	Closeness	.30	.30	.07	.05	.57	.66
Harris et al. (2015), Germans + Gruenenfelder-Steiger et al. (2016)	2,054		12	1.0	Parent	Multiple	Rosenberg	Parent closeness, subjective, and objective peer acceptance (averaged)	.33	.31	.08	.10	.57	.59

	Sample characteristics								Effect sizes					
Study	*N*	Proportion female	Mean age (years)	Time lag (years)	Relation-ship partner	Relation-ship reporter	Measure of self-esteem	Measure of relationship characteristic	$r_{REL,SE1}$	$r_{REL,SE2}$	$\beta_{REL \rightarrow SE}$	$\beta_{SE \rightarrow REL}$	$\beta_{SE \rightarrow SE}$	$\beta_{REL \rightarrow REL}$
Hutteman, Nester, Wagner, Egloff, & Back (2015)	876	.77	16.0	0.1	General others	Self	Other	Social inclusion	.25	.28	.10	-.01	.70	.77
Johnson (2013)	13,401	.49	21.8	6.0	Parent	Self	Rosenberg	Closeness				.19		
Juang, Syed, & Cookston (2012)	276	.57	14.6	1.0	Parent	Self	Rosenberg	Low conflict	.06	.26	.08	.15	.46	.39
Kakihara, Tilton-Weaver, Kerr, & Stattin (2010)	1,022	.47	14.3	1.0	Parent	Self	Rosenberg	Connectedness	.40			.07	.63	
Kinnunen, Feldt, Kinnunen, & Pulkkinen (2008)	213	.53	36.0	6.0	General others	Self	Rosenberg	Support	.14	.27	.21	.10	.60	.56
Kipp & Weiss (2015)	174	1.00	13.5	0.6	Other	Self	Harter	Coach & teammate relatedness (averaged)	.07			.11	.51	.53
Kistner, David, & Repper (2007)	670	.55	9.4	0.5	Peer	Informant	Harter	Liking, low disliking, & acceptance (averaged)	.14	.10	.02	.06	.40	.73

	Sample characteristics								Effect sizes					
Study	*N*	Proportion female	Mean age (years)	Time lag (years)	Relation-ship partner	Relation-ship reporter	Measure of self-esteem	Measure of relationship characteristic	$r_{REL,SE1}$	$r_{REL,SE2}$	$\beta_{REL \rightarrow SE}$	$\beta_{SE \rightarrow REL}$	$\beta_{SE \rightarrow SE}$	$\beta_{REL \rightarrow REL}$
Klima & Repetti (2008)	247	.47	9.5	2.0	Other	Multiple	Harter	Classmate acceptance & friend support (averaged)	.35	.31	-.01	.11	.55	.46
Krause (2009)	1,024	.63	76.6	3.0	Other	Self	Rosenberg	Church members & secular support (averaged)				.06		
Kuster et al. (2013), dataset 2	600	.50	34.6	1.0	Other	Self	Rosenberg	Coworkers & supervisor support (averaged)	.22		.10	-.02	.74	.42
Laursen, Furman, & Mooney (2006)	199	.50	15.3	2.0	Other	Self	Harter	Mother, close friend, romantic partner support & social acceptance (averaged)	.26	.35	.10	.10	.60	.58
Lee, Dickson, Conley, & Holmbeck (2014)	1,126	.72	18.5	0.3	General others	Self	Rosenberg	Support	.64	.66	.22	.09	.71	.67
Lemay & Ashmore (2006)	172	.53	19.5	0.2	Peer	Self	Rosenberg	Social inclusion & time spent socializing (averaged)	.21			.12	.82	.73

