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The Contribution of Agreeableness and Self-efficacy Beliefs to Prosociality

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Abstract

The present study examined how agreeableness and self-efficacy beliefs about responding empathically to others' needs predict individuals' prosociality across time. Participants were 377 adolescents (66% males) aged 16 at Time 1 and 18 at Time 2 who took part at this study. Measures of agreeableness, empathic self-efficacy and prosociality were collected at two time points. The findings corroborated the posited paths of relations to assigning agreeableness a major role in predicting the level of individuals' prosociality. Empathic self-efficacy beliefs partially mediated the relation of agreeableness to prosociality. The posited conceptual model accounted for a significant portion of variance in prosociality and provides guidance with respect to interventions aimed at promoting prosociality.

Keywords

prosociality; agreeableness; empathic self-efficacy beliefs

INTRODUCTION

Prosocial behaviours refer to voluntary actions undertaken to benefit others. They include a variety of behaviours such as sharing, donating, caring, comforting and helping (Batson, 1998; Eisenberg & Fabes, 1998; Eisenberg, Fabes, & Spinrad, 2006; Penner, Dovidio, Piliavin, & Schroeder, 2005; Schroeder, Penner, Dovidio, & Piliavin, 1995). Although the benefits of these behaviours for the target are quite obvious, findings also attest to their beneficial effects for the actor. In particular, early individual differences in prosocial behaviour appear to relate to children's accomplishments in the academic domain and levels of depression and transgressive behaviour (Bandura, Barbaranelli, Caprara, & Pastorelli, 1996; Bandura, Caprara, Barbaranelli, Pastorelli, & Regalia, 2001; Kokko, Tremblay, Lacourse, Nagin, & Vitaro, 2006; Vitaro, Brendgen, Larose, & Tremblay, 2005; Wentzel, 1993). Children inclined to prosocial behaviour perform better at school and are less at risk of problem behaviours (i.e. internalizing and externalizing behaviour; Bandura, Pastorelli, Barbaranelli, & Caprara, 1999; Caprara, Barbaranelli, Pastorelli, Bandura, & Zimbardo, 2000; Eisenberg & Morris, 2004; Miles & Stipek, 2006; Newman, 1991; Wentzel, 1997; Wentzel, McNamara-Barry, &

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Caldwell, 2004; Xinyin, Mowei, Rubin, Cen, Xiangping, & Li, 2002). In addition, over the course of life, dispositional prosocial behaviour (i.e. prosociality) may foster self-worth and successful psychosocial adaptation and increases experiences that nourish positive feelings, such as others' regard or gratitude (Caprara & Steca, 2005; Keyes, 1998; Midlarsky, 1991; Moen, Dempster-McClain, & Williams, 1992; Musick, Herzog, & House, 1999; Oman, Thoresen, & McMahon, 1999; Van Willigen, 2000).

These positive correlates of prosocial behaviour and prosociality have led to a focus on the psychosocial processes that regulate and promote prosocial behaviour as well as a focus on individuals' tendencies conducive to behave prosocially across situations. A number of authors have pointed to sympathy and empathy as critical ingredients for individuals' prosocial behaviour and have noted that both concern for others well-being and the capacity for experiencing others' feelings are crucial to effectively meet others' needs (Eisenberg et al., 2006; Hoffman, 2001; Krebs & Van Hesteren, 1994). Yet the interplay among the psychological structures and processes associated with the frequency and the stability of prosocial behaviour needs to be further clarified. As certain people are more inclined than others to enact behaviours that benefit others, the systematic study of individual differences is crucial to identify aspects of personality that are conducive to prosocial behaviour and a prosocial personality (Penner et al., 2005).

A number of researchers, in fact, have shown that individual differences in the tendency to help, care and share are relatively stable over time and can be traced back to a common latent personality dimension (Ashton & Lee, 2001; Eisenberg, Carlo, Murphy, & Van Court, 1995; Graziano, 1994; Graziano & Eisenberg, 1997; Penner et al., 2005). Among trait psychologists viewing the Big Five as a comprehensive framework for addressing major individual differences in personality, agreeableness has been seen as a major determinant of prosocial behaviour (Graziano, Bruce, Sheese, & Tobin, 2007; Graziano & Eisenberg, 1997; Graziano & Tobin, 2002; Tobin, Graziano, Vanman, & Tassinari, 2000). Agreeable individuals are altruistic, straightforward, trusting, soft-hearted, modest and compliant (Graziano, 1994; McCrae & Costa, 1997, 1998). Penner and his associates (Penner et al., 1995) have identified two dimensions of the 'prosocial personality'—'other-oriented-empathy' (i.e. the tendency to experience cognitive and affective empathy) and helpfulness (i.e. the self-perception that one is a helpful individual)—and demonstrated that the first dimension was highly related to agreeableness. Graziano, Hebashi, Sheese, and Tobin (2007), in a multi-method study that allowed an experimental manipulation of empathic focus, clearly demonstrated that aspects of agreeableness causally affected prosocial motivation.

Social cognitive theorists, instead, have pointed to the pervasive role that self-efficacy beliefs exert on personality functioning through their influence on affect, thought, motivation and actions (Bandura, 1997). Caprara (2002), in particular, pointed to affective and interpersonal self-efficacy beliefs as important determinants of psychosocial functioning, including prosocial behaviour. It is unlikely that people engage in the sacrifices and costs of prosocial behaviour unless they believe they are able to both master the emotions associated with the recognition of others' needs and establish the proper relationships and actions conducive to meet those needs.

