

# The Relation of Pro-Sociality to Self-Esteem: The Mediational Role of Quality of Friendships

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## Abstract

The present longitudinal study examined the role of quality of friendship in mediating the relation of pro-sociality to self-esteem over time. Participants were 424 Italian young adults (56% females) assessed at two waves ( $M_{\text{age}} = 21.1$  at Time 1;  $M_{\text{age}} = 25$  at Time 2). An autoregressive cross-lagged panel model was used to test the mediational model. Self- and friend-report measures of pro-sociality, quality of friendship, and self-esteem were included in the analyses. Results were in line with the hypothesized paths, with quality of friendship mediating the relation of pro-sociality to later self-esteem above and beyond its high stability. Self-esteem, in turn, predicted pro-sociality 4 years later. Overall, the present findings support the potential benefits of behaving pro-socially for an actor in terms of increased perceived self-worth and also expand previous work by outlining the specific mediational role of the quality of friendships. The theoretical and practical implications of these results are discussed.

Pro-sociality refers to an individual's tendency to enact behaviors such as sharing, helping, and caring (Batson, 2011; Eisenberg, Fabes, & Spinrad, 2006). It is an individual difference variable that has been related to quality of moral reasoning, moral emotions (e.g., sympathy), social competence, and low levels of aggression problems, as well as personality/temperament (Eisenberg et al., 2006). According to evolutionary theorists, this tendency is likely a result of the selection processes associated with survival and evolution of the species (Batson, 2011) because pro-social individuals were more likely to establish *mutually supportive social bonds* necessary to cope with the dangers associated with harsh environmental conditions (e.g., predators, food shortages).

More recently, researchers have found that helpers appear to benefit from their pro-social actions in terms of better psychological functioning (Eisenberg et al., 2006; Midlarsky & Kahana, 2007; Weinstein & Ryan, 2010). For instance, results of several studies are consistent with the assumption that pro-social behavior counteracts internalizing and externalizing problems (e.g., Eccles & Barber, 1999) and promotes positive developmental outcomes such as higher academic grades (e.g., Caprara, Barbaranelli, Pastorelli, Bandura, & Zimbardo, 2000) and psychological well-being (Midlarsky & Kahana, 2007). Pro-social individuals might tend to be well adjusted partly because they elicit social closeness and supportiveness, and thus build a high supportive social environment (Caprara & Steca, 2005). In line with this reasoning, the main purpose of

the present study was to examine whether pro-sociality is indirectly related to one component of psychological well-being, self-esteem (i.e., how favorably persons evaluate themselves; Baumeister, Campbell, Kruegger, & Vohs, 2003), via the mediational role of quality of friendships.

As stressed by Robins and Trzesniewski (2005), people's self-evaluations of being worthy of value may play an important role in buffering individuals from the onset of mental problems. Although results are sometimes mixed regarding the effect of self-esteem in counteracting aggressive behavior (e.g., Baumeister et al., 2003; Donnellan, Trzesniewski, Robins, Moffitt & Caspi, 2005), drug and alcohol consumption (see Baumeister et al., 2003; Leary & MacDonald, 2003), and anxiety (Sowislo & Orth, 2013), multiple empirical findings seem to support the role of self-esteem in reducing depression from childhood to old age (e.g., Orth, Robins, & Roberts, 2008; Sowislo & Orth, 2013), as well as its positive association with important indicators of well-being such as life satisfaction (Diener & Diener, 1995), physical health (e.g., Trzesniewski et al., 2006), and relationship satisfaction (e.g.,

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Orth, Robins, & Widaman, 2012). Therefore, given its importance in several areas of psychosocial functioning, some scholars have pointed to the need to identify predictors of self-esteem across human development (Robins & Trzesniewski, 2005; Trzesniewski et al., 2006). Accordingly, in the current study, we sought to provide empirical evidence regarding the relevance of interpersonal aspects of individuals' lives (i.e., pro-sociality and quality of friendship) for their self-worth during early adulthood. Although, from a developmental perspective, young adults seem to exhibit normative increasing trajectories in regard to pro-sociality (e.g., Luengo Kanacri, Pastorelli, Eisenberg, Zuffianò, & Caprara, 2013) and self-esteem (e.g., Orth et al., 2012), as noted by Arnett (2000), early adulthood is a delicate transitional phase characterized by several demographic and subjective challenges (e.g., independent living, labor market entrance, parenthood) that can easily undermine individuals' perception of being valuable.

A theory dealing with more proximal mechanisms is relevant to understanding the relation between pro-sociality and self-esteem. The *sociometer theory of self-esteem* stresses the interpersonal nature of people's self-worth by conceiving of it as an indicator of individuals' perceived degree of feeling socially included and valued by others (Leary & Baumeister, 2000). Consistent with this theory, we hypothesized that the beneficial effect of pro-sociality on self-esteem is at least partly mediated by the rewarding social relationships that pro-social people are able to develop and maintain. Specifically, we investigated the role of *friends*. According to the sociometer theory, friends, along with the family, represent one of the most important social groups involved in the development of the self (see Harter, 1999); thus, high-quality friendships could validate/invalidate individuals' perception of being worthy of value (Hartup & Stevens, 1997).

To our knowledge, this study represents one of the first attempts to investigate the relations among pro-sociality, quality of friendship, and self-esteem using the sociometer theory as an overarching theoretical framework. Although some researchers have highlighted the positive empirical association between pro-sociality and self-esteem (for a review, see Eisenberg et al., 2006; Yates & Youniss, 1996), pro-sociality and quality of friendship (e.g., Markiewicz, Doyle, & Brendgen, 2001), or self-esteem and quality of friendship (e.g., Keefe & Berndt, 1996), few, if any, have simultaneously addressed these different relations. After a brief review of the empirical findings on the relation of pro-sociality to self-esteem, we discuss sociometer theory as the conceptual basis for our hypothesis about the mediational role of the quality of friendships in the aforementioned relation.