	Sample characteristics								Effect sizes					
Study	*N*	Proportion female	Mean age (years)	Time lag (years)	Relation-ship partner	Relation-ship reporter	Measure of self-esteem	Measure of relationship characteristic	$r_{REL,SE1}$	$r_{REL,SE2}$	$\beta_{REL \rightarrow SE}$	$\beta_{SE \rightarrow REL}$	$\beta_{SE \rightarrow SE}$	$\beta_{REL \rightarrow REL}$
Lönnqvist, Leikas, Mähönen, & Jasinskaja-Lahti (2015)	225	.72	45.5	0.6	General others	Self	Rosenberg	Support	.35	.34	.13	.05	.54	.38
Marks, Lambert, Jun, & Song (2008), males	446	.00	45.0	6.0	General others	Self	Rosenberg	Relationship quality	.05			.10	.34	
Marks, Lambert, Jun, & Song (2008), females	614	1.00	45.0	6.0	General others	Self	Rosenberg	Relationship quality	.04			-.04	.37	
Marshall et al. (2014)	793	.49	13.4	1.0	General others	Self	Rosenberg	Support quality			.13	.01		
Moreira & Telzer (2015)	338	.64	18.4	0.3	Other	Self	Rosenberg	Family cohesion	.39	.40	.11	.00	.74	.77
Oliver et al. (2011)	106	.46	12.0	2.0	Other	Self	Marsh	Quality of family life	.53	.56	.08	.13	.73	.63
Orth et al. (2012)	1,448	.57	49.3	3.0	Romantic partner	Self	Rosenberg	Relationship satisfaction			.05	.01		
Orth, Robins, Widaman, & Conger (2014)	674	.50	10.4	2.0	General others	Self	Marsh	Support	.41		.21			

	Sample characteristics								Effect sizes					
Study	*N*	Proportion female	Mean age (years)	Time lag (years)	Relation-ship partner	Relation-ship reporter	Measure of self-esteem	Measure of relationship characteristic	$r_{REL,SE1}$	$r_{REL,SE2}$	$\beta_{REL \rightarrow SE}$	$\beta_{SE \rightarrow REL}$	$\beta_{SE \rightarrow SE}$	$\beta_{REL \rightarrow REL}$
Park & Epstein (2013), males	1,584	.00	12.0	1.0	Parent	Self	Other	Relationship quality				.03		
Park & Epstein (2013), females	1,582	1.00	12.0	1.0	Parent	Self	Other	Relationship quality				.07		
Pinquart & Fröhlich (2009)	353	.43	54.0	0.8	General others	Self	Rosenberg	Availability of social support	.52			.32	.53	
Reitz et al. (2016)	1,057	.47	12.7	1.0	Peer	Multiple	Rosenberg	Perceived, in-group, and out-group popularity (averaged)	.14	.09	.07	.01	.50	.32
Reynolds (2010), Study 2	912	1.00	11.5	1.0	Peer	Informant	Harter	Popularity	.08			-.01	.54	
Schaffhuser et al. (2014), males	141	.00	50.0	2.0	Romantic partner	Self	Rosenberg	Relationship satisfaction	.29	.35	.01	.13	.63	.79
Schaffhuser et al. (2014), females	141	1.00	50.0	2.0	Romantic partner	Self	Rosenberg	Relationship satisfaction	.17	.27	.09	.08	.76	.83
Schindler (2010)	538	1.00		5.0	Other	Self	Rosenberg	Engagement with child & low disagreement with child's mother (averaged)	.20	.18	.08	.10	.61	.49

	Sample characteristics								Effect sizes					
Study	*N*	Proportion female	Mean age (years)	Time lag (years)	Relation-ship partner	Relation-ship reporter	Measure of self-esteem	Measure of relationship characteristic	$r_{REL,SE1}$	$r_{REL,SE2}$	$\beta_{REL \rightarrow SE}$	$\beta_{SE \rightarrow REL}$	$\beta_{SE \rightarrow SE}$	$\beta_{REL \rightarrow REL}$
Schmidt, Blum, Valkanover, & Conzelmann (2015), males	230	.00	11.9	0.2	General others	Self	Rosenberg	Acceptance	.11	.27	.10	.13	.64	.67
Schmidt, Blum, Valkanover, & Conzelmann (2015), females	198	1.00	11.8	0.2	General others	Self	Rosenberg	Acceptance	.11	.27	.10	.12	.64	.67
Smokowski, Bacallao, Cotter, & Evans (2015)	2,617	.54	12.7	1.0	Parent	Self	Rosenberg	Low conflict & support (averaged)	.38	.36	.06	.10	.39	.48
Vanhalst, Luyckx, Scholte, Engels, & Goossens (2013)	526	.63	15.0	1.0	Peer	Self	Rosenberg	Acceptance	.53	.54	.08	.04	.68	.64
Yeh & Lempers (2004)	374	.50	12.4	1.0	Other	Self	Rosenberg	Sibling & best friend positive relationships (averaged)	.33	.32	.05	.04	.71	.67

Note. *N* = sample size, *r* = Pearson's correlation, β = standardized regression coefficient, REL = relationship, SE = self-esteem. $r_{REL, SE1}$ = concurrent correlation between social relationships and self-esteem at Time 1; $r_{REL, SE2}$ = concurrent correlation between social

relationships and self-esteem at Time 2. Other relationship partners include any partner different from parents, peers, romantic partners, or general others as well as a combination of two or more partners.

