



Does depression affect prosocial behavior in adolescence?

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Abstract

Prosocial behavior has increasingly gained the attention of developmental researchers and it constitutes one of the aspects of positive youth development (PYD). The aim of this study was to investigate the relation between depressive affect and prosocial behavior in adolescents. It was hypothesized that adolescents who scored higher on depression measures would be less prosocial than their counterparts who scored lower. Additional hypotheses were that prosocial behavior and depressive symptoms would increase with age and that females would score higher than males on both measures. As expected, regression analyses revealed that age and gender were important predictors of prosocial behavior. However, no significant association was found between depressive affect and prosocial behavior. The results are discussed in the light of other aspects of PYD, such as self-regulation strategies, that could mediate this relation, cross-cultural diversities, as well as limitations deriving from self-reports. Understanding the relation between negative emotionality and prosocial behavior is important for identifying pathways to promote a healthy development in adolescents.

1. Introduction

Research on adolescent development has focused mainly on the problematic aspects of development such as impulsivity and risk-taking behavior. Recently, prosocial development has been increasingly investigated and it constitutes one of the positive outcomes of development during adolescence (Benson, Scales, Hamilton, & Sesma, 2006; Lerner, 2005). This shift in developmental research reflects the need to identify potential pathways for a healthy development, by understanding the interactions between internal resources (e.g. cognitive and socio-affective developmental achievements) and contextual (e.g. societal demands) factors (Brittain & Humphries, 2015). Indeed, the interplay of multiple factors during adolescence seems to give rise to prosocial behaviors.

Prosocial behaviors refer to positive actions towards other people and can be expressed as “helping, sharing, cooperating and comforting behaviors” (Scourfield, John, Martin, & McGuffin, 2004, p.927). Six types of prosocial behaviors have been identified, being differentiated upon the context and the motives that lead to them (Carlo & Randall, 2001): altruistic, compliant, emotional, public, dire, and anonymous. Randall (2002) suggested that prosocial behaviors are better understood as distinct dimensions rather than a global construct. For instance, altruistic behaviors are led by motivations of sympathy, internalized norms and principles, and perspective taking, while public prosocial behaviors are characterized by the desire to gain the others’ approval.

Although research has shown that prosocial behavior follows an increasing pattern with age (Eisenberg and Fabes, 1996; Fabes, Carlo, Kupanoff, & Laible, 1999a; Eisenberg, Carlo, Murphy & van Court, 1995), there is evidence that this pattern is not universal but depends upon individual (i.e. gender, personality traits) and contextual factors (Nantel-Vivier et al., 2009; Hay, 1994; Kanacri et al., 2014; Eisenberg, Hofer, Sulik, & Liew, 2014). For instance, Kanacri et al. (2014) found that personality traits of Agreeableness increased the likelihood that the individual behaved more prosocially, a trend that increased with age.

Given that prosocial behavior can depend on certain personality characteristics, the main purpose of this study is to investigate the relationship between prosocial behavior and the personality trait of neuroticism with a focus on depression. This particular relation might be crucial to investigate, as, similar to prosocial behavior, neuroticism increases during adolescence and interferes with well-being (Soldz & Vaillant, 1999). Importantly, it specifically interferes with social functioning and positive intrapersonal experiences (see

McNulty, 2008). On the other hand, prosocial behaviors in a great extent emerge from perceived positive relationships with peers and family (see Wentzel & McNamara, 1999), while a lack of positive relationships is related to depression (Zimmer-Gembeck, Hunter, & Pronk, 2007). Neuroticism has been examined as a risk factor for psychopathology (Sandahl, Lindberg, Bergman, 1987; Cervera, Lahortiga, Martínez-González, Gual, de Irala-Estévez, & Alonso, 2003), and especially strong associations with depression (Dunkley, Sanislow, Grilo, McGlashan, 2009; Kendler, Gatz, Gardner, Pedersen, 2006) and anxiety (Jylhä & Isometsä, 2006; Uliaszek, Hauner, Zinbarg, Craske, Mineka, Griffith, Rose, 2009) have been found. Given that adolescence is a period when many psychiatric disorders emerge (Paus, Keshavan, & Giedd, 2008), including internalizing (e.g. depression, anxiety) disorders, it is especially important to investigate neuroticism during adolescence. However, research on the relation between neuroticism and prosocial behavior is extremely limited in adolescent populations; therefore we considered that link as crucial for further investigation. It is also worth mentioning that the research on how neurotic traits, such as depression, might affect prosocial behavior in the general population is limited and yielding mixed evidence.