## Self-Esteem and Pro-Sociality

A number of studies provide support for the role of pro-sociality in fostering a positive sense of the self. In a review of 44 empirical studies, Yates and Youniss (1996) found that adolescents involved in volunteer activities (i.e., a specific

pro-social behavior enacted in an organized context) reported high levels of self-esteem. Similarly, Midlarsky and Kahana (1994), in a survey of 400 older adults, reported how volunteering in late life was positively associated with four indices of well-being, including self-esteem. As discussed by Browne, Hoyer, and Nicholson (2012), it is likely that volunteers experience high self-regard because helping others enhances their sense of social connectedness and social inclusion as well as their perception of being competent and helpful. Moreover, the benefits for the self stemming from caring for others have been documented by researchers who used broader measures of pro-sociality that were not limited to volunteerism (e.g., Laible, Carlo, & Roesch, 2004; Le, Impett, Kogan, Webster, & Cheng, 2012). For instance, Le et al. (2012) reported that communally oriented people (i.e., people assigning great value to the welfare of others) tended to experience a greater sense of self-worth over the course of 4 weeks through the activation of positive emotions related to caring for others. Telzer and Fuligni (2009), investigating the effects of helping behaviors toward family members in adolescents from different ethnic backgrounds, found that providing daily assistance to the family was associated with higher levels of psychological well-being. In addition, the authors found that this effect was mediated by adolescents' sense of role fulfillment within the family, which helped them to feel appreciated and valued by their parents and siblings (Telzer & Fuligni, 2009).

Yet there is an important debate in the pro-social literature about the direction of influence between behaving pro-socially and self-esteem. Leary and MacDonald (2003) pointed to self-esteem as a cause of pro-sociality rather than vice versa. The authors speculated that helping someone, like other interpersonal behaviors, might be rebuffed, which results in people with low self-esteem refraining from pro-social acts in order to avoid social rejection (Leary & MacDonald, 2003). However, Eisenberg et al. (2006) hypothesized that the relation between pro-sociality and self-esteem is likely to be reciprocal. Engagement in pro-social activities (e.g., helping someone in need, doing volunteer work) can strengthen people's perception of being good and helpful to others, which in turn can enhance their self-regard. In addition, behaving pro-socially, like other social conduct, requires adequate motivational resources to be enacted, and a high level of self-esteem could lead individuals to feel "motivationally equipped" to help others. Indeed, it is likely that the better individuals feel about themselves, the better able they are to take care of others' needs because their own needs are satisfied (Eisenberg et al., 2006). Consistent with this hypothesis, Thoits and Hewitt (2001), in one of the few longitudinal studies on this topic, reported a reciprocal relation between volunteerism and self-esteem: Those individuals characterized by a high sense of self-worth were those more likely to engage in volunteer activities and vice versa (Thoits & Hewitt, 2001).

In summary, there appears to be a positive relation between self-esteem and pro-sociality (see Eisenberg et al., 2006), and it is likely that this relation can be bidirectional (Eisenberg

et al., 2006; Thoits & Hewitt, 2001). However, it should be noted that the mechanisms (mediators) linking the two variables are unclear and merit further investigation. One plausible mediator of the relation of pro-sociality to self-esteem is the quality of friendships, as suggested by the sociometer theory of self-esteem (Leary & Baumeister, 2000).

### Pro-Sociality, Self-Esteem, and the Mediation Role of Quality of Friendships

In the last 20 years, the sociometer theory of self-esteem has received considerable attention in the psychological literature (see Leary, 2005; Leary & Baumeister, 2000). In contrast to other theorists who have proposed that the relevance of self-esteem for human well-being is due to the degree of congruency between a person's real and ideal selves (Rogers, 1959) or its capacity to buffer people against the terror of death (Pyszczynski, Greenberg, Solomon, Arndt, & Schimel, 2004), sociometer theory emphasizes the interpersonal nature of people's self-worth by pointing to the human desire to establish positive and rewarding social bonds. Specifically, Leary and Baumeister (2000) conceptualized self-esteem as a social thermometer indicating the level of individuals' perception of being accepted and valued by others. From this perspective, positive social relationships increase individuals' perceptions of their *relational value* (i.e., how they perceive themselves to be accepted by others), thereby positively influencing their self-esteem. Accordingly, individuals strive to seek and maintain social bonds in order to feel accepted and to perceive themselves as worthy of value.

Consistent with sociometric theory, many scholars agreed that having *high-quality friendships* (i.e., friendships characterized by supportiveness, intimacy, and closeness) represents one of the most important aspects of humans' social life, with relevant implications for psychological adjustment and self-esteem (Hartup & Stevens, 1997). In general, friendships are characterized by reciprocity: Individuals expect their friends to provide them with joy, trust, and intimacy, and that they should reciprocate by giving the same emotional support (Berndt, 2002; Hartup & Stevens, 1997). Therefore, one may assume that providing care to one's friends and helping them when they are in need can strengthen friendships, providing positive feedback about the relational value of the persons involved in the relationship. Consistent with this view, Keefe and Berndt (1996) found that positive features of friendship such as support and intimacy were positively correlated with global self-worth and social acceptance during early adolescence. Similarly, other authors argued for the importance of friends in early adulthood for promoting positive changes in self-conceptions (e.g., Rawlins, 1992), and several empirical studies have supported the role of friends for counteracting depression and anxiety (e.g., Cambron, Acitelli, & Steinberg, 2010). Interestingly, Denissen, Penke, Schmitt, and van Aken (2008) found that interaction quality with one's own closest

friend, rather than the quantity of interaction (i.e., the time spent with the best friend), positively predicted feelings of self-worth.

Based on the research and aforementioned arguments, we presumed that pro-sociality could foster self-esteem through the positive and supportive friendships that pro-social individuals are able to create and maintain (Eisenberg et al., 2006; Markiewicz et al., 2001). Indeed, the capacity to enact pro-social behaviors is critical to the maintenance of mutually rewarding friendship relationships (because such behavior is highly valued and rewarded by others; Caprara & Steca, 2005), which, in turn, would be expected to increase individuals' self-esteem by enhancing their perception of being positively accepted and valued by others.

Moreover, although the contribution of self-esteem to pro-sociality was not the main focus of the present work, based on the suggestions of some scholars (e.g., Eisenberg et al., 2006; Leary & MacDonald, 2003), we considered the statistical significance of a possible reverse effect, from self-esteem to pro-sociality. As discussed previously, it seems plausible that self-esteem can sustain pro-sociality by providing the motivational resources needed to help and to take care of others (Eisenberg et al., 2006; see also Thoits & Hewitt, 2001).

The present work, in comparison to relevant prior studies (e.g., Le et al., 2012; Telzer & Fuligni, 2009; Weinstein & Ryan, 2010), is novel in several respects. First of all, we used the conceptual framework offered by the sociometer theory of self-esteem to derive a hypothesis about the likely direction of relations among pro-sociality, self-esteem, and quality of friendships. Second, we examined the relevant relations with data across 4 years rather than a shorter period of time (e.g., Telzer & Fuligni, 2009; Weinstein & Ryan, 2010) or with cross-sectional data (e.g., Laible et al., 2004). Third, we extended previous studies investigating the mediators of the effect of pro-sociality on self-esteem (e.g., Browne et al., 2012; Weinstein & Ryan, 2010) by focusing on the specific mediational role of the quality of friendships. Fourth, we included both self- and friend-report measures of individuals' pro-sociality, quality of friendship, and self-esteem. Whereas the use of other-report measures of pro-sociality is usually common and recommended to reduce the social desirability bias arising from the sole use of self-evaluation of socially valued behaviors (Caprara, Alessandri, & Eisenberg, 2012), to our knowledge, few researchers have used other reporters for quality of friendship (e.g., Simpkins & Parke, 2001) and self-esteem (e.g., Donnellan et al., 2005). Finally, given the existence of gender differences in pro-sociality (e.g., Eisenberg et al., 2006), self-esteem (e.g., Robins & Trzesniewski, 2005), and the quality of friendships (e.g., Thomas & Daubman, 2001), we corrected parameter estimates for the potential biasing effect of gender. Finally, according to a theoretical perspective suggesting that interpersonal relationships might be of greater relevance for females than for males (e.g., Thomas & Daubman, 2001), we investigated the possibility that the hypothesized relation of

pro-sociality to self-esteem, mediated through the quality of friendships, is stronger for women.

## METHOD

### Participants and Design

The current study included 424 participants (56% females) from Genzano, a community near Rome, involved in an ongoing longitudinal study started in 1989. Participants were originally drawn from two public junior high schools in Genzano.

Participants' mean age was 21.1 years ( $SD = 0.99$ ) at Time 1 (T1) and 25 years ( $SD = 1.03$ ) at Time 2 (T2). At T2, about half (47%) of the sample were college students. Of the remaining participants (i.e., 53%), 70% had stable work, 10% worked occasionally, 13% were unemployed, and 7% were searching for a job. Across the years in which the study was performed, the families of Genzano matched the socioeconomic national profile of the larger Italian society (Istituto Italiano di Statistica, 2002). At T1, approximately 14% of the parents were in professional or managerial ranks, 25% were merchants or operators of other businesses, 31% were skilled workers, 29% were unskilled workers, and 1% were retired. After being contacted by phone, participants received the questionnaire with a small payment for their participation. Questionnaires and consent forms were returned by participants to researchers during specifically scheduled meetings in one school of Genzano. Moreover, at T2, participants also were asked to provide copies of questionnaires designed for peer ratings to a friend who knew them very well. In total, 240 friend-evaluators (57% females), with a mean age of 25.1 years ( $SD = 3.36$ ), were considered in the present study. These individuals reported that they had been friends of the participants for a mean of 9 years ( $SD = 6.50$ ) and reported ("How well do you know the participant?"; 1 = *not at all* to 10 = *very well*) that they knew the target very well ( $M = 8.51$ ,  $SD = 1.11$ ).

### Attrition and Missing Data Analysis

Participation at T2, four years later, was moderate (63%). The attrition was mainly due to the unavailability of individuals to take part in the later phase of the study due to their refusal to participate or their relocation from the area of Genzano. The lack of selective attrition in our data is supported by Little's test (1988) for missing completely at random (MCAR), which was nonsignificant,  $\chi^2(40) = 44.76$ ,  $p = .28$ , indicating that the missingness on one variable was unrelated to the other measured or unmeasured variables (Enders, 2010). Accordingly, we computed the maximum-likelihood estimates of missing data via the expectation-maximization (EM) algorithm (Enders, 2010). The EM algorithm restores the complete data matrix under the assumption of multivariate normality (Enders, 2010). The final sample for this study was composed by 187 males and 237 females. The following structural equation models (SEMs) were analyzed in *Mplus 7* (Muthén & Muthén, 2012).

### Measures

The measures of pro-sociality, quality of friendship, and self-esteem at T1 ( $M_{age} = 21.1$ ) were all self-report scales. At T2 ( $M_{age} = 25$ ), friend-report measures of the same constructs were used in addition to the self-report scales. For the friend-report version of the following scales, the same items of the self-report scales were worded in the third person. Reliability coefficients for the scales are reported in Table 1.

**Pro-Sociality.** Participants rated (1 = *never/almost never true* to 5 = *almost always/always true*) their pro-sociality on a 16-item scale that assesses the degree of engagement in actions aimed at sharing, helping, taking care of others' needs, and empathizing with their feelings (e.g., "I try to help others" and "I try to console people who are sad"; Caprara, Steca, Zelli, & Capanna, 2005). The psychometric properties of the pro-sociality scale have been cross-nationally validated on large

**Table 1** Descriptive Statistics and Correlations Among Pro-Sociality, Quality of Friendship, and Self-Esteem

Variables	Mean	SD	1	2	3	4	5	6	7	8	9	10
1. Gender	—	—	(—)									
2. PRO T1	3.74	0.62	.21**	(.93)								
3. QFT1	4.19	0.55	-.13**	.32**	(.90)							
4. EST T1	3.29	0.51	-.03	.17**	.30**	(.88)						
5. PRO T2	3.77	0.60	.27**	.79**	.29**	.20**	(.94)					
6. PRO T2 (friend)	3.70	0.56	.14*	.42**	.18**	.17**	.50**	(.94)				
7. QFT2	4.19	0.49	-.08	.32**	.65**	.24**	.31**	.24**	(.81)			
8. QFT2 (friend)	3.62	0.39	-.11*	.16**	.39**	.18**	.18**	.25**	.43**	(.85)		
9. EST T2	3.36	0.45	-.01	.15**	.33**	.63**	.20**	.21**	.30**	.21**	(.87)	
10. EST T2 (friend)	3.82	0.38	-.12*	.23**	.15**	.42**	.24**	.24**	.16**	.18**	.45**	(.86)

Note. SD = standard deviations; PRO = pro-sociality; QF = quality of friendship; EST = self-esteem. Gender = 0 (male), 1 (female). Reliability coefficients are reported on the main diagonal.

\* $p < .05$ . \*\* $p < .01$ .



samples of respondents (Luengo Kanacri, Tramontano, Regner, Vignale, & Caprara, 2013). Researchers have also found a moderate correlation ( $r = .44$ ) between self- and other-ratings on this pro-sociality scale, further supporting its validity (Caprara et al., 2012). For the friend-report version of the scale, sample items are “He/She tries to help others” and “He/She tries to console people who are sad.”