Table 2

Summary of Effect Sizes for Concurrent and Longitudinal Associations between Social Relationships and Self-Esteem

Effect	*k*	*N*	Weighted mean effect size	95% CI	Heterogeneity		
					Q	τ^2	I^2
$r_{REL,SE}$	43	24,198	.28*	[.23, .33]	716.68*	.029	94.1
Prospective effects							
REL→SE	48	46,231	.08*	[.05, .10]	257.04*	.005	81.7
SE→REL	35	21,995	.08*	[.06, .10]	74.26*	.002	54.2
Stability effects							
SE	37	22,578	.57*	[.51, .61]	1,112.67*	.050	96.8
REL	30	15,780	.60*	[.54, .64]	637.60*	.042	95.5

Note. Computations were made with random-effects models. $r_{REL,SE}$ = concurrent correlation between social relationships (REL) and self-esteem (SE) at Time 1. *k* = number of samples. *N* = total number of participants in the *k* samples. CI = confidence interval. *Q* = statistic used in heterogeneity test; τ^2 = estimated amount of total heterogeneity; I^2 = ratio of total heterogeneity by total variability (given in percent).

*$p < .05$.

Table 3

Intercorrelations among Moderators

	1	2	3	4	5	6	7	8	9
1. Mean age (years)	-	.21	.03	.22	.30*	-.05	.46*	-.05	-.12
2. Time lag (years)		-	-.01	.28*	.02	-.03	.17	.36*	-.50*
3. Proportion female			-	.03	-.03	.05	-.09	.06	.08
4. Relationship partner				-	.28*	.02	.24	.03	.00
5. Relationship reporter					-	-.10	.44*	.30*	.23
6. Ethnicity						-	-.06	.30*	-.07
7. Measure of self-esteem							-	.12	-.09
8. Presence of control variables								-	.06
9. Year at Time 1									-

Note. The intercorrelations are based on $k = 53$ samples.

*$p < .05$.

Table 4

Simple Correlations and Mixed-Effects Meta-Regression Coefficients for Moderators Predicting Prospective Effects between Social Relationships and Self-Esteem

Moderator	Prospective effect of social relationships on self-esteem (k = 48, N = 46,231)				Prospective effect of self-esteem on social relationships (k = 35, N = 21,995)			
	r	*p*	β	*p*	*r*	*p*	β	*p*
Ethnicity (White)	.05	.77	.12	.50	-.09	.62	-.11	.58
Self-esteem measure (Rosenberg)	-.21	.15	-.09	.64	.02	.93	.09	.65
Presence of control variables	-.05	.76	-.02	.93	.05	.78	-.16	.47
Year at Time 1	.12	.41	.09	.68	.06	.72	-.10	.65
Age at Time 1	-.20	.20	-.10	.60	-.06	.76	-.20	.39
Time lag	-.24	.10	-.07	.80	.03	.89	-.02	.93
Gender (% female)	-.12	.43	-.13	.44	.02	.89	-.02	.88
Relationship partner[a]	-.17	.24	-.21	.29	.37*	.03	.43*	.01
Relationship reporter[b]	.05	.74	.16	.43	.17	.32	.41*	.03

Note. For prospective effect of social relationships on self-esteem, R^2 = .27, Q_{model} = 3.83 (df = 5, p = .57), $Q_{residual}$ = 39.89 (df = 39, p = .43). For prospective effect of self-esteem on social relationships, R^2 = .50, Q_{model} = 15.07 (df = 5, p = .01), $Q_{residual}$ = 27.15 (df = 26, p = .40). k = number of samples. Q = statistic used in heterogeneity test.

[a] 1 = general, 0 = other. [b] 1 = self, 0 = other.

*$p < .05$.

Table 5

Analysis of Variance of Both Prospective Effects by Relationship Partner

Relationship partner	*k*	*N*	Weighted mean effect size	95% CI	Heterogeneity (*Q*)
	Prospective Effect of Social Relationships on Self-Esteem (*k* = 48)				
Parent	15	27,522	.09*	[.06, .12]	9.45
Peer	9	5,057	.07*	[.03, .11]	5.72
Romantic	3	1,730	.05	[-.04, .13]	1.34
General	12	8,322	.07*	[.03, .10]	24.57*
Combination	9	3,600	.06*	[.01, .11]	4.13
	Prospective Effect of Self-Esteem on Social Relationships (*k* = 35)				
Parent	9	9,077	.07*	[.04, .10]	2.20
Peer	8	4,451	.07*	[.03, .10]	9.11
Romantic	3	1,730	.05	[-.02, .12]	0.39
General	8	4,335	.14*	[.10, .18]	17.18*
Combination	7	2,402	.08*	[.03, .12]	2.21

Note. For the prospective effect of social relationships on self-esteem: Q_{model} = 45.21 (*df* = 43, *p* = .38); $Q_{residual}$ = 2.27 (*df* = 4, *p* = .69). For the prospective effect of self-esteem on social relationships: Q_{model} = 31.09 (*df* = 30, *p* = .41); $Q_{residual}$ = 10.23* (*df* = 4, *p* = .04). *k* = number of samples. *N* = total number of participants in the *k* samples. CI = confidence interval.

*$p < .05$.

Table 6

Analysis of Variance of Both Prospective Effects by Relationship Reporter

Relationship reporter	*k*	*N*	Weighted mean effect size	95% CI	Heterogeneity (*Q*)
	Prospective Effect of Social Relationships on Self-Esteem (*k* = 48)				
Self	40	40,071	.08*	[.06, .10]	2.79
Other	8	6,160	.07*	[.02, .11]	41.01
	Prospective Effect of Self-Esteem on Social Relationships (*k* = 35)				
Self	28	16,950	.10*	[.07, .12]	26.21
Other	7	5,045	.04	[-.01, .08]	3.85

Note. For the prospective effect of social relationships on self-esteem: Q_{model} = 43.79 (*df* = 46, *p* = .57); $Q_{residual}$ = .09 (*df* = 1, *p* = .77). For the prospective effect of self-esteem on social relationships: Q_{model} = 30.06 (*df* = 33, *p* = .61); $Q_{residual}$ = 5.30* (*df* = 1, *p* = .02). *k* = number of samples. *N* = total number of participants in the *k* samples. CI = confidence interval.

*$p < .05$.

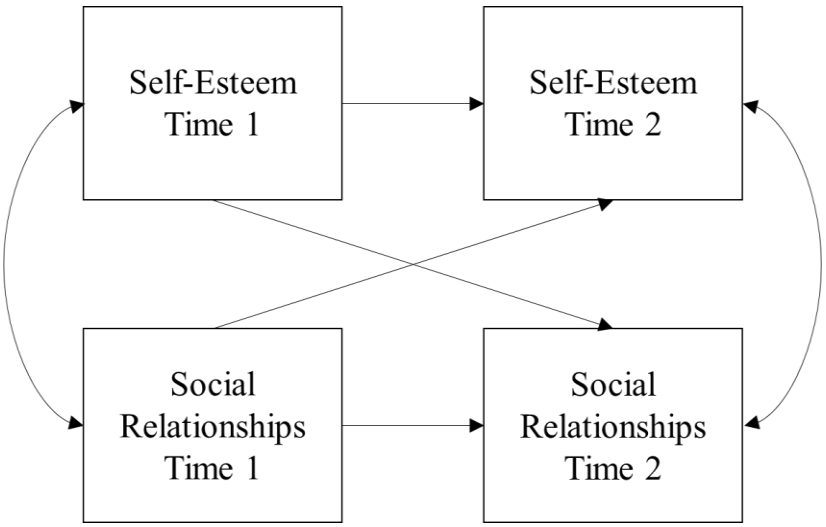
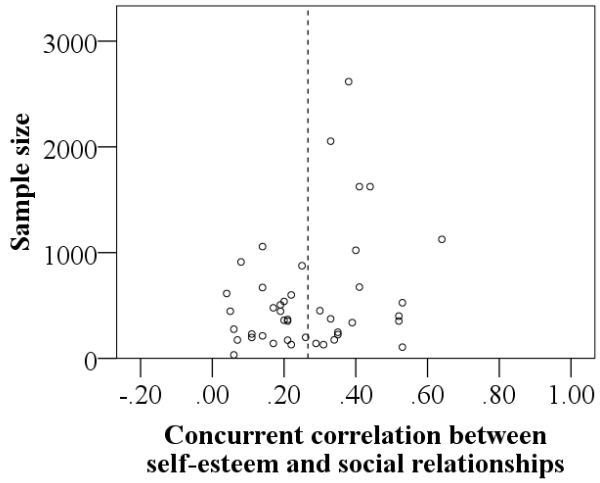