Before proceeding with an overview of the findings that link prosocial behavior to emotional well-being on the one hand and depression on the other, we will try to theoretically explore this association through the Self-Awareness Theory. As we will see, this theory suggests that the way an individual will behave in a certain situation, to a great extent depends on the salience of their internal states (e.g. mood).

1.1. Self-Awareness Theory and Prosocial Behavior

The theory of self-awareness (Duval & Wicklund, 1972; Wicklund, 1975; 1979) has its roots in the school of symbolic interactionism (Cooley, 1902; Mead, 1934; Shibusani, 1961), which points to the importance that the learned values have on behavior. Although its theorists acknowledge the crucial role the values play, they support that this impact does not happen unconditionally, but under conditions that facilitate the individual to perceive themselves as an entity, namely accessing multiple aspects of the self (i.e. emotions, beliefs etc.). One of these aspects is the learned values, which include social norms and demands. When the values are accessible to the individual it is more probable that they will drive one's behavior. Accordingly, self-awareness theory predicts that the individual is more likely to proceed in a prosocial action when the values of helping a needy other or being socially responsible are salient and accessible to them. Self-awareness helps the individual to access the aspects of the self that are more salient at the moment. Importantly, people with anxieties or mood

problems are more likely to be self-concerned or self-preoccupied with their personal problems (Berkowitz, 1972; Mikulincer & Shaver, 2007), which may render them less able to respond to the other's needs and perspectives.

In the same line of thinking, more recently researchers suggested that negative affect interferes with the ability to behave prosocially as it deprives the individual of the required cognitive and emotional resources to shift the attention to the needs of another (Wetzel et al., 2007; Kunce & Shaver, 1994). However, under conditions of security the individual can conceptualize the self in relation to others as caregiver or recipient of care (Kunce & Shaver, 1994). This link could also function the other way around. Adopting a prosocial behavior likely brings a sense of purpose that prevents negative or depressive affect to appear (Davis et al., 2015; Guegan & De Gail, 2003), especially in non-clinical individuals (Cialdini et al., 1973). Mikulincer & Shaver (2007) also suggested that anxious and/or depressed individuals have a particular concern about what others think of them, making it more probable that they will proceed in public prosocial behaviors or when a pay-off is likely. Drawing on this theory, it is expected that anxious and depressed individuals are in a state of self-awareness, which is not facilitative for prosocial behavior. Below we present findings that reveal a positive relationship between prosocial behavior and positive affect (well-being), followed by findings linking less prosocial behavior to negative affect (e.g. depression).

1.2. Well-being and Prosocial Behavior

Prosocial behavior has been associated with predictors and elements of well-being, and is considered as an indicator of health (Carlo, 2014).

In a set of experiments (Guegan & De Gail, 2003; Isen & Levin, 1972) a positive correlation between positive mood and prosocial behavior was revealed. In the study of Guegan & De Gail (2003), positive mood was induced in 400 random passersby (experimental group) by receiving a smile from a person participating in the experiment. The control group (400 passersby) did not receive any smile. All participants were thereafter exposed to a helping condition, namely, help someone whose computer diskettes dropped. The experimental group demonstrated more helpful behaviors than the control group. The study of Isen & Levin (1972) consisted of two experiments using also positive mood induction for the experimental group. In the first experiment, the experimental group was offered cookies and the dependent variable was the subjects' willingness to reply to a student's request. In the second one, positive mood was induced by finding a coin in a public telephone and the

participants were tested for their helpfulness to someone whose papers fell down. In both experiments, the experimental group showed greater helpfulness than the control group.

Less direct associations between well-being and prosocial behavior and its correlates can be found in a set of attachment-related studies, which have revealed positive correlations between secure attachment (a predictor of well-being) and prosocial behavior (for a review see Mikulincer & Shaver, 2007). For instance, Mikulincer, Gillath, Halevy, Avihou, Avidan, & Eshkoli (2001) investigated the relationship between the boost of attachment security and the compassion to needy others. To activate the sense of security, the experimental group read a story about receiving support by an attachment figure. This group was compared with a mood-enhancement and a neutral condition group. All participants read a story about a person in distress who lost his parents in a car accident and rated their compassion and personal distress while thinking of the story. Compared to both control groups, the boost of attachment security resulted in the decrease of personal distress and the increase of compassion and thus, more sophisticated motives to help a needy other. In another study, Mikulincer, Gillath, Sapir-Lavid, Yaakobi, Arias, Tal-Aloni, & Bor, (2003) found that the boost of attachment security (having the participants recall personal experiences of positive interactions with an attachment figure) was related to concern about others as well as for humanity.

In the paragraph below, studies researching the negative relationship between prosocial behavior and depression/ depressive affect are presented.

1.3. Negative/ depressive affect and Prosocial Behavior

Existing literature has continuously enlightened that traits of neuroticism, such as negative and depressive affect, are negatively associated with the demonstration of- and global indicators of prosocial behavior (see Padilla-Walker et al., 2015; Wentzel & McNamara, 1999).

Laible, Carlo, Murphy, Augustine, & Roesch (2014) investigated the relationship between self-regulation (an element reversely associated with neuroticism) and negative emotionality and prosocial behavior in children. The former was assessed by the mothers of children and the latter by teachers and parents. From the assessment, four different temperamental profiles emerged: high regulation/low negative emotionality; moderate regulation and negative emotionality; low regulation/ high negative emotionality; and very low regulation/ high anger emotionality. The less prosocial children were the ones with high negative emotionality and especially with anger emotionality, while the more prosocial were the ones

with low/moderate negative emotionality. Similarly, Lopes, Salovey, Côté, Beers, & Petty (2005) found positive correlations between emotion regulation abilities (measured with a test for emotional intelligence) and social sensitivity and prosocial tendencies (using both self- and peer- reports). Students who scored higher in emotion regulation abilities were perceived as more socially sensitive and prosocial by themselves as well as by their peers. Similar results are provided by a study conducted by Eisenberg et al. (1996), who examined children for prosocial tendencies (through peer reports), social functioning, self-regulation and negative emotionality (through parental reports). Children who had been rated as the most prosocial by their peers received also higher rates for social skills and lower rates of negative emotionality by their parents.

Numerous studies focusing on negative cultural-based experiences have revealed a negative relation between depressive affect and prosocial behavior. Storch, Nock, Masia-Warner, & Barlas, (2003) conducted a study with Hispanic and African American children. They found that depressive affect related to overt and relational victimization was negatively associated with prosocial behaviors. In the study of Davis et al. (2015), it was examined how discrimination experiences of U.S. Latinos affect prosocial behavior. It is worth mentioning that discrimination experiences are highly related to depressive symptoms (Torres & Ong, 2010). The study indicated that discrimination experiences were positively associated with depressive symptoms and negatively associated with altruistic prosocial behaviors, while positively with public ones. This finding is consistent with the results of Brittain et al. (2015), who also found positive associations between discrimination experiences and public prosocial behaviors. Another interesting finding of this study was that prosocial behavior was a protective factor for positive outcomes related to the discrimination experience, revealing again a negative link between depression and prosocial action in the opposite direction. Consistently with the previous findings, Padilla-Walker, Carlo, & Nielson (2015) found that depressive affect in American adolescents was negatively associated with prosocial behavior towards family members.

However, the research on the relation between depression/ depressive affect and prosocial behavior has yielded contradicted evidence. For example, Vollhardt (2009) found positive correlations between trauma exposure and prosocial action, contradicting the notion that positive behaviors can only derive from positive experiences and that negative or traumatic events can only lead to antisocial behavior. Another study that shows a less direct relation

between prosocial behavior and depression is the prospective study of Gjerde and Block (1991), who found that girls who manifested dysthymic tendencies at the age of 18 had demonstrated in younger ages a concern about moral issues (an indicator of prosocial behavior).

1.4. Prosocial Behavior and Depression/Depressive Affect from a Developmental Perspective: Adolescence

While prosocial behavior has been examined in relation to neurotic traits, this relationship has not been extensively examined in adolescent populations. Given that adolescence is a multifactorial event that gives rise to both prosocial behavior and depressive affect, it is an especially interesting period to investigate the relationship between these two variables. We have already referred to the increase of prosocial behavior that occurs during adolescence. Multiple factors contribute to this increase. On the one hand, individual developmental factors give rise to prosocial behavior. Socio-affective and cognitive development that characterizes adolescence provides the cognitive and emotional background that is required for a prosocial action. For instance, moral reasoning and perspective taking are necessary cognitive elements for prosocial behavior. Similarly, empathy is an emotion without which prosocial behavior would be impossible. Importantly, new developmental needs that emerge during this period, such as the need for intimate relationships, can foster other-oriented behaviors and emotions (Fabes, Carlo, Kupanoff, & Laible, 1999a). On the other hand, contextual factors play a crucial role. For example, societal demands towards adolescents to act according to social norms require them to behave more prosocially (Brittain & Humphries, 2015).

Pubertal changes during adolescence along with contextual factors, such as increased conflicts in the family, likely bring about an emotional disturbance, often accompanied by depressive affect (Dekker, Ferdinand, Van Lang, Bongers, Van Der Ende, & Verhulst, 2007; Aldinger et al., 2014). With the onset of adolescence, depressive symptoms increase compared to childhood and peak in young adulthood. Of course, this pattern is not universal (Aldinger et al., 2014; Caspi, Roberts, & Shiner, 2005) and varies upon gender and other individual factors.

1.5. Gender Differences

Research has revealed gender differences, with females demonstrating higher levels of prosocial behaviors (Fabes, Carlo, Kupanhoff, & Laible 1999; Eisenberg & Fabes, 1996), as

well as elevated levels of depression and depressive affect (Keenan & Hipwell, 2005; Dekker, Ferdinand, Van Lang, Bongers, Van Der Ende, & Verhulst, 2007). Females score higher in altruistic, compliant, anonymous, and emotional types (Carlo & Randall, 2002), while males score higher in the public type (Carlo et al., 2003).

Evidence indicates that the relation between prosocial behavior and depression might be different for males and females. For example, in the study of Davis et al. (2015), results indicated that gender differences in the demonstration of depressive affect mediated the effects of discrimination experiences on prosocial behaviors. It is more probable for females to seek support and intimacy to others in response to negative affect, while males tend to behave less emotionally or avoid interactions (Taylor et al., 2000).

1.6. Research Questions

This paper will mainly investigate the relation between depressive affect and prosocial behavior in adolescence. Drawing on the Self-awareness theory and the research findings described above, it is hypothesized that there will be a negative correlation between the two variables. The higher the individual will score on the depression scale, the lower they will be expected to score on the prosocial measures. Subsequently, age and gender effects will be examined. Based on the literature presented above, it is expected that both prosocial and depression scores will show an increase in adolescence. It is also hypothesized that females will score higher than males in both measures.

2. Methods

2.1. Participants

The sample used for this study consisted of 299 participants (146 males, 153 females) of an age range between 11.9 and 28.7 years ($M=18.1$, $SD=3.7$). All participants were healthy and in the normal IQ range ($M= 108.2$, $SD= 10.3$). They were recruited through schools and advertisements. For their participation, adults received payment, children received presents and their parents were reimbursed for their travel costs. Written consent forms were filled out by the participants or minor's parents. The study received approval from the Institutional Review Board at the Leiden University Medical Center.

2.2. Measurements

2.2.1. Prosocial Behavior

Prosocial Behavior was measured by the self-report scale Opportunities for Prosocial Action (OPA; Eberly Lewis, 2013). The participants were asked to determine the frequency they performed a prosocial behavior described by 20 items on a 6-point-scale (1=never, 6=very often).

2.2.2. Neuroticism and Depression

NEO-PI-R was used to assess levels of Neuroticism. NEO-PI-R (Revised version of NEO-PI; Costa & McCrae, 1985) is a self-report personality inventory which consists of 240 items representing statements about personality. Subjects indicated the extent to which they agree with each of these statements on a 7-point Likert scale (1=disagree, 7=agree). It assesses the big dimensions of personality, namely Neuroticism, Extraversion, Agreeableness, Conscientiousness, and Openness to Experience. Neuroticism is measured through six different facets, one of which is Depression. It is one of the most widely used inventories for personality assessment.

Additional measures for Depression were conducted using the BDI. It is a self-report inventory of 21 items measuring the presence and severity of different depressive symptoms the past two weeks. Participants indicate the severity of each of these symptoms on a four-point-scale (0-3). Higher scores indicate a higher severity of depressive symptoms. The total score ranges between 0 and 63 (14-19= mild depression; 20-28= moderate depression; 29-63= severe depression).

2.3. Statistical Analyses

First, a Pearson correlation analysis was conducted to examine whether there were significant age effects on depression and prosocial scores. To check for sex effects on both variables independent sample t-tests were performed. Linear Regression Analysis was conducted to examine whether depressive affect predicted prosocial behavior, after controlling for sex and age. This was also tested separately for males and females. Moreover, we tested whether the severity of depressive symptoms would impact on prosocial behavior by comparing the means of the prosocial behavior of four groups (no depression, mild, moderate, and severe depression). This was tested using ANCOVA, including the covariates of age and sex.

3. Results

3.1. Age Effects

As is known from the literature, both prosocial behavior and depressive symptoms change with age. Therefore we first examined whether the variables were significantly correlated with age. A Pearson correlation analysