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BRIEF REPORT

Longitudinal Bidirectional Relations Between Adolescents' Sympathy and Prosocial Behavior

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Despite the importance of understanding sympathy and prosocial behaviors, research on the development of these tendencies in adolescence remains relatively sparse. In the present study, we examined age trends and bidirectional longitudinal relations in sympathy and prosocial behaviors across early to middle adolescents. Participants were 500 12-year-olds at Time 1 (52% girls, 70% European American) who completed measures of sympathy and prosocial behaviors at 5 different time points, each approximately 1 year apart. Results showed significant bidirectional relations between sympathy and prosocial behaviors across all time points, and an initial decrease of prosocial behaviors followed by an increase into middle adolescence. The implications for prosocial developmental theories and research are discussed.

Keywords: prosocial behaviors, sympathy, adolescence, longitudinal, bidirectional

Prosocial behaviors are voluntary actions intended to benefit another person or persons (Eisenberg, Fabes, & Spinrad, 2006) and may include physical helping, emotional comforting, or providing financial or social assistance. Prior research shows age-related changes in prosocial behaviors during adolescence, which suggests that these behaviors continue to undergo transformations that may have long-term consequences for health and well-being (Carlo, Crockett, Randall, & Roesch, 2007; Eisenberg et al., 1999). These age-related changes are no doubt partly due to general increases in adolescents' ability to comprehend the emotions of themselves and others, as well as in their abilities to regulate behavior (Steinberg & Morris, 2001). Moreover, individual differences in these cognitive and emotional changes are associated with how and why adolescents engage in prosocial behavior and may help to explain the varying prosocial trajectories from childhood to adolescence. For example, moral emotions like sympathy, i.e., feelings of sorrow or concern for others (Eisenberg et al., 2006) are key predictors of prosocial behavior because they provide an impetus for action to alleviate another's distress. Eisenberg and Miller's (1987) meta-analytic review indicated that sympathy led to increased prosocial behavior at all different stages of life, but their study did not indicate any firm direction for these effects, nor has the majority of research since then (Malti, Gummerum, Keller, &

Buchmann, 2009). Apprehension of directionality is important because we do not know if experiencing sympathy leads to prosocial behavior, or if prosocial experiences lead to more sympathy. Indeed, the majority of existing studies linking sympathy to prosocial behavior has been cross-sectional, and even when looking at these behaviors over time, authors most often test conceptual models that hypothesize predictive effects of sympathy on subsequent prosocial behaviors. However, some social-cognitive theorists posit that exhibiting prosocial behaviors can also influence sociocognitive and socioemotive tendencies, including sympathy (Carlo & Randall, 2001; Eisenberg et al., 2006). To this end, the primary purpose of the present study was to examine the longitudinal, bidirectional relations between sympathy and prosocial behavior during adolescence.

The Role of Sympathy in Prosocial Behavior

Eisenberg et al. (1996) defined sympathy as feelings of sorrow and concern for others that may stem from an initial empathetic (i.e., feeling the same as another) response. Numerous scholars and theorists have indicated a conceptual connection between sympathetic feelings (whether they are defined as sympathy, empathy, or empathetic responses) and prosocial behavior (e.g., Hoffman, 2000; Staub, 1978). The basis for this connection may be that people who feel bad for other people are often motivated to act to alleviate the distress they perceive in others (Staub, 1978), or that moral emotions such as sympathy motivate one to act on existing cognitions to help (Izard, Kagan, & Zajonc, 1985). In most conceptual models, sympathy is posited as the antecedent of subsequent prosocial behavior. As such, numerous studies have been devoted to examining the expected causal links between sympathy and prosocial behaviors. To date, the empirical evidence in support of this contention is relatively substantial, though most studies are cross-sectional designs (Eisenberg et al., 2006). Furthermore, there is

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limited (though somewhat inconsistent) evidence from intervention studies that sympathy training interventions lead to increases in subsequent prosocial behaviors (see Eisenberg & Miller, 1987). Taken together, the findings generally are in accord with cognitive–developmental and social–cognitive theories.

The Role of Prosocial Behavior in Sympathy

The vast majority of research on prosocial behavior has focused on sympathy as a predictor of prosocial behavior, but it is acknowledged (though much less studied) that the relations may be reciprocal. Social–cognitive theorists (Bandura, 1986; Carlo & Randall, 2001; Eisenberg et al., 1999), for example, posit that social behaviors can have a reciprocal effect on subsequent individual traits and tendencies. Carlo and Randall (2001) suggested a social feedback process (e.g., rewards, punishments) whereby engaging in prosocial behaviors can influence subsequent tendencies to sympathize with others' plight. Other researchers suggest that predictors of prosocial behavior, like sympathy, are likely outcomes of prosocial behavior as well because "prosocial interactions provide opportunities to understand and sympathize with others and may therefore facilitate later sympathy and moral judgment" (Malti et al., 2009, p. 457). To date, two previous studies examined bidirectional relations between sympathy and prosocial behaviors, and both studies reported support (Carlo, Mestre, Samper, Tur, & Armenta, 2010; Eisenberg et al., 1999; cf. Caprara, Alessandri, & Eisenberg, 2012, for a study with young adults). However, one study was conducted with adolescents in Spain (Carlo et al., 2010) and the other study was conducted with a relatively small sample ($n = 32$) of preschoolers to young adulthood (Eisenberg et al., 1999). That said, these studies provide preliminary evidence that sympathy also influences prosocial behavior over time.

Development and Stability in Adolescence

Development and stability are important to consider when studying the links between sympathy and prosocial behavior. Sympathy levels generally increase through the first 2 decades of life as children progress in their theory of mind and ability to differentiate themselves from others, and are increasingly able to comprehend that others may be feeling different emotions than they are, and attempt to define those emotions (Eisenberg et al., 2006). In general, as children age, their ability to self-regulate also generally improves (Eisenberg et al., 2007), increasing both sympathetic responding (Zahn-Waxler, Schiro, Robinson, Emde, & Schmitz, 2001) and prosocial behavior. However, relatively less is known regarding age-related changes in sympathy during adolescence. In a recent relevant study, investigators reported age-related changes in sympathy across adolescence that suggested that girls' sympathy remained relatively stable during early to middle adolescence. However, for boys, sympathy levels decreased initially and then rebounded in later adolescence (van der Graaff et al., 2014).

Similarly, longitudinal research on age-related changes in prosocial behavior during adolescence is also not straightforward because studies have shown decreases followed by slight increases (Carlo et al., 2007; Eisenberg et al., 2005; Luengo Kanacri, Pastorelli, Eisenberg, Zuffianò, & Caprara, 2013), decreases (Luengo Kanacri et al., 2013), or no changes (e.g., Flynn, Ehrenreich, Beron, & Underwood, 2015), and these findings may also vary by

the target of the behavior (Padilla-Walker et al., 2015). In addition, extant research on prosocial behavior and sympathy indicates relative stability in both constructs throughout adolescence (Eisenberg et al., 2005; Gregory, Light-Häusermann, Rijdsdijk, & Eley, 2009), but there is a relative dearth of direct research on this issue in adolescents.

Hypotheses

In the current study, we sought to explore bidirectional relations between sympathy and prosocial behavior over a 5-year period from early to middle adolescence in a relatively large sample of European Americans. Given the somewhat mixed findings regarding age trends in prosocial behavior across adolescence, we explored longitudinal change in sympathy and prosocial behavior over time. We hypothesized that both sympathy and prosocial behavior would demonstrate relatively moderate stability across time. Based primarily on theory and sparse prior evidence, we also explored cross-lagged relations and expected that sympathy would be associated longitudinally with subsequent prosocial behavior, and that earlier prosocial behavior would also promote future sympathy. We expected to find positive bidirectional associations between sympathy and prosocial behaviors at all ages, but explored whether the strength of associations varied over time. Finally, based on earlier gender and moral socialization theories and research (Eisenberg et al., 2006), we generally expected girls to report more of these prosocial tendencies than boys.

Method

Participants and Procedures

Participants were 500 adolescents who participated in a longitudinal study at five different time points, each approximately 1 year apart. Data were collected by wave but were restructured by age because of the large age range at each wave. At the initial time point, adolescents were an average of 11.5 years old (52% girls, 70% European American, 30% single-parent families). Because some of the variables of interest were not available until Wave 2, the restructured data included only ages 12–16. Average monthly income as reported by mothers was \$5,800 (approximately \$70,000 per year), but approximately 30% of the sample reported a family income below \$40,000 per year.

At the initial wave, families were randomly selected from targeted census tracts that mirrored local school districts using a purchased, national telephone-survey database. In an attempt to more closely mirror the demographics of the local areas, a limited number of families were recruited into the study through other means (e.g., referral, fliers; $n = 77$, 15%). Of the eligible families contacted, those agreeing to participate resulted in a 61% response rate. Of the families who participated at Time 1, 93% had complete data at Time 5 (see Padilla-Walker, Harper, & Bean, 2011 for additional information on procedure). At each wave of data collection, researchers visited the family's home and administered questionnaires that were completed in the home. Missing data were minimal in the original data set (<5%) and were missing completely at random (MCAR) at Waves 3 and 4 when all variables used in the current study were included (i.e., Wave 3, Little's MCAR test was $\chi^2(119) = 127.52, p = .280$; at Wave 4, $\chi^2(68) =$

71.84, $p = .352$), and at Wave 5, a planned missing design was used so that all missing values were imputed. However, once data were restructured by age, because sympathy measures were not given until Time 3, sympathy at ages 12 and 13 were missing in upward of 200 cases. Because the age of the child at the first interview was random (in the range from 10–14), data missing at age 12 due to the child not being 12 at the time were missing completely at random. Missing data were handled using the multiple imputation feature of SPSS and the Full Information Maximum Likelihood feature of AMOS. Longitudinal attrition analysis was conducted on all variables, and there were no differences other than the fact that those who dropped out of the study were more likely to be boys, $\chi^2(1) = 12.31, p < .001$.

Measures

Sympathy. Adolescents responded to seven items on a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*) assessing their own sympathy (also referred to as empathetic concern; $\alpha = .71-.79$; Davis, 1983; e.g., “When I see someone being taken advantage of, I feel kind of protective towards them”). Mean scales for sympathy were created for each age from 12 to 16 using these seven items.

Prosocial behavior toward strangers. Adolescents reported on their own prosocial behavior toward strangers at each time point using items modified from the Kindness and Generosity subscale of the Values in Action Inventory of Strengths (Youth Version, Peterson & Seligman, 2004). This adapted measure has been used extensively among adolescent populations and has shown adequate validity and reliability (Padilla-Walker et al., 2011). Adolescents answered nine items regarding prosocial behavior toward strangers ($\alpha = .91-.92$; e.g., “I help people I don’t know, even if it’s not easy for me” and “I really enjoy doing small favors for people I do not know”) on a 5-point Likert scale ranging from 1 (*not like me at all*) to 5 (*very much like me*). Mean scales for prosocial behavior were created for each age from 12 to 16 using these nine items.

Results

Descriptive Statistics and Correlations

Means and standard deviations for all variables, separated by gender, are found in Table 1. A number of *t* tests were conducted to see if mean values varied as a function of gender, and all were statistically significantly different ($p < .001$), with girls reporting higher levels of sympathy and prosocial behavior than boys at every age (see Table 1 for means). Correlations between all variables are also found in Table 1, and it is important to note that all variables were correlated similarly for girls and boys.

To determine differences in means over time, as well as potential interactions between age and gender, we conducted two repeated-measures ANOVAs, one for sympathy and one for prosocial behavior, with sympathy or prosocial behavior at all five time points being within-groups variables and gender being a between-groups variable. The main effect of age, $F(1, 495) = 12.02, p < .01$, partial $\eta^2 = .09$ and the interaction between age and gender, $F(4, 495) = 8.45, p < .001$, partial $\eta^2 = .06$, were significant for sympathy. Follow-up analyses suggested that there was positive linear change for girls, $F(1, 257) = 7.76, p < .01$, partial $\eta^2 = .03$, whereas for boys, there was quadratic change, $F(1, 241) = 24.67, p < .001$, partial $\eta^2 = .09$, suggesting that levels of sympathy increased over time for girls, but decreased initially for boys, and then increased by age 16 (see Figure 1 and means in Table 1). The ANOVA for prosocial behavior did not suggest an interaction between age and gender, but did reveal a main effect of age, $F(4, 495) = 59.45, p < .001$, partial $\eta^2 = .33$. Linear patterns, $F(1, 498) = 31.37, p < .001$, partial $\eta^2 = .06$, quadratic patterns, $F(1, 498) = 114.13, p < .001$, partial $\eta^2 = .19$, and cubic patterns, $F(1, 498) = 63.76, p < .001$, partial $\eta^2 = .11$, were all significant. Follow-up analyses suggested an initial decrease in prosocial behavior from ages 12 to 13, with a gradual increase back to initial levels by age 15 and continued increase to age 16 for both girls and boys (see Figure 1 and means in Table 1).

Table 1
Descriptive Statistics and Correlations Between Adolescent Sympathy and Prosocial Behavior Toward Strangers

Variable	1	2	3	4	5	6	7	8	9	10	M/SD Boys
1. Sympathy, 12	—	.60	.57	.50	.42	.46	.45	.26	.24	.28	3.78/.54
2. Sympathy, 13	.59	—	.70	.66	.54	.43	.51	.43	.46	.45	3.63/.67
3. Sympathy, 14	.52	.65	—	.81	.68	.29	.40	.40	.40	.49	3.57/.74
4. Sympathy, 15	.37	.53	.66	—	.71	.31	.40	.31	.36	.42	3.57/.80
5. Sympathy, 16	.39	.48	.56	.58	—	.16	.30	.28	.31	.49	3.71/.76
6. PB, 12	.52	.45	.33	.32	.29	—	.52	.42	.33	.29	3.18/.72
7. PB, 13	.47	.52	.44	.40	.37	.66	—	.67	.64	.56	2.86/.72
8. PB, 14	.35	.45	.53	.39	.40	.55	.72	—	.69	.60	2.97/.69
9. PB, 15	.27	.44	.48	.48	.38	.45	.63	.76	—	.69	3.16/.77
10. PB, 16	.30	.47	.52	.45	.47	.39	.60	.71	.76	—	3.24/.73
M/SD Girls	4.02/.54	4.01/.57	4.07/.59	4.10/.59	4.13/.56	3.46/.73	3.26/.78	3.35/.72	3.53/.76	3.63/.76	

Note. PB = prosocial behavior toward strangers. 12–16 = the age range of the adolescents. Values for girls ($n = 258$) are below the diagonal, values for boys ($n = 242$) are above. All correlations are significant at $p < .001$, with the exception of Sympathy, 16, and PB, 12, which were significant at $p < .05$.

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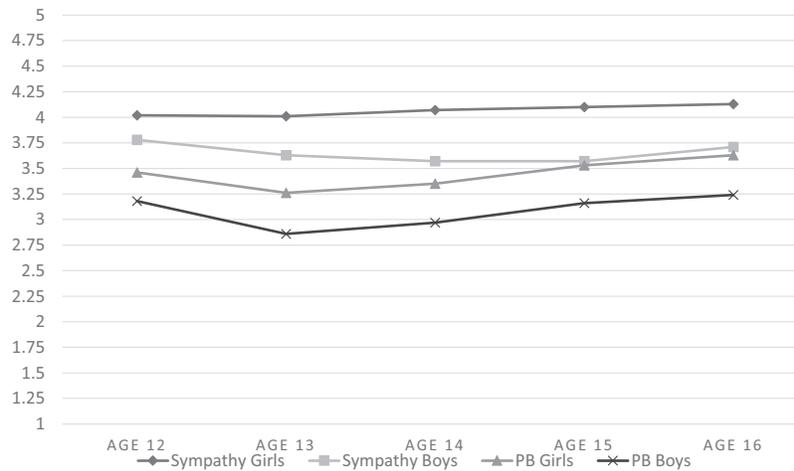


Figure 1. Longitudinal change in sympathy and prosocial behavior for girls and boys. Note. PB = prosocial behavior. For sympathy, analyses suggested that there was positive linear change for girls, $F(1, 257) = 7.76, p < .01$, partial $\eta^2 = .03$, whereas for boys, there was quadratic change, $F(1, 241) = 24.67, p < .001$, partial $\eta^2 = .09$, suggesting that levels of sympathy increased over time for girls, but decreased initially for boys, and then increased by age 16. For prosocial behavior, analyses suggested an initial decrease in prosocial behavior, and then a steady increase over time for both girls and boys (cubic), $F(1, 498) = 63.76, p < .001$, partial $\eta^2 = .11$.

Longitudinal Panel Model

We conducted a panel model using all five time points of adolescent sympathy and prosocial behavior toward strangers. Income and family structure were used as controls in the model. We did not have sufficient sample size to conduct the panel model using latent variables, so all variables were mean scales. Initial model fit (with no constraints) was adequate, $\chi^2(24) = 102.73, p < .001$, comparative fit index (CFI) = .958, root-mean-square error of approximation (RMSEA) = .08. Given mean gender differences found above, we first conducted a multiple group model as a function of adolescent gender, and model fit decreased significantly when means and covariances were constrained to be equal, so these were left free to vary. In addition, model fit decreased when autoregressive or stability paths for sympathy were constrained to be equal across gender (with the exception of age 12–13), so these paths were also left free to vary. Thus, a final multiple group model was conducted, with above mentioned paths, means, and covariances left free to vary; and with autoregressive paths for prosocial behavior and all cross-lagged paths constrained to be equal across boys and girls (compared with the unconstrained model, $\Delta\chi^2(12) = 18.40, p = .10$).

Next, autoregressive and cross-lagged paths were constrained to be equal across time points, which resulted in a decrease in model fit, $\Delta\chi^2(24) = 52.21, p < .001$. Paths were freed one at a time and it was determined that autoregressive paths for sympathy could not be constrained across time points, nor could the autoregressive path from prosocial behavior at 12 years of age be constrained to prosocial autoregressive paths at other time points. Thus, the final model had good fit, with prosocial behavior autoregressive paths from ages 13–16 constrained to be equal across time, as well as all cross-lagged paths, $\chi^2(64) = 142.63, p < .001$, CFI = .952, RMSEA = .05. Results revealed that all bidirectional cross-lagged paths were statistically significant at $p < .001$ (see Figure 2), suggesting that sympathy was longitudinally associated with

prosocial behavior, and prosocial behavior was longitudinally associated with sympathy at all ages. To determine that this was the best fitting model for the data, we examined a number of alternative models, all of which resulted in a decrease in model fit. More specifically, we examined a model with no cross-lagged paths, $\Delta\chi^2(22) = 79.94, p < .001$, another with the paths from prosocial behavior to sympathy set to zero, $\Delta\chi^2(21) = 47.06, p < .001$, another with the paths from sympathy to prosocial behavior set to zero, $\Delta\chi^2(21) = 58.90, p < .001$, and a final model where the strength of the cross-lagged paths were set to be equal to one another, $\Delta\chi^2(21) = 34.68, p < .05$. These analyses suggested that the bidirectional model with all cross-lagged paths was the best fit to the data (see Figure 2), and that, given the decrease in model fit when these paths were constrained to be equal, the paths from sympathy to prosocial behavior were stronger than those from prosocial behavior to sympathy. Family structure was not associated with either variable so it was dropped for parsimony, but income was significantly and positively associated with sympathy at age 12, $r = .28, p < .01$. In terms of overall variance, 31% of the variance of sympathy and 36% of the variance of prosocial behavior were accounted for at age 13, whereas 56% of the variance of sympathy and 53% of the variance of prosocial behavior were accounted for at age 16.

Discussion

Overall, the findings demonstrate support for the expected bidirectional relations between sympathy and prosocial behavior from early to middle adolescence. These findings are in accord with social-cognitive theorists who have asserted that engagement in prosocial behaviors can provide feedback and influence individuals' socioemotive tendencies. Tests of developmental changes in both sympathy and prosocial behavior showed somewhat complex patterns. The results also showed relatively moderate stability of both sympathy and prosocial behavior, and girls reported more

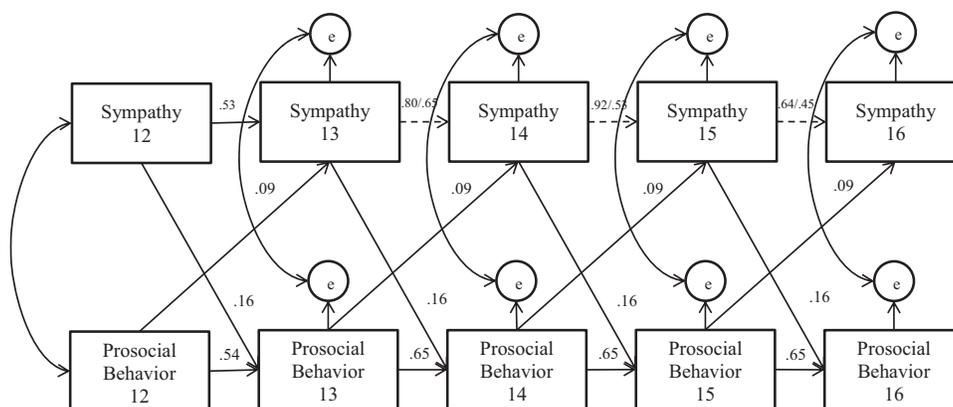


Figure 2. Bidirectional longitudinal panel models between adolescent sympathy and prosocial behavior toward strangers. All values are unstandardized and significant at $p < .001$. Note. Dashed arrows represent paths free to vary as a function of gender (values for boys are before the slash). All structural paths were constrained to be equal across time except stability paths for sympathy and paths from prosocial behavior at age 12-13, $\chi^2(64) = 142.63, p < .001, CFI = .952, RMSEA = .05$.

sympathy and prosocial behaviors than boys across all ages, which is also in accord with previous research findings (Carlo, 2014; Eisenberg et al., 2006). Taken together, the findings suggest a dynamic interplay between moral emotions and prosocial behaviors during adolescence.

The bidirectional relations between sympathy and prosocial behavior across early and middle adolescence provide further support for social feedback hypotheses in that social behaviors can influence subsequent socioemotive tendencies. These findings add to the sparse evidence that suggest interplay between prosocial behavior and sympathy during this age period. As scholars have noted, sympathy may induce a motive to alleviate the distress in others but engaging in prosocial behavior may also induce emotional sensitivity toward others. Although the bidirectional relations in the current study were significant, it should be noted that the findings suggest a relatively stronger effect of sympathy on prosocial behavior than the reverse. This latter finding may reflect the early emergence and strong temporal stability of sympathy from early childhood (Eisenberg et al., 2006). However, over time, these bidirectional effects could reflect a recursive, integrative process that results in a strong sense of moral self. Along with greater sociocognitive abilities and the importance of identity development in adolescence (Erikson, 1980), this recursive process may facilitate greater integration of expressed sympathy and prosocial behavior into a developing sense of moral self. Although research on moral identity development is scarce (Hardy & Carlo, 2011), the present findings provide impetus for future research on this issue.

Of particular interest were the age-related changes in prosocial tendencies. Age-related changes in sympathy were complex and gender-specific. For girls, sympathy increased across early to middle adolescence; however, for boys, sympathy initially decreased but then was followed by an increase in later adolescence. The findings for boys are in accord with previous research (Van der Graaff et al., 2014). The general increase for girls is consistent with earlier theories and some prior research (Eisenberg et al., 2006), but is somewhat inconsistent with other research that

showed no age-related changes in sympathy for adolescent girls (van der Graaff et al., 2014). These mixed findings are somewhat puzzling and will need to be further examined in future research.

We found it interesting that there was a cubic pattern of age-related changes in prosocial behaviors for both boys and girls. The age-related changes in prosocial behaviors demonstrated that there was an initial decrease in prosocial behaviors, followed by an increase in such behaviors into middle adolescence. This finding replicates prior studies that demonstrate similar patterns of age-related changes in adolescence (e.g., Carlo et al., 2007; Eisenberg et al., 2005). Research is needed to examine the possible causes for this initial dip and subsequent increase during adolescence. Although the pattern is similar to the pattern demonstrated for boys' sympathy, there was no such pattern for girls' sympathy. These findings suggest that age-related changes in prosocial behavior are not likely to be fully explained by age-related changes in sympathy during this age period. Perhaps, as cognitive-developmental theorists (see Eisenberg et al., 2006) have suggested, age-related changes in prosocial behaviors are better explained by age-related changes in sociomoral cognitions (e.g., perspective taking, moral reasoning). Finally, the gender differences in sympathy and prosocial behavior, such that girls scored higher than boys, add to the extant evidence and are consistent with gender-role socialization theories and prior research (Carlo, 2014).

Other findings showed relatively moderate stability of sympathy and prosocial behavior across adolescence. These findings are in accord with the few prior longitudinal studies in adolescence on sympathy and prosocial behaviors (Carlo et al., 2007; Matthews, Batson, Horn, & Rosenman, 1981; Eisenberg et al., 1999). However, the present findings extend those earlier studies by demonstrating stability across a longer period of adolescence, and with a relatively large sample. Scholars have suggested that the demonstrated stability of prosocial tendencies is partly due to biological factors, including genetics, and environmental factors such as parenting and peer-group affiliations (Carlo, 2014; Eisenberg et al., 1999). However, it should be noted that the relatively moderate

effect sizes also demonstrate instability, which allows for intraindividual change in these processes to also occur.

The present findings should be interpreted with caution. First, the measures of sympathy and prosocial behavior were self-report, paper-and-pencil measures. Although the findings were generally consistent with prior research, future studies using multiple methods are desirable. And second, despite the relatively large sample, research on samples that represent greater diversity (e.g., race, ethnicity) is needed to generalize the present findings. However, the findings also provide promise for future research on prosocial development during adolescence. For example, given the recent interest in studying different forms of prosocial behavior (e.g., altruistic, selfish) and helping different target individuals (e.g., friends, romantic partners; Padilla-Walker & Carlo, 2014), future research efforts on understanding age-related changes and relations in these different forms of prosocial tendencies during this age period are needed. Indeed, the growing evidence on specific forms and targets of helping suggest that the present findings should be considered generalizable to helping strangers, but not necessarily to other targets (e.g., Padilla-Walker et al., 2015). Similarly, the bidirectional relations between sympathy and helping might be particularly evident in strong emotionally evocative contexts (e.g., in dire or emergency situations), but might be less so in relatively nonemotional contexts (e.g., donating to school charities; see Carlo, 2014). Nonetheless, the findings demonstrate a complex, gender-specific pattern of age-related change in prosocial tendencies and reciprocal links between sympathy and prosocial behavior across time. These findings yield supportive evidence for theorists who posit the bidirectional effects of prosocial tendencies, and provide evidence for the need to consider gender and developmental issues in intervention efforts designed to promote prosocial tendencies in adolescents.

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