**Perceived Quality of Friendship.** Six items based on the Friendship Qualities Scale of Bukowski, Hoza, and Boivin (1994) were used to assess participants’ perception of their quality of friendships. All the items of the scale reflect the perceived amount of support, closeness, and solidarity *received* from friends (e.g., “How much help and support do you receive from your friends?” “How much do you trust your friends?”). Each item was rated on a 5-point scale ranging from 1 (*not at all*) to 5 (*a lot*). The psychometric properties of this scale in terms of factorial structure and validity have been tested in samples of Italian adolescents and young adults (Lupinetti, 2006). For the friend-report version of the scale, sample items are “How much help and support does he/she receive from his/her friends?” and “How much does he/she trust his/her friends?”

**Self-Esteem.** Self-esteem was assessed with the 10-item Rosenberg (1965) Self-Esteem Scale, which measures the extent to which participants feel they possess good qualities and have achieved personal success (e.g., “I feel that I have a number of good qualities,” “On the whole, I am satisfied with myself”). Each item was rated on a 4-point scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). For the friend-report version of the scale, sample items are “He/She feels to have a number of good qualities” and “On the whole, he/she is satisfied with his/herself.”

## RESULTS

### Descriptive Statistics

As reported in Table 1, pro-sociality, quality of friendship, and self-esteem were positively and significantly intercorrelated, both concurrently and across time. Pro-sociality, quality of friendship, and self-esteem proved to be highly stable over time.  $r_s$  (424) = .80, .65, and .63,  $ps < .001$ , respectively. In addition, self- and friend-reports of a given construct demonstrated moderate convergence. Indeed, the across-reporter correlations on the same variable (e.g., self- and friend-rated pro-sociality) were .39 or higher, both concurrently (i.e., at T2 when both evaluators were available) or longitudinally (i.e., self-rated pro-sociality at T1 correlated .42 with friend-rated pro-sociality at T2). In terms of mean-level changes over time, repeated measures of analyses of variance indicated that pro-sociality,  $F(1, 423) = 5.11$ ,  $p < .05$ ,  $\eta_p^2 = .01$ , and self-esteem,  $F(1, 423) = 12.74$ ,  $p < .001$ ,  $\eta_p^2 = .03$ , increased slightly over time, whereas quality of friendship remained essentially stable,

$F(1, 423) = 0.05$ ,  $p = .82$ ,  $\eta_p^2 = .00$ . Finally, none of the variables presented a problematic deviation from normal distributions (i.e., skewness  $> 2$  and kurtosis  $> 7$ ; Curran, West, & Finch, 1996).

### Preliminary Analyses

As a preliminary step to hypothesis testing via structural equation modeling, we investigated potential item overlap and construct distinctiveness between the two scales of pro-sociality and quality of friendship (separately at each time point) through maximum-likelihood exploratory factor analysis (ML-EFA) with Promax rotation (at T2, we also performed an ML-EFA for the friend-report version of the scales). According to the scree plot for self-reports, the three EFAs revealed clearly a two-factor structure corresponding to the hypothesized constructs (i.e., pro-sociality and quality of friendship). The principal loadings for the pro-sociality scale (self-report) were high and ranged from .49 to .87 ( $M = .69$ ,  $SD = .10$ ) for the two assessments. Conversely, the cross-loadings (for friendship items loading on pro-sociality) were all low and ranged from  $-.19$  to .21 ( $M = .02$ ,  $SD = .11$ ) at the two assessments. The principal loadings for the quality of friendship scale (self-report) were also high and ranged from .66 to .89 ( $M = .77$ ,  $SD = .08$ ) across the two assessments. Again, the cross-loadings were very low and ranged from  $-.09$  to .07 ( $M = -.01$ ,  $SD = .05$ ) across the two assessments. Factor correlations were moderate: .34 and .30, respectively, at T1 and T2.

For the friend-report version of the scales, the principal loadings were high for both scales and ranged from .42 to .88 for the pro-sociality scale ( $M = .69$ ,  $SD = .13$ ) and from .58 to .82 for the quality of friendship scale ( $M = .69$ ,  $SD = .08$ ). However, item 2 of the pro-sociality scale (“He/She shares the things that he/she has with his/her friends”) resulted in a non-negligible cross-loading (i.e., .38), indicating a possible content overlap with the factor assessed by the friend-rated quality of friendship scale. On the basis of this result, we decided to remove item 2 of the pro-sociality scale from all subsequent analyses (at each time, and from both the self and the friend version of the measure) in order to avoid any possible source of unwanted construct overlap. All remaining cross-loadings of the items of the pro-sociality scale were low and ranged from  $-.17$  to .22 ( $M = .01$ ,  $SD = .12$ ). None of the items on the quality of friendship scale had high cross-loadings (i.e., they ranged from  $-.16$  to .08;  $M = -.02$ ,  $SD = .09$ ). The factor correlation was .30. Overall, these EFAs support the distinctiveness of the two constructs and the lack of overlap among the items of the two scales.

### Measurement Invariance

Before computing the hypothesized mediational model, we analyzed the longitudinal invariance of all instruments (but not

for friend-reported measures that were available only at T2). Measurement invariance investigates whether individuals' scores at different waves are directly comparable (Kline, 2010) and is a prerequisite for optimal interpretation of longitudinal models. For our purposes, longitudinal metric invariance (i.e., the same factor structure and factor loadings of the same items are constrained to equality over time) was of practical relevance (Kline, 2010) and was examined by constraining factor loadings at T1 to be equal to factor loadings at T2 (also called the metric invariance model), and then looking at the chi-square difference (i.e.,  $\Delta\chi^2$ ) between the resulting model and a model with no constraints (also called the configural invariance model). These analyses were conducted separately for each variable. Latent constructs were defined by using the complete set of items of each scale (e.g., 10 items for the Rosenberg Self-Esteem Scale). Model fit was evaluated following standard procedure (Kline, 2010):  $\chi^2$  likelihood ratio statistic, comparative fit index (CFI), Tucker-Lewis Index (TLI), and the root mean square error of approximation (RMSEA) with associated 90% confidence intervals (90% CIs) were considered. Because the  $\chi^2$  is sensitive to large sample sizes, we accepted CFI and TLI  $\geq .90$ , and RMSEA  $\leq .08$  as indicative of acceptable model fit (Kline, 2010). For all constructs, the longitudinal metric invariance model fit the data moderately well—pro-sociality:  $\chi^2(402) = 1001.97$ ,  $p = .00$ , CFI = .91, TLI = .90, RMSEA = .06, 90% CI [.05, .06]; quality of friendship:  $\chi^2(53) = 155.55$ ,  $p = .00$ , CFI = .96, TLI = .95, RMSEA = .07, 90% CI [.06, .08]; self-esteem:  $\chi^2(157) = 280.60$ ,  $p = .00$ , CFI = .97, TLI = .96, RMSEA = .04, 90% CI [.03, .05]—and was not statistically different from the configural invariance model in any comparison, pro-sociality:  $\Delta\chi^2(17) = 18.98$ ,  $p = .33$ ; quality of friendship:  $\Delta\chi^2(6) = 7.38$ ,  $p = .29$ ; self-esteem:  $\Delta\chi^2(20) = 18.91$ ,  $p = .53$ . Therefore, we can assume for pro-sociality, quality of friendship, and self-esteem the longitudinal invariance of their items' factor loadings across the two waves.<sup>1</sup>

### Modeling Strategies

According to Batson's (2011) assertion that in longitudinal studies of helping behaviors "rarely have cross-lagged correlations been adequately tested" (p. 185), we investigated our hypothesized mediational model by using a two-wave autoregressive cross-lagged model (ARC). Two-wave ARC mediational models are superior to cross-sectional designs in that they (a) allow one to better investigate (although not to prove) the likely direction of causal influence among variables, (b) allow for more stringent testing of alternative models, and (c) control for the autoregressive prediction of variables over time (Cole & Maxwell, 2003). In our analytical approach, all the variables were modeled as latent constructs, although their modeling was different at each time point given the presence of friend-reported data only at T2. In order to deal with measurement error, all variables included in the model at T1 (i.e., pro-sociality, quality of friendship, and self-esteem) were

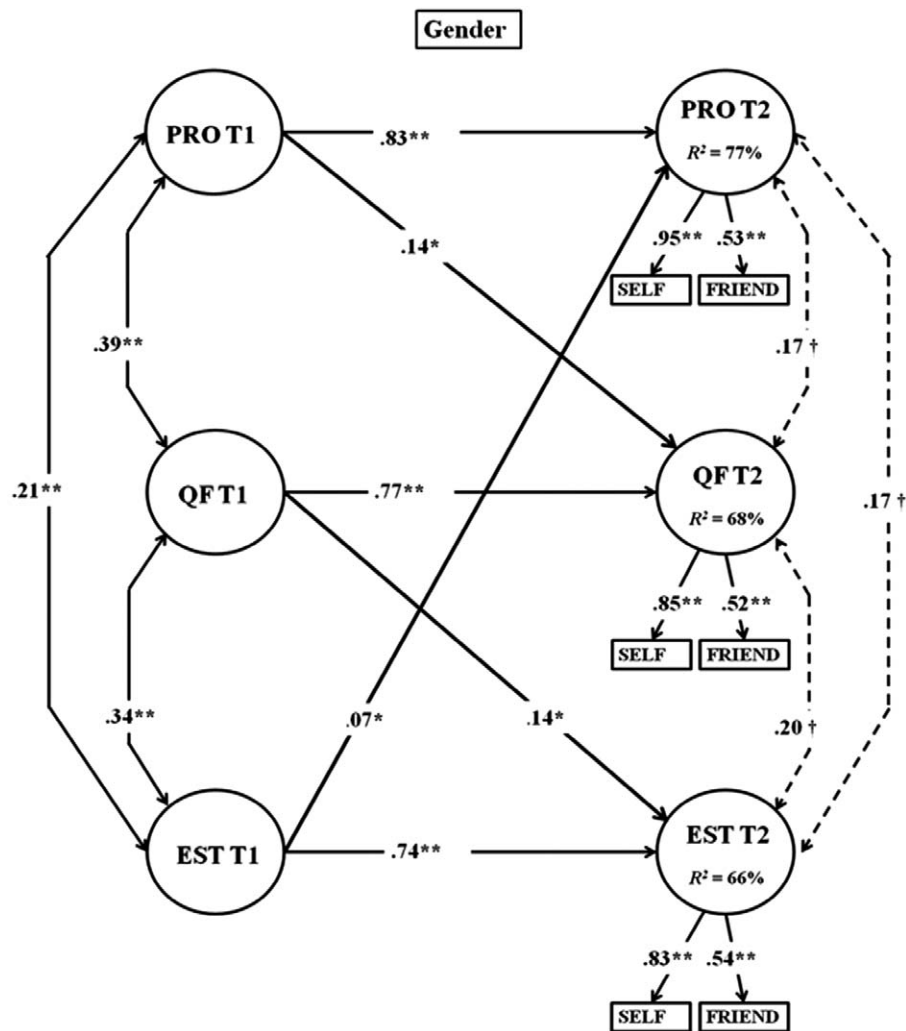
posited as single-indicator latent variables by estimating the error terms from reliabilities ( $1 - \text{scale reliability}$ ). The composite mean score of each scale at T1 was used as the indicator for a given construct. In detail, according to Kline's recommendation (2010), we fixed the error term of the indicator of variable  $y$  at T1 at  $(1 - r_{xx}) * s^2$ , where  $r_{xx}$  is the scale reliability (i.e., Cronbach's  $\alpha$ ) of  $y$  at T1 and  $s^2$  is the sample variance of  $y$  at T1. This procedure allowed us, at the same time, to be parsimonious in the number of parameters estimated, to take into account the unreliability of the scales, and to deal with the problem of attenuation in mediation analysis (Kline, 2010). At T2, instead, based on the moderate convergence between the self- and friend-report evaluations, we modeled pro-sociality, quality of friendship, and self-esteem as latent dimensions using the ratings (i.e., the mean scores) of the two informants. We also controlled for gender by using it as a covariate in our SEMs. Finally, since we tested the plausibility of alternative models explaining our data, the Akaike information criterion (AIC) was also used to evaluate model fit (with lower values indicating a better fit; Kline, 2010) because it is appropriate for comparing the fit of non-nested models. Specifically, we compared the AIC of the hypothesized model with the AIC of three alternative models. In this regard, Burnham and Anderson (2004) recommended that difference in AIC ( $\Delta\text{AIC}$ ) computed between Model<sub>*i*</sub> (where  $i = 1, 2, \dots, R$  alternative models in the set) and the model reporting the minimum AIC ( $\Delta\text{AIC}_i = \text{AIC}_i - \text{AIC}_{\text{minimum}}$ ) should be considered before selecting the best-fitting model. This transformation forces the best model to have  $\Delta\text{AIC}_i = 0$ . The authors suggested "as a rule of thumb" that models with  $\Delta\text{AIC}_i \leq 2$  have substantial support, models with  $4 \leq \Delta\text{AIC}_i \leq 7$  have considerably less support, and models with  $\Delta\text{AIC}_i \geq 10$  have essentially no support (Burnham & Anderson, 2004).

### Mediation Analysis

We examined the hypothesized pattern of influences by estimating (a) all the autoregressive paths (which reflect interindividual rank-order stability over time in the variables of interest) and the across-time paths from (b) pro-sociality at T1 to quality of friendship at T2, (c) quality of friendship at T1 to self-esteem at T2, and (d) self-esteem at T1 to pro-sociality at T2. In addition, all variables within T1 and all variables within T2 were allowed to covary (Cole & Maxwell, 2003). The hypothesized model fit the data moderately well,  $\chi^2(23) = 69.63$ ,  $p = .00$ , CFI = .97, TLI = .94, RMSEA = .07, 90% CI [.05, .09], AIC = 4218.08. In accordance with our hypotheses, pro-sociality at T1 predicted quality of friendship at T2, and quality of friendship at T1 predicted self-esteem at T2; in addition, self-esteem at T1 predicted pro-sociality at T2. According to recent recommendations from Hayes and Scharkow (2013), we used the Monte Carlo (MC) confidence interval method to formally test the significance of the mediated effect of pro-sociality on self-esteem through quality of friendship because it has been found to offer good Type 1 error

protection (Hayes & Scharkow, 2013). This method simulates a large number of random samples (repetitions), and the distribution of the product of the regression coefficients ( $ab$ ) is used to estimate a confidence interval of the indirect effect. In detail, we calculated the upper and lower values for the 95% confidence limits (CIs) of the indirect effect with 20,000 repetitions using the online calculator developed by Selig and Preacher (2008). The MC online calculator simulated the 20,000 repetitions and estimated the 95% CI of the indirect effect using the unstandardized regression coefficients with their relative standard errors ( $SE$ ). According to the recommendations of Cole and Maxwell (2003) for two-wave ARC mediational models, we used the product between the unstandardized cross-lagged effects of pro-sociality at T1 on quality of friendship at T2 (path  $a = .10$ ,  $SE = .03$ ) and of quality of friendship at T1 on self-esteem at T2 (path  $b = .10$ ,  $SE = .04$ ) as the estimate of the mediated effect (see Caprara

et al., 2012, for a similar approach). The unstandardized mediated effect ( $ab = .01$ , 95% CI [.001, .021]) was statistically significant (the 95% lower and upper CI limits did not include zero), highlighting the role of quality of friendship in mediating the effect of pro-sociality on self-esteem. The model depicted in Figure 1 accounted for a large proportion of variability for pro-sociality (77%), quality of friendship (68%), and self-esteem (66%), with our control variable gender (coded 0 = male, 1 = female) significantly predicting pro-sociality at T1 ( $\beta = .25$ ,  $p < .01$ ) and at T2 ( $\beta = .10$ ,  $p < .01$ ), and quality of friendship at T1 ( $\beta = -.06$ ,  $p < .05$ ) and at T2 ( $\beta = -.08$ ,  $p = .08$ ). Gender did not significantly predict self-esteem at T1 ( $\beta = .00$ ,  $p = .90$ ) or at T2 ( $\beta = -.01$ ,  $p = .90$ ). In addition, the standardized factor loadings of the indicators at T2 (i.e.,  $\lambda_s$  self-report  $> .80$ , and  $\lambda_s$  friend-report  $> .51$ ) attested to the appropriate degree of convergence between the two evaluators.



**Figure 1** Mediation model. PRO = pro-sociality; QF = quality of friendship; EST = self-esteem. All the reported parameters are standardized. For simplicity, we omitted the effects of gender. Standardized mediated effect = .02. Fit indices:  $\chi^2(23) = 69.63$ ,  $p = .00$ , CFI = .97, TLI = .94, RMSEA = .07, 90% CI [.05, .09], AIC = 4218.08.  $\dagger p < .10$ .  $*p < .05$ .  $**p < .01$ .

Finally, further estimation of the remaining cross-lagged paths (i.e., from pro-sociality at T1 to self-esteem at T2, from quality of friendship at T1 to pro-sociality at T2, and from self-esteem at T1 to quality of friendship at T2) did not significantly improve the fit of the hypothesized model, as indicated by the chi-square difference test for nested models,  $\Delta\chi^2(3) = 2.26, p = .52$  (and the  $\Delta\chi^2$  was not significant for any of these parameters when tested one at a time). None of these additional paths was statistically significant.<sup>2</sup>

### Alternative Models

In order to rule out different explanations for our data, three alternative models (*AM*) were tested. Because the three *AMs* were not nested in the hypothesized model (that reported the minimum AIC = 4218.08),  $\Delta$ AIC was used to compare their fit. In *AM 1*, we considered self-esteem as the independent variable, quality of friendship as the mediator, and pro-sociality as the outcome. The fit of this model,  $\chi^2(24) = 88.83, p = .00, CFI = .95, TLI = .91, RMSEA = .08, 90\% CI [.06, .10], AIC = 4235.28$ , was less acceptable than that of the hypothesized model, and the higher AIC indicated that it was a worse approximation to the data ( $\Delta$ AIC = 17.20). In addition, in *AM 1*, none of the cross-lagged paths was statistically significant. In *AM 2*, we considered quality of friendship as the independent variable, pro-sociality as the mediator, and self-esteem as the outcome. *AM 2* also fit worse than the hypothesized model,  $\chi^2(24) = 85.85, p = .00, CFI = .96, TLI = .92, RMSEA = .08, 90\% CI [.06, .10], AIC = 4232.31$ , and resulted in a higher AIC ( $\Delta$ AIC = 14.23). In this model, only the positive cross-lagged effect from pro-sociality at T1 to self-esteem at T2 was nearly significant ( $\beta = .10, p = .06$ ). Finally, in *AM 3*, we considered pro-sociality as the independent variable, self-esteem as the mediator, and quality of friendship as the outcome. The fit of *AM 3* was less acceptable than that of the hypothesized model,  $\chi^2(24) = 86.85, p = .00, CFI = .96, TLI = .92, RMSEA = .08, 90\% CI [.06, .10], AIC = 4233.30$ , and had a higher AIC ( $\Delta$ AIC = 15.22). As for the previous *AM*, in this model only the regression coefficient linking pro-sociality at T1 to self-esteem at T2 was marginally significant ( $\beta = .10, p = .06$ ). For all three *AMs*, the information deriving from the  $\Delta$ AIC indicated that they were models with essentially no support ( $\Delta$ AIC  $\geq 10$ ) compared to the hypothesized mediational model. Finally, in order to test for any possible bias arising from the different modeling of our constructs at T2 (self- and friend-report measures) versus T1 (only self-report measures), we repeated all the above SEMs by using only the self-report measures both at T1 and at T2. The results did not change.

### Moderation by Gender

We investigated moderation by gender using a multigroup analysis. In particular, we tested whether a model in which the

unstandardized parameters were constrained to equality across sex (i.e., constrained model) was statistically different from a model in which the parameters were freely estimated (i.e., unconstrained model). In these analyses, we used maximum likelihood with standard errors robust to non-normality as the method for estimating parameters (i.e., MLR in *Mplus*) because self-report scores of self-esteem at T2 (for males) and quality of friendship at T2 (for females) reported moderate deviations from normal distributions (i.e., kurtosis  $> 4$ ). The constrained model reported an acceptable fit to the data,  $\chi^2(57) = 125.16, p = .00, CFI = .92, TLI = .90, RMSEA = .07, 90\% CI [.06, .09]$ , and was not statistically different from the unconstrained model,  $\Delta\chi^2(14) = 20.77, p = .11$ . In sum, we found no evidence supporting the existence of gender differences in the relations among the constructs. Of note, the unstandardized mediated effect from pro-sociality to self-esteem via quality of friendship was statistically different from zero for both groups ( $ab = .01, 95\% CI [.0001, .019]$ ; the unstandardized mediated effect was the same for both males and females since the unstandardized parameters have been fixed to equality across gender).<sup>3</sup> Finally, the effect from self-esteem at T1 to pro-sociality at T2 was statistically significant both for males and females ( $b = .10, p < .01$ ).

## DISCUSSION

The tendency to enact pro-social behaviors is widely recognized as one of the most important factors for human psychosocial well-being (Batson, 2011; Eisenberg et al., 2006; Midlarsky & Kahana, 2007). Notably, previous researchers occasionally have focused on the beneficial effects for helpers in regard to relevant indicators of psychological adjustment such as self-esteem (e.g., Laible et al., 2004; Le et al., 2012). Accordingly, in the present study, we tested a conceptual model highlighting the potential mediational role of positive interpersonal relationships in the association between pro-sociality and self-esteem in an attempt to clarify the nature of that association.

Specifically, we proposed that pro-sociality can positively affect self-esteem by improving the positive and supportive social bonds that people have with their friends. Indeed, because pro-social individuals are generally more prone to help and to be sensitive with their friends, they are more likely to establish close and warm friendships, which, in turn, affect their relational value (Leary & Baumeister, 2000). This hypothesis, drawn from the sociometer theory of self-esteem (Leary, 2005; Leary & Baumeister, 2000), has at its core the idea that when significant others, such as our friends, evaluate us positively and make us feel accepted, they convey positive information pertinent to our self-concept and enhance our perception that we are worthy of value. To test this, we implemented a stringent longitudinal mediational model with two waves of data that allowed us to control for the stability of the constructs over time and to obtain more accurate estimates of the cross-lagged effects (Cole & Maxwell, 2003). Consistent



with our hypotheses, we found that above and beyond the high stability of self-esteem over time, a higher tendency to behave pro-socially at T1 positively predicted participants' self-esteem 4 years later through the mediational role of quality of friendship.

From a theoretical perspective, this result has several implications. First, this study provides new support for the sociometer theory of self-esteem. Within the sociometer theory (Leary, 2005; Leary & Baumeister, 2000), self-esteem is conceptualized as a social thermometer indicating the degree to which individuals feel included within social groups that are relevant for them. According to this perspective, individuals seem to have an evolutionarily based motive to search for signs of social regard and to strive to be valued and included in social groups because, in the past, the establishment of supportive social bonds was crucial for human survival. Of equal importance, similar arguments have been made about the role of pro-sociality as an evolutionary strategy for human adaptation (Batson, 2011). Indeed, the notion of *reciprocal altruism* has been usually invoked as the evolutionary mechanism that, in the past, has absolved the function of establishing mutually supportive social bonds among individuals (Batson, 2011). Therefore, the inclusion of pro-sociality within the sociometer hypothesis might increase the heuristic power of this theory by highlighting one of the possible mechanisms (i.e., behaving pro-socially) by which individuals can enhance the probability of feeling accepted and valued by their social groups. Interestingly, these arguments are also in line with other previous studies pointing to the enhancement of relatedness (Weinstein & Ryan, 2010) and social connectedness (Browne et al., 2012) as mediators of the positive relation of the tendency to take care of others to helpers' self-regard and well-being. Finally, our data further confirm the relevance of friendships for individuals' well-being and the role of friends as an invaluable source of information for the individuals' self-evaluation process (Hartup & Stevens, 1997). Consistent with the findings of Harter (1999), we found that the more support and help people receive from their friends, the higher their feeling of being persons worthy of value will be.

We also found that self-esteem at T1 positively predicted pro-social tendencies at T2 while controlling for its strong autoregressive path. This effect is consistent with the notion that adequate motivational resources (likely conveyed by self-esteem) may be needed to behave pro-socially (Eisenberg et al., 2006; Leary & MacDonald, 2003). In particular, the presence of both effects (i.e., from pro-sociality to self-esteem via quality of friendship, and from self-esteem to pro-sociality) seems to be in line with arguments for a reciprocal flow of influence between pro-sociality and self-esteem (Eisenberg et al., 2006; Thoits & Hewitt, 2001). In this regard, one can further speculate that there are even more complex reciprocal relations among pro-sociality, quality of friendship, and self-esteem, such as a circle of positive effects. However, we acknowledge that the use of two waves of data was not adequate to verify complex reciprocal effects.

Finally, in the future, researchers might also investigate which variables mediate the effect of self-esteem on pro-sociality. For instance, cognitive-motivational structures like self-efficacy beliefs may be possible mediators of this relation. In this regard, some researchers have found that social self-efficacy (i.e., the perceived capacity to deal effectively with one's own relationships) and, in particular, empathic self-efficacy (i.e., the perceived capacity to sense another person's feelings) were empirically related to pro-sociality (Caprara et al., 2012; Caprara & Steca, 2005). In addition, previous studies conducted within the framework of the self-determination theory have shown how the fulfillment of basic psychological needs may lead individuals to experience higher self-esteem (Ryan & Deci, 2001) and to become more engaged in pro-social behavior (Gagné, 2003). Thus, one may speculate that people with high self-esteem, relative to people with lower self-esteem, feel more motivated (because their own needs are likely satisfied) and more confident about their abilities to appropriately manage their social relationships and to understand others' perspectives and, consequently, are relatively prone to behave pro-socially toward others.

There are multiple strengths of this study. In order to increase the robustness of our conclusions, we used different evaluators of our constructs (although friend-report measures were available uniquely at T2). In this regard, the use of friend-evaluators who knew their target well allowed us to have a good degree of convergence between the friend- and self-report evaluations of pro-sociality, quality of friendship, and self-esteem. In addition, we tried to rule out alternative explanations by testing three alternative SEMs including different mediated pathways; all the alternative models had a worse fit than the posited mediational model. The results did not change even when identical measures of constructs were used at both assessments (i.e., the T2 peer reports were not used as indicators of constructs). Finally, we controlled for the effects of gender in the models, and we also tested gender invariance of the hypothesized mediated effect by conducting a multiple-group analysis.

## LIMITATIONS AND FUTURE DIRECTIONS

In spite of a number of strengths, we acknowledge some limitations of the present study. First of all, our data are correlational in nature and, although longitudinal, cannot allow definitive conclusions about causality (Cole & Maxwell, 2003). Second, our findings are based on a single study, at a specific age (i.e., young adulthood), and in a specific culture. In particular, regarding the context, the high relevance of a sense of belonging and connectedness in relationships in Italy (Reher, 1998) might affect the degree to which friendship quality mediates the relation of pro-sociality to self-esteem. Thus, more research is needed to confirm these results in other cultural contexts and with participants of different ages. Third,

although we used a rigorous statistical methodology and the availability of two waves of data allowed us to control for the stability of the constructs over time, three data points represent the optimal standard for a longitudinal mediational model. Fourth, although we identified an important mediational mechanism, we focused uniquely on the quality of friendship. It would be of interest to investigate the mediational role of other relevant interpersonal bonds like family (Telzer & Fuligni, 2009) and romantic relationships (e.g., Denissen et al., 2008; Le et al., 2012) in order to clarify and, presumably, differentiate their relevance during human development. From a developmental perspective, future long-term studies might also investigate whether the mean-level increase of self-esteem during adulthood can be predicted by interindividual differences in pro-sociality and quality of friendship, as well as to what extent mean-level changes of pro-sociality, quality of friendships, and self-esteem are related to each other. Fifth, we focused only on an overall evaluation of quality of friendships. In future studies, investigators might consider using psychological instruments better suited to capture specific subdimensions of quality of friendship (e.g., support, closeness; Keefe & Berndt, 1996).<sup>4</sup> Future research should also consider the moderation role of motives (e.g., extrinsic vs. intrinsic) for behaving pro-socially. For instance, Midlarsky and Kahana (1994) found that elder individuals who reported higher intrinsic motives for helping were most likely to experience their pro-social actions as personally rewarding. Therefore, the mediational role of quality of friendship in linking pro-sociality to self-esteem could be moderated by the different motives underlying the pro-social action. Lastly, the sole use of self-report measures for pro-sociality at T1 can represent another limit given the supposed high social desirability of this construct. Although we are quite confident that our measure of pro-sociality at T1 is representative of pro-social behaviors effectively enacted by individuals (of importance, individuals' scores on this measure were moderately correlated with the other-report assessment at T2), we acknowledge that the lack of friend-report assessments at T1 weakened our design. Therefore, future studies replicating and extending these findings might include other methods of assessments, such as observational measures of pro-social behaviors.

## CONCLUSION

Despite the aforementioned limitations, we believe that the present study provides information relevant for the comprehension of a possible psychological mechanism linking pro-sociality to self-esteem and might have some practical implications for educators and psychologists working with intervention programs designed to promote a robust sense of self-worth among youths. Indeed, fostering pro-sociality through appropriate educational actions could allow individuals to develop more positive friendships and to feel better about themselves and, ultimately, can avoid undesirable consequences stemming from an exclusive focus on the direct

enhancement of self-esteem, which may lead to an overestimation of their own value (Baumeister et al., 2003). Of note, recent studies have shown the relevance of promoting pro-social behavior in the school context for students' psychological adjustment (e.g., Caprara et al., 2014); moreover, involvement in volunteer mentoring programs (e.g., Big Brothers Big Sisters; Rhodes, Grossman, & Resch, 2000) has been reported to have positive effects on adolescents' self-esteem. Accordingly, the current study, by highlighting the specific mediational role of quality of friendship in the association of pro-sociality to self-esteem, might offer some guidelines about the components that should be targeted in intervention programs designed to bolster or sustain self-esteem and, in general, psychological well-being (although more work is still needed to identify the specific areas of psychological functioning that are positively affected by self-esteem). We believe that teaching children and adolescents to recognize others' feelings and to provide appropriate help when they are in need is likely to increase the probability of their feeling socially accepted and establishing mutually supportive social ties that, in the long run, could be the basis of a positive sense of self-worth.

## Declaration of Conflicting Interests

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## Notes

1. For the self-esteem scale, we also included two latent method factors associated with the five positively and negatively worded items. For the pro-sociality scale, we included the correlations between the residual variances of (a) item 8 and item 5, and (b) item 14 and item 15.
2. We also ran two other models. First, we reran the same SEM in the reduced subset of participants who provided data at both time points. In this model, the paths linking pro-sociality at T1 to quality of friendship at T2 ( $\beta = .12, p = .090$ ), and quality of friendship at T1 to

self-esteem at T2 ( $\beta = .13, p = .063$ ), were close in size to those reported in the model with the missing data estimated, although they were only marginally significant. Second, we tested the same mediational model when the other four items of the pro-sociality scale containing the word *friends* were removed (although these items did not show empirical overlap with the items of the quality of friendship scale in the aforementioned ML-EFA we conducted). In this model, the relation of pro-sociality at T1 to quality of friendship at T2 ( $\beta = .08, p = .098$ ) was marginally significant, whereas the path from quality of friendship at T1 to self-esteem at T2 ( $\beta = .11, p = .001$ ) remained statistically significant.

3. As requested by modification indices, we included in the female subsample the correlation between the residual variances of the indicator pro-sociality at T2 (friend report) and quality of friendship at T2 (friend report).

4. As suggested by an anonymous reviewer, we also analyzed the mediational role of each item of the quality of friendship scale. We found that the three specific items of quality of friendship related to the aspects of trustworthiness, support, and closeness were significant mediators of the effect of pro-sociality on self-esteem.

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