Figure 1. Conceptual model of coefficients meta-analyzed in the present research. Specifically, the present research examined the prospective effect of social relationships (Time 1) on subsequent self-esteem (Time 2) after controlling for previous levels of self-esteem (Time 1); the prospective effect of self-esteem (Time 1) on social relationships (Time 2) after controlling for previous characteristics of social relationships (Time 1); stability effects within the two constructs (e.g., the prospective effect of self-esteem at Time 1 on self-esteem at Time 2); and the concurrent correlation between social relationships and self-esteem at Time 1.

A


Sample size
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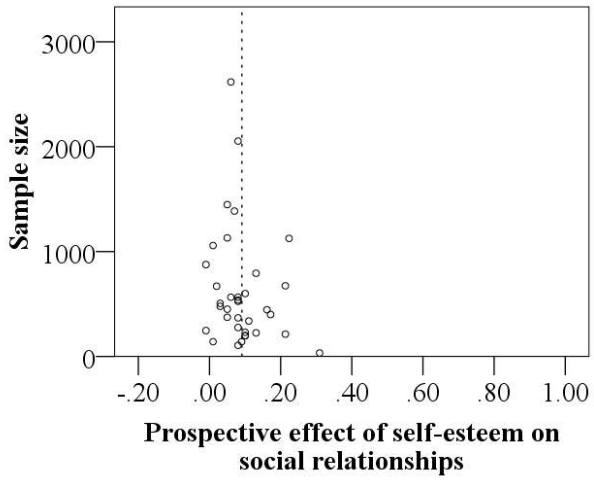
2000
1000
0
-.20
.00
.20
.40
.60
.80
1.00
Concurrent correlation between self-esteem and social relationships

B


Sample size
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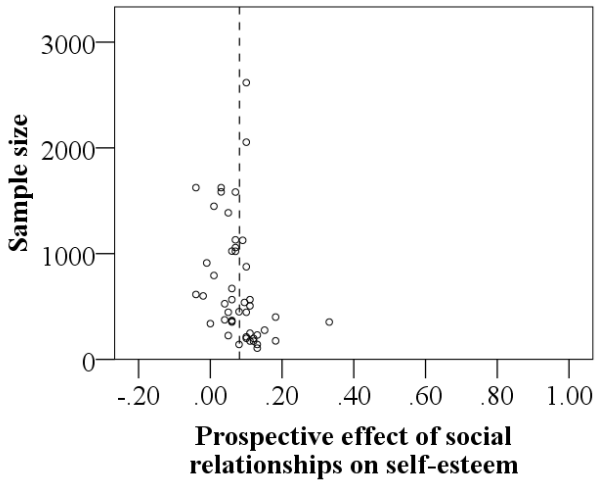
2000
1000
0
-.20
.00
.20
.40
.60
.80
1.00
Prospective effect of self-esteem on social relationships

C


Sample size
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2000
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0
-.20
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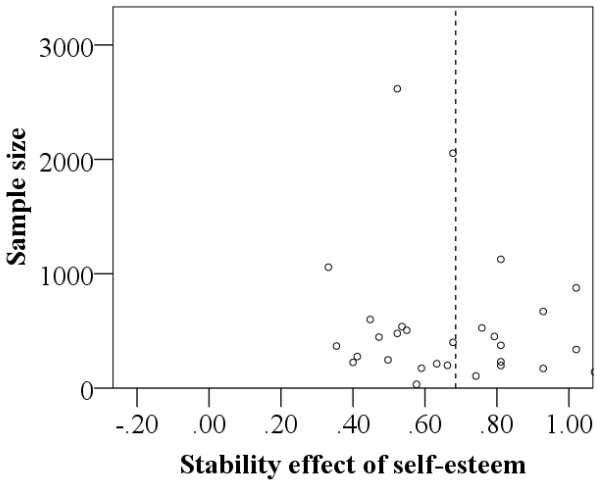
.20
.40
.60
.80
1.00
Prospective effect of social relationships on self-esteem

D


Sample size
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2000
1000
0
-.20
.00
.20
.40
.60
.80
1.00
Stability effect of self-esteem

E

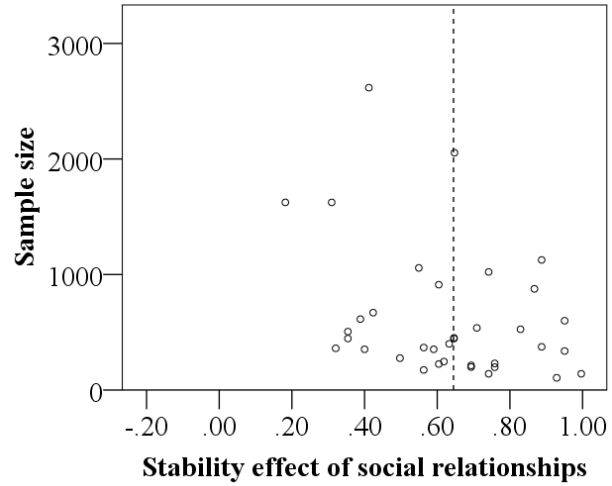
Sample size
3000
2000
1000
0
-.20
.00
.20
.40
.60
.80
1.00
Stability effect of social relationships

Figure 2. Funnel graphs showing the relation between sample size and observed effect sizes. Dotted lines indicate weighted mean effect sizes. For Figure 2C, we omitted a data point with the sample size of 13,401 for easier comparison with Figure 2B. The effect size for this study was .19 and was included in all analyses.

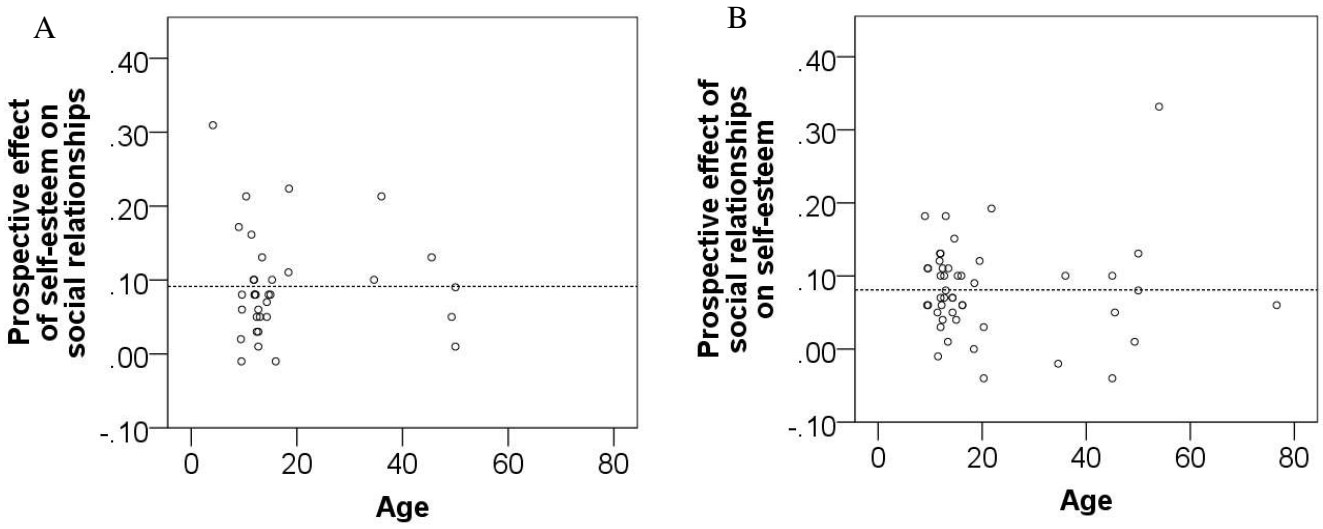

Figure 3. Scatterplots of the associations between prospective effect sizes and mean age of samples. Dotted lines indicate weighted mean effect sizes.