Previous findings attest to the role of affective and interpersonal self-efficacy beliefs in sustaining and promoting individuals' tendencies to behave prosocially. Empathic self-efficacy beliefs, namely individuals' judgments about their abilities to be sensitive to others' feelings in situations of need, have accounted for a significant portion of individual differences in prosociality. Moreover, empathic self-efficacy beliefs fully mediate the relation of affective self-regulatory efficacy beliefs, namely self-efficacy beliefs in managing negative affect and expressing positive affect, to prosocial behavioural tendencies (Alessandri, Caprara, Steca, &

Eisenberg, 2009; Bandura, Caprara, Barbaranelli, Gerbino, & Pastorelli, 2003; Caprara, Scabini, Barbaranelli, Pastorelli, Regalia, & Bandura, 1999). As the capacity to regulate emotions is crucial to be sensitive to others' feelings, empathic self-efficacy probably is crucial in sustaining prosociality in many contexts.

Ultimately, it is unlikely that people engage in activities aimed to benefit others, unless they assign value to others' 'well being'. Yet even the most altruistic intentions may fail unless people feel able to face the emotional and interpersonal challenges that prosocial behaviour may entail (Caprara & Steca, 2007).

As noted above, a number of findings indicate that people differ in their inclination to engage in costly activities just for others' well being and attest to the role of agreeableness in fostering prosocial behaviour (Graziano & Eisenberg, 1997). Yet it is unlikely that agreeableness alone accounts for all prosocial behaviour when specific abilities and/or the belief in one's abilities are required to complement ones' own friendly dispositions to effectively meet others' needs.

Few researchers, to our knowledge, have capitalized on both trait theory and social cognitive theory when examining prosociality. Caprara, Capanna, Steca, and Paciello (2005) conducted a cross-sectional study examining interpersonal and social self-efficacy beliefs, as well as agreeableness, as major determinants of prosociality. Two alternative models were separately tested. The first assigned causal primacy to agreeableness, assuming that self-efficacy beliefs mediate its relation to prosociality. The second model, instead, posited self-efficacy beliefs as an antecedent of agreeableness which, in turn, mediated self-efficacy beliefs' influence on prosociality. Both models showed satisfactory fit but the cross-sectional nature of study precluded any firm conclusion regarding the direction of influence among the examined variables.

Although trait theory and theory regarding self-efficacy beliefs have different roots, it may be useful to integrate both approaches to obtain a better comprehension of psychological structures and mechanisms conducive to stable individual differences in prosociality (Caprara & Cervone, 2000).

In conceiving personality as a complex system, we include structures and processes operating in concert although at different levels and at different distance from behaviour. Thus, trait theory and social cognitive theory may complement each other as they address different structures and processes that are crucial to fully account for personality functioning and major individual differences. Whereas trait theorists focus on basic universal tendencies conducive to respond isomorphically to environment demands, social cognitive theorists focus on self-regulatory processes and mechanisms attesting to individuals' propensities to self-reflect and to accord behaviour to ones' own pursuits and standard.

One may view prosocial behaviour as an appropriate target to build a bridge between the two theories, as both agreeableness and empathic self-efficacy beliefs have been found to account for a significant portion of variability in individual differences in a surface behavioural tendency such as prosociality. We consider agreeableness, empathic self-efficacy beliefs, and prosociality as layers of a hypothetic architecture of personality, in which: (i) Agreeableness is a relatively unconditional, broad disposition referring to what a person 'has' (level 1); (ii) prosociality is a specific behavioural tendency referring to what a person habitually does (level 3); (iii) and empathic self-efficacy is a knowledge structure (i.e. a set self-related beliefs) operating at an intermediate level between broad dispositions and specific behaviour.

This reasoning echoes previous distinctions made by both McAdams' (1995) and Graziano, Jensen-Campbell, and Finch (1997) in regard to levels of analysis, while assigning to self-efficacy a crucial mediating role in turning basic dispositions into specific behaviours.

Although our layers do not fully overlap with McAdams' (1995) and Graziano, Jensen-Campbell et al.'s (1997) levels of analysis, we share the view that individual differences in personality should be addressed at different levels, as well as the belief that a comprehensive view of personality should account for both traits and self-processes.

The present prospective study was designed to examine how agreeableness and empathic self-efficacy beliefs might contribute to the chronic tendency to behave prosocially, namely to prosociality. We posited a model in which agreeableness contributes to prosociality directly and indirectly through its influence on empathic self-efficacy beliefs. Figure 1 displays the proposed theoretical model. We assigned primacy to agreeableness in the posited set of pathways in accordance with a vast literature attesting to the significant genetic component of basic traits, including agreeableness, as well as in accordance with alternative views of traits as habitual responses resulting from chronic person-situations interactions that, once crystallized, operate as automatic behavioural tendencies (Cervone & Shoda, 1999; Higgings, 1999; Jang, Livesley, & Vernon, 1996; Jang, McCrae, Angleitner, Riemann, & Livesley, 1998; Johnson & Krueger, 2004; Lohelin, 1982; Lohelin, McCrae, Costa, & John, 1998; Riemann, Angleitner, & Strelau, 1997). As agreeableness is a fundamental and early-appearing aspect of temperament and personality (Caspi & Shiner, 2006; Eisenberg et al., 2006; Rothbart & Bates, 2006), it seems reasonable that it would affect beliefs about the self rather than *vice versa*.

Heritability appears to account for a considerable portion of agreeableness (Jang et al., 1996, 1998; Lohelin et al., 1998; Riemann et al., 1997), and agreeableness has been linked to early temperamental self-regulative systems of effortful control (Cumberland-Li, Eisenberg, & Reiser, 2004; Rothbart, 1989; Rothbart & Bates, 1998). As children mature, effortful control (i.e. temperament-based self-regulatory processes based on executive attention) develops into a personality system, likely contributing to trait agreeableness (Caspi, 1998; Rothbart & Bates, 2006), that is specifically linked to anger regulation, control of negative affect, and the ability to deal effectively with frustrations due to other people (Ahadi & Rothbart, 1994; Graziano, 1994; Haas, Omura, Constable, & Canli, 2007; Jensen-Campbell, Adams, Perry, Workman, Furdella, & Egan, 2002; Jensen-Campbell & Graziano, 2001; Shiner, 1998; Shiner & Caspi, 2003). Later in childhood and adulthood, highly agreeable individuals, in comparison to less agreeable adults, have shown a willingness to sacrifice their self-interest in favour of others, respond constructively to interpersonal conflict, cooperate during group tasks, display self-control, and report positive perceptions of others (Ahadi & Rothbart, 1994; Cumberland-Li et al., 2004; Finch & Graziano, 2001; Graziano & Eisenberg, 1997; Graziano, Hair, & Finch, 1997; Graziano, Jensen-Campbell, & Hair, 1996; Jensen-Campbell & Graziano, 2001; Tobin et al., 2000). Consistent with these findings pointing to the early developmental roots of trait agreeableness, we hypothesized that agreeableness operates as a primary spontaneous behavioural tendency setting the basis for mastery experiences in prosocial interactions leading to prosocial self-efficacy beliefs. Moreover, we also speculated that it is likely that self-evaluations of one's own agreeableness contribute to individuals' experiences as effective in contexts with prosocial opportunities and to self-perceptions of how capable one is of empathy in such situations. As spontaneous sharing, donating, caring, comforting and helping get rewarded by others, individuals gain confidence in their capabilities to meet others' needs.

In particular, confidence in one's capacity to empathize with others, namely empathic self-efficacy beliefs, is crucial to engender appropriate actions aimed at meeting others' needs for comprehension, comfort and support, over and above the spontaneous tendency to benefit others, namely agreeableness. Investigators have found that children's actual ability to help and their knowledge of helping strategies have been related to their prosocial behaviour, as have their empathy and sympathy (see Eisenberg, 1987; Eisenberg & Fabes, 1998, for reviews). In addition, perceived empathic self-efficacy has been related to youths' and adults' prosocial

behaviour (Alessandri et al., 2009; Caprara & Steca, 2005, 2007). Thus, we expected empathic self-efficacy beliefs to predict individuals' propensities to help in late adolescence, an age at which mature cognitive and emotional functioning and moral reasoning enhance individuals' abilities to take others' perspective, be sensitive to others' feelings, and express appropriately ones' own sympathy (Carlo, Eisenberg & Knight, 1992; Eisenberg, 2000, 2002; Eisenberg et al., 1995, 2002, 2006; Eisenberg, Miller, Shell, McNalley, & Shea, 1991; Underwood & Moore, 1982).

In accordance with previous findings (Alessandri et al., 2009; Bandura et al., 2003; Caprara et al., 2005; Caprara & Steca, 2005, 2007), we also expected females to score higher than males in agreeableness, empathic self-efficacy, and prosociality, but we had no reason to expect any gender differences in the posited relations among these variables. Also in accordance with previous findings, we expected moderate to high rank-order stability of agreeableness and prosociality for both males and females (Eisenberg et al., 1995, 2002; Roberts & DelVecchio, 2000), as well as for empathic self-efficacy (Alessandri et al., 2009; Caprara, 2008).

METHOD

Participants

The participants were part of an ongoing longitudinal project that began in 1989 and was implemented to investigate the main determinants and pathways of successful development and adjustment from late childhood to early adulthood. The longitudinal project followed a staggered, multiple cohort design (Menard, 2007). In a staggered multiple cohort design two or more different cohorts have the same age, but at different years. In this study, we used two cohort of the same age, assessed at two different time points. The first cohort was age 16 at 2000; the second cohort was age 16 at 2002 (Time 1, henceforth T1). These participants were retested at age 18 (Time 2, henceforth T2). Cohort effects were tested (e.g. variables were compared at the same age) and were found to be non-significant for socio-demographic and the major study variables (i.e. agreeableness, empathic self-efficacy and prosociality at both time points). Therefore, the data from the two cohorts were combined.

Three hundred and seventy seven adolescents (66% males) took part at this study. Participants attended the 10th grade at T1 and most of them attended the 12th grade at T2. Originally, at first assessment (T1), all participants were drawn from two schools located in Genzano, a residential community near Rome, and they were from families involved in an ongoing longitudinal study in that community. The families constituting this community represent a socio-economic microcosm of the larger Italian society: 14% 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. The socioeconomic heterogeneity of the sample adds to the generalizability of the findings. The occupational socio-economic distribution also matched the national profile (ISTAT, 2002). In addition, the composition of the families matched national data with regard to type of families and number of children. Most adolescents were from intact families (94.8%) and, on average, from one-child families. The participation rate was high during the longitudinal data collection. Ten per cent of participants (66% males) missed data collection at T2. The attrition was mainly due to absence from school at the time of the assessment, or in a few cases, relocation from the area or the inability to contact the participant. Analyses of variance suggested that the latter participants included in the final sample did not significantly differ from their counterparts (i.e. the participants who were not available at T2) on any of the variables in the initial assessment; nor did the groups differ in the covariance matrices as tested by the *Box-M* test for homogeneity of covariance matrices.

Procedures

At both time points, adolescents completed a set of measurement scales that was administered in classrooms by two trained females experimenters. They were asked to complete the scales independently of others. When necessary, the experimenters offered clarification regarding the behaviours measured. Parents' and youths' consents, as well as approval from school councils, were obtained. The researcher explained that responses to the questionnaires would be kept confidential. All participants received a small payment for participation (25€/\$34) or an equivalent dinner token).

Measures

Prosociality—Participants rated their prosociality on a 16-item scale (1 = never/almost never true; 5 = almost always/always true) that assesses the degree of engagement in actions aimed at sharing, helping, taking care of others' needs and empathizing with their feelings (Caprara, Steca, Zelli, & Capanna, 2005). The α reliability coefficient was .95 at T1 and .95 at T2. The psychometric properties of the prosociality scale have been cross-gender and cross-nationally validated on large samples of respondents (Tramontano et al., 2009 e.g. 'I try to help others' and 'I try to console people who are sad'). Researchers have also found a moderately high correlation ($r = .54$) between self- and other-ratings on this prosociality scale, further supporting its validity (Caprara, Steca, Vecchio, Tramontano, & Alessandri, 2008). Because the four items related to empathizing with others' feelings could overlap with measures of empathic self-efficacy beliefs, we used only the 12 items that assess the degree of their sharing, helping, taking care of others' needs. The α for the reduced scale was .90 at T1 and .91 at T2.

Agreeableness—Participants rated their agreeableness on the 24 items of Big Five Questionnaire (BFQ; Caprara, Barbaranelli, & Borgogni, 1996). The BFQ contains five domain scales and 10 'facet' scales to assess the Big Five Factors of personality. The psychometric properties of the BFQ have been validated on large samples of Italian respondents as well as in cross-cultural comparisons (Barbaranelli & Caprara, 2000; Caprara, Barbaranelli, Bermudez, Maslach, & Ruch, 2000). The Friendliness domain scale refers to personality characteristics often labelled agreeableness (McCrae & Costa, 1997) and is structured into two facets: *Cooperativeness*, (e.g. 'I'm convinced that better results are obtained by cooperating rather than by competing') which refers to concern and sensitiveness toward others and their needs, and *Politeness* (e.g. 'I hold that there's something good in everyone'), which refers to kindness, civility, docility and trust. For each item, the respondent indicated complete disagreement (1 = very false for me) to complete agreement (5 = very true for me). The α reliability coefficients were .74 at T1 and .78 at T2. High correlations between the BFQ and the NEO-PI (Costa & McCrae, 1985) have been previously established; in particular, BFQ-Friendliness/agreeableness has been strongly and positively correlated with NEO-PI-agreeableness (Caprara, Barbaranelli, Borgogni, & Perugini, 1993). Of note, since five items related to empathy domains could overlap with measures of empathic self-efficacy beliefs, we used only 19 items from this scale. The α for the reduced scale was .71 at T1 and .77 at T2.

Empathic self-efficacy—Perceived empathic self-efficacy (Bandura et al., 2003; Caprara, Gerbino, & Delle Fratte, 2001) was measured with 12 items reflecting one's perceived capability to sense another person's feelings and need for emotional support, to discern emotional expressions, to experience emotions from another person's perspective, to respond empathetically to others distress and misfortune, and to be sensitive to how one's actions affect others' feelings (e.g. 'How well can you experience how a person in trouble feels?'). Recent findings attest to a positive, moderately high correlations between empathic self-efficacy and sympathy and perspective taking (Ranfone, 2008). Participants rated the strength of their self-efficacy beliefs on a 5-point scale (1 = not well at all; 5 = very well) ranging from perceived

incapability to complete self-assurance in one's capability. The α coefficients at T1 and T2 were .86 and .89.

Preliminary analysis—In order to investigate the dimensionality of the measure items and to avoid any overlapping among the three measures, a principal factor analysis with Promax rotation was performed at each assessment times. According to the scree-plots, the two analyses yielded a three-factor structure corresponding to the hypothesized three domains of agreeableness, empathic self-efficacy, and to prosociality at each assessment time. The actual item loadings on the intended factors ranged from .39 to .89 ($M = .53$; $SD = .13$) across the two assessment times, whereas the secondary loading varied from .03 to .15 ($M = .13$; $SD = .07$) across the two assessment times. Factor correlations ranged from .11 to .66 across the two assessment time. These analysis, further attested: (1) To the factorial validity of all the measures, (2) to the empirical separateness of the considered constructs, and the lack of empirical overlapping among items measuring different constructs, as revealed by the low secondary loadings.

RESULTS

Missing data

There were some missing data for all of the variables. This situation is common in longitudinal research due to subject attrition (Hanson, Tobler, & Graham, 1990). Our modelling assumed that the missing values are 'missing at random' (i.e. missingness may be related to the observed value for the variable in the data set, but unrelated to unobserved missing values); thus, we estimated missing values by using the expectation maximization algorithm. This procedure is an iterative algorithm that restores the complete data matrix using maximum-likelihood estimation (Dempster, Laird, & Rubin, 1977; Little & Rubin, 2002), under the assumption of multivariate normality.

Descriptive statistics

One-way analyses of variance (ANOVAs) were performed to assess sex differences in the adolescents' reports of agreeableness, empathic self-efficacy and prosociality at T1 and T2. Table 1 reports imputed means, standard deviations, results of the ANOVAs examining gender differences, and estimates of effect sizes. At both T1 and T2, females scored higher than males on agreeableness, empathic self-efficacy and prosociality.

Table 2 contains the zero-order correlations among agreeableness, empathic self-efficacy and prosociality. High correlations across time attest to the high stability of agreeableness, empathic self-efficacy beliefs and prosociality. Furthermore, ratings of agreeableness, empathic self-efficacy and prosociality were significantly and positively correlated at both time points for both sexes, although some of these interrelations were found for males but not females across time. Specifically, females' empathic self-efficacy at T1 did not correlate with agreeableness at T2; nor did females' T1 prosociality correlate with their empathic self-efficacy at T2.

Relations of agreeableness and self-efficacy beliefs to prosociality

We tested the hypothesized relations among the variables using two longitudinal models, using Mplus 4.01 (Muthén & Muthén, 2006). In the first longitudinal model, we tested mediation 'within time' at T1 and at T2. In a second longitudinal model, we tested for mediation 'across time' when controlling for stability of the variables across time. As suggested by Cole and Maxwell (2003; Maxwell and Cole, 2007), the second model represented a more stringent test of mediation using two time points. According to a multifaceted approach to the assessment of the model's fit (Tanaka, 1993), the following criteria were employed to evaluate the goodness of fit: χ^2 likelihood ratio statistic, Tucker and Lewis Index (TLI), Comparative Fit

Index (CFI), and the Root Mean Square Error of Approximation (RMSEA) with associated confidence intervals. The significance value of χ^2 is sensitive to large sample sizes and easily produces a statistically significant result (Kline, 1998). We accepted TLI and CFI values greater than .95 (Hu & Bentler, 1999) and RMSEA values lower than .08 (Browne & Cudeck, 1993). In order to test for possible moderation by sex, we used multiple group structural equation modelling. In this approach, the equivalence between the different groups is evaluated by constraints imposing identical unstandardized estimates for the model's parameters (Byrne, 1994; Scott-Lennox & Scott-Lennox, 1995).¹ In Mplus, the plausibility of these equality constraints is examined with the modification indices and the χ^2 difference test between nested models (i.e. constrained models vs. the baseline unconstrained model; see Bollen, 1989). For the first model, mediated effects were calculated using the procedures outlined by MacKinnon, Lockwood, Hoffman, West, and Sheets (2002). Furthermore, we followed the asymmetric confidence interval method recommended by MacKinnon et al. (2002) to formally test mediation (MacKinnon, Lockwood, & Williams, 2004). The critical values for the upper and lower confidence limits for indirect effect were calculated on the basis of the product of two random variables from the program PRODCLIN2 (Fritz & MacKinnon, 2007; MacKinnon, Fritz, Williams, & Lockwood, 2007). The composite mean scores on each scale were used as indicators in all the subsequent models and all variables included in the model were posited as single indicator latent variables by estimating the error terms from reliabilities (Bollen, 1989).

Test of within-time mediation controlling for variable stability

In the hypothesized model (Figure 1), there were paths from agreeableness to empathic self-efficacy, and then from empathic self-efficacy to prosociality within T1 and within T2. As we hypothesized partial mediation, we also included paths from agreeableness to prosociality at both T1 and at T2. In this model, we included the autoregressive paths between the same variables from T1 to T2 (i.e. the path predicting a variable at T2 from its prior level). The hypothesized unconstrained model fit the data very well, $\chi^2(12) = 11.28$, $p = .50$, CFI = 1.00, TLI = 1.00, RMSEA = .01 (.01–.07).

Starting from this unconstrained model, to investigate the moderating role of sex, we constrained all the paths to be equal for males and females (*the sex constrained model*). The aforementioned model with freely estimated paths fit better than the model with paths constrained to be equal across gender, as indicated by the significant change in overall χ^2 between the constrained vs. unconstrained model, $\Delta\chi^2(9) = 17.76$, $p = .04$. Therefore, we compared the unconstrained model with models in which we fixed one path at a time. The path that could not be set equal across sexes was the path from agreeableness to empathic self-efficacy at T1, $\Delta\chi^2(1) = 8.91$, $p < .001$. Inspection of structural parameters indicated that the unstandardized parameter estimates associated with this path were both significant but substantively higher at T1 for males ($b = .42$) than for females ($b = .11$). When we set all other paths equal across sex, the fit of the model was not significantly degraded, $\Delta\chi^2(8) = 9.21$, $p = .32$.

Next we tested a 'time constrained/sex partial constrained model'. In this model, we constrained all the paths to be equal either across T1 and T2, and across males and females, except for the path from agreeableness to empathic self-efficacy which (according to previous results) was still freely estimated across sexes (although the equality constraint across times within the male group and, separately, within the female group, was imposed).

¹As equality constrain was imposed on unstandardized parameter estimates, standardized parameter could be different across groups. In all figures, we reported separate standardized parameter estimates from the 'time constrained/sex partial constrained model', one for males and one for females, and signalled when the equality constraint needed to be lifted from the associated unstandardized parameter estimate (i.e. in all figures, the parameter that differed across sexes are underlined).

We compared the time constrained/sex partial constrained model with the ‘unconstrained model’. The change in fit between the constrained versus unconstrained model was not significant: $\Delta\chi^2(11) = 18.64, p = .08$. Figure 2 presents this final model with associated standardized paths. The model had a good data fit: $\chi^2(23) = 29.92, p = .15$, CFI = .99, TLI = .99, RMSEA = .040 (.01–.076). All paths at T1 and T2 were significant and in the expected directions. As expected, for both males and females, agreeableness significantly and positively related to empathic self-efficacy beliefs and prosociality. In addition, empathic self-efficacy beliefs significantly related to prosociality.

The unstandardized parameter estimates were all equivalent across sex either within or across time points with the exception of the two within-time paths from agreeableness to empathic self-efficacy. (The estimates in Figure 2 are standardized and thus differ across sex and time). Thus, the indirect effects of agreeableness on prosociality through empathic self-efficacy beliefs were different for males and females, resulting in two different associated indirect effects. Moreover, in the time constrained/sex partial constrained model, empathic self-efficacy beliefs significantly and partially mediated the relations between agreeableness and prosociality differently for males, $b = .12; z = 5.79$, and females, $b = .07; z = 3.64, ps < .001$, with mediation being stronger for the former.

For testing mediation more formally, we computed asymmetric confidence intervals around the significant coefficients for the indirect effects (MacKinnon et al., 2002, 2004). The confidence intervals for these paths did not include zero (from .08 to .17 for males and .03 to .11 for females). Mediation by empathic self-efficacy beliefs accounted for 30% of the relation of agreeableness to prosociality in males and for 19% in females.

Test of mediation over time

Recently Cole and Maxwell proposed a more stringent test of mediation using two time points (Cole & Maxwell, 2003; Maxwell & Cole, 2007). According to this test, we examined whether agreeableness at T1 predicted empathic self-efficacy and prosociality at T2, and whether empathic self-efficacy at T1 predicted prosociality at T2 over and beyond the autoregressive effects.

We conducted this analysis within the above presented multiple-group framework and simultaneously estimated for males and females a model that included: (1) The autoregressive paths; (2) the cross-time paths from agreeableness T1 to empathic self-efficacy and prosociality at T2; (3) the cross-time paths from empathic self-efficacy at T1 to prosociality at T2; (4) the covariance between all of the variables at T1 and also at T2. The empirical test showed that this model showed a good data fit, $\chi^2(6) = 6.28, p = .39$, CFI = 1.00, TLI = 1.00, RMSEA = .001 (.01–.085). However, the comparison of this model with a model imposing the equality of all structural paths across sexes revealed a non-trivial decline in fit, $\Delta\chi^2(12) = 42.17, p < .001$. The covariance between empathic self-efficacy beliefs and prosociality at T1, $\Delta\chi^2(1) = 22.64, p < .001$, and the covariance between prosociality and agreeableness at T2, $\Delta\chi^2(1) = 14.61, p < .001$, were not invariant across sexes. Inspection of structural parameters indicated that the unstandardized covariance estimate between empathic self-efficacy and prosociality was higher for males ($\phi = .11$) than females ($\phi = .04$) at T1, and that the unstandardized estimate of the covariance between agreeableness and prosociality at T2 was lower for females ($\psi = .03$) than for males ($\psi = .08$). Both parameters were significant for both males and females. Considering all others paths to be equal across sex did not significantly degrade the fit of the model, χ^2 -difference test: $\Delta\chi^2(10) = 14.11, p = .17$.

Figure 3 presents this final model with associated standardized paths. Fit indices attest to the good fit of the model, $\chi^2(16) = 20.40, p = .19$, CFI = .99, TLI = .99, RMSEA = .038 (.01–.082). As shown in Figure 3, and in accordance with our reasoning and expectations, agreeableness

predicted prosociality directly and indirectly through the partial mediation of empathic self-efficacy. Finally, the model fit did not improve when we simultaneously added: (1) The path from T1 empathic self-efficacy to T2 agreeableness, (2) the path from T1 prosociality to T2 agreeableness, and (3) the path from T1 prosociality to T2 empathic self-efficacy: $\Delta\chi^2(6) = 6.95, p = .33$, and all of these paths were non-significant. Finally, all constructs were positively correlated within time.

We also attempted to test cross-directional paths in the model by computing two alternative models. The first tested whether empathic self-efficacy at T1 predicted agreeableness and prosociality at T2, and agreeableness at T1 predicted prosociality at T2 (following standard procedure, we also allowed all autoregressive paths).² The fit of this model was only marginally acceptable. It yielded a significant Chi-square value, $\chi^2(8) = 17.57, p = .02$, and fared less well on the indices of goodness fit, CFI = .99, a TLI = .95, and a RMSEA = .080 (.03–.13). The second model tested whether prosociality at T1 predicted empathic self-efficacy and agreeableness at T2 (again, we also included all autoregressive paths). This model do not fit the data adequately, $\chi^2(8) = 31.06, p < .01$, CFI = .97, a TLI = .87, and RMSEA = .12 (.08–.17).

DISCUSSION

A number of studies in recent years have pointed to basic traits and self-efficacy beliefs as major determinants of individual differences in prosocial behaviour (Alessandri et al., 2009; Caprara & Steca, 2005, 2007; Graziano, Bruce, et al., 2007; Graziano, Hebashi, et al., 2007). However, except for the cross-sectional study of Caprara et al. (2003), no previous longitudinal work has focused on the differential contribution of traits and self-efficacy beliefs to prosociality, nor how these variables may operate in concert over time.

As stated in the introduction, we view at personality as a complex self-regulatory system including basic traits, self beliefs, values, surface behavioural tendencies as well other constructs, we may use in the study of individual differences. We view agreeableness, empathic self-efficacy beliefs and prosociality as different intrapersonal systems including structures and processes that operate in concert but may impinge on behaviour to a different degree. Distinct constructs respond to the need of fine-grained description of personality as well as to the need to capture different intrapersonal structures and processes we usually infer from what people do and/or report about themselves and others. This is particularly needed when dealing with people, and on longitudinal findings other than on experiments that are impossible (and unethical) to make.

Basic traits and self-efficacy beliefs belong to different traditions, but it is time to bring them together. Basic traits point to what is universal and stable in personality; in contrast, self-efficacy beliefs point to mastery experiences conducive to skills that mostly depend on opportunities and challenges. Bringing together basic traits and self-efficacy beliefs is crucial to bind individual potential with the agentic power of human nature.

Findings corroborated the posited conceptual model in which a broad and basic trait like agreeableness contributes to a specific behavioural tendency like prosociality directly and indirectly through the mediation of self-efficacy beliefs across time. This pattern of influence held when taking into account the stability of the examined variables.

When considering agreeableness and empathic self-efficacy as unique predictors, this study shows that both agreeableness and self-efficacy accounted for a unique portion of the variance in prosociality. Agreeableness accounted for much of the variability in prosociality within time.

²These estimates were not constrained to be equals across sexes.

However, mediation by empathic self-efficacy accounted for about the 30% of the within-time relation between agreeableness and prosociality in males and for about 19% in females. The potential mediational role of empathic efficacy was further corroborated over time (Cole & Maxwell, 2003; Maxwell & Cole, 2007). Whereas agreeableness appeared to provide a basis for both prosociality and empathic self-efficacy, the latter provided access to mechanisms by which agreeableness may foster prosociality. Overall, these findings corroborate previous findings attesting to the important role of personality agreeableness in promoting prosocial behaviour (see Graziano & Eisenberg, 1997, for a review) and highlight the role that self-efficacy beliefs may play in turning individual dispositions into actual behavioural tendencies

Importantly, the predicted pattern of relations was obtained in longitudinal models even when controlling for stability of the constructs. This pattern of findings suggests that changes in agreeableness and self-efficacy across two years in late adolescence result in changes in prosociality (above and beyond the level of prosociality 2 years earlier). Given that adolescence is often viewed as a time of relatively rapid change in self-perceptions (e.g. identity), factors that foster agreeableness and self-efficacy in adolescents may have important effects on youths' emerging prosocial self-perceptions and behaviour. Moreover, how well youths develop and exercise their personal efficacy during this formative period can play key role in setting the course for their life paths (Bandura, 1997).

Gender differences replicate previous findings (Caprara, Caprara, & Steca, 2003; Caprara & Steca, 2007, 2005), with females, in comparison to males, scoring higher in agreeableness, in empathic self-efficacy, and in prosociality.

Although not further investigated, empathic self-efficacy beliefs seemed to decrease from T1 to T2, suggesting that responding empathetically to others may become more challenging and demanding over time. Yet, despite these differences in mean values of variables, the same pattern of findings was obtained for both sexes. According to zero-order correlations, females' empathic self-efficacy beliefs at T1 did not correlate with T2 agreeableness; nor did prosociality at T1 correlate with empathic self-efficacy at T2. These results suggest a higher independence of empathic self-efficacy beliefs from prosociality for females, perhaps because gender-related self-perceptions or norms are partly responsible for higher levels of either (or both) constructs for females.

However, one should note that in the concurrent model, the within-time unstandardized path from agreeableness to empathic self-efficacy at T1 was higher for males than females, but significant for both. Likewise, in the more restrictive longitudinal model (Cole & Maxwell, 2003; Maxwell & Cole, 2007), differences were found only in the strength of correlations (not in their direction or significance) between the correlation of empathic self-efficacy beliefs with prosociality at T1 and between the correlation of agreeableness and prosociality at T2. As responding empathetically to others' needs is traditionally more consistent with females' gender role and socialization, it is likely that the contribution of basic dispositions to empathic self-efficacy is higher for males than for females. Due to gender-role socialization, most females develop relatively high levels of positive interpersonal abilities, such as empathy or prosocial behaviour (Eisenberg et al., 2006; Else-Quest, Hyde, Goldsmith, & Van Hulle, 2006). Perhaps this kind of socialization contributes to the observed, slightly different strength of the association between empathic self-efficacy beliefs and prosociality at T1 and between agreeableness and prosociality at T2, although it does not rule out genes or hormones (Jang et al., 1996, 1998; Lohelin et al., 1998; Rienman et al., 1997). Future studies should further investigate these issues.

Potential limitations of this study pertain to the measures used and the population examined. Whereas perceived self-efficacy beliefs are private cognitive states that are necessarily

accessible through the reports of individuals who hold those beliefs, measures of agreeableness and prosociality may derive from multiple informants. Past findings attest to a good degree of accordance between self- and other-rated prosociality (Caprara et al., 2008), as well as between self- and other-rated agreeableness (Barbaranelli & Caprara, 2000). With regard to prosociality, in particular one should recognize that prosocial behaviour varies across contexts and it is debatable whereas others informants should be considered more reliable than the subject itself. Previous findings have shown that self-report of prosociality correlated with parent and friend ratings more than parent ratings with friends ratings of prosociality (Caprara et al., 2008). Certainly, in future work it would be desirable to rely upon multiple methods and informants across situations to minimize bias due to self-report and reputations, in addition to the well-known limitations due to shared method variance. Moreover, these results need to be corroborated in different samples as well as in different cultural contexts. In fact, the desirability and pursuit of others' well being may show important variations across social context and cultures (see Eisenberg et al., 2006). Despite these limitations, the support of the posited paths among agreeableness, self-efficacy beliefs and prosocial behaviour have practical implications for promoting the development of a stable tendency to behave prosocially.

Agreeableness and self-efficacy beliefs together might play a major role in the promotion of prosociality beyond the mere accounting for variance. Although agreeableness may be useful for predicting prosociality, relying upon agreeableness alone may be of limited value to actively promoting prosociality. Self-efficacy beliefs may be gradually instilled through experiences conducive to appreciate their value. Social cognitive theory provides guidelines regarding the development of efficacy beliefs through persuasion, modelling, and mastery experiences (Bandura, 1997). As previous findings show that empathic self-efficacy beliefs rest upon individuals' efficacy to deal with their own positive and negative emotions (Alessandri et al., 2009; Bandura et al., 2003), social cognitive theory would seem to recommend interventions designed to promote the capacities needed to regulate one's own emotions and to acknowledge and share others' emotional experiences. In turn, these capacities are likely to contribute to the abilities to empathize with others and be able to help others effectively. Although one cannot exclude the possibility that spontaneous agreeableness would be strengthened by interventions designed to instil and promote emotional and empathic efficacy, the path from empathic self-efficacy beliefs at T1 to agreeableness at T2 in the longitudinal model was not significant. Initial evidence supports the importance of providing youths, parents and educators with strategies designed to increase adolescents' competencies for understanding others' needs and for recognizing when persons are in trouble as methods for fostering the development of the abilities to empathize and sympathize with others (see Domitrovich, Cortes, & Greenberg, 2007; Feshbach & Feshbach, 1982). Moreover, familial and school practices that foster prosocial behaviour (see Eisenberg et al., 2006) may have beneficial effects on prosociality partly through fostering agreeableness and empathic self-efficacy, as well as empathic and sympathetic capacities.

Finally, we believe that our work contributes conceptually to the existent literature. This study provides a bridge between two grand traditions of research in personality, namely trait theory and social cognitive theory, and open new directions for research aimed at better understanding how basic dispositions and potentials may turn into actual behaviours.

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Figure 1.
Conceptual model of the paths of influence of agreeableness (AGRE), empathic self-efficacy (ESE) on prosociality (PRO) assessed at Time 1 (T1) and at Time 2 (T2).

Figure 2.

Empirical model of the paths of potential influence of agreeableness (AGRE), empathic self-efficacy (ESE) on prosociality (PRO) with standardized estimates separately for males and females at Time 1 (T1) and at Time 2 (T2). The coefficients within brackets are for females. * $p < .05$; ** $p < .01$. The underlined paths are significantly different for males and females.

Figure 3.

Longitudinal mediation with standardized estimates separately for males and females. AGRE = agree-agreeableness, ESE = empathic self-efficacy, PRO = prosociality, T1 = variable assessed at time 1, T2 = variable assessed at time 2. The coefficients within brackets are for females. $*p < .05$; $**p < .01$. The underlined paths are significantly different from the others. Dotted lines are non-significant paths.

Means and standard deviations of agreeableness, empathic self-efficacy and prosocial behaviour at Time 1 and Time 2 among males and females

Table 1

	Time 1				Time 2				η^2	$F(1,375)$	SD	$Mean$	SD	$F(1,375)$	η^2
	Males		Females		Males		Females								
	Mean	SD	Mean	SD	Mean	SD	Mean	SD							
Agreeableness	3.36	.35	3.62	.39	3.47	.48	3.82	.47	.10	42.80**	.47	3.82	.47	45.29**	.11
Empathic self-efficacy	4.00	.50	4.61	.25	3.81	.49	4.26	.45	.31	170.39**	.45	4.26	.45	77.36**	.17
Prosociality	3.72	.42	4.16	.40	3.61	.58	4.12	.51	.20	92.11**	.51	4.12	.51	70.42**	.16

**
 $p < .01$.

Table 2

Correlation matrix of the different variables for males and females

	(1)	(2)	(3)	(4)	(5)	(6)
(1) Agreeableness T1	1	.18*	.33**	.65**	.26**	.41**
(2) Empathic self-efficacy T1	.30**	1	.35**	.08	.38**	.33**
(3) Prosociality T1	.42**	.57**	1	.18*	.12	.45**
(4) Agreeableness T2	.48**	.25**	.30**	1	.33**	.37**
(5) Empathic self-efficacy T2	.24**	.48**	.29**	.34**	1	.54**
(6) Prosociality T2	.27**	.38**	.42**	.51**	.58**	1

Note: The correlation coefficients below the diagonal refer to males; the correlation coefficients above the diagonal refer to females. T1 = variable assessed at time 1; T2 = variable assessed at time 2.

* $p < .05$;

** $p < .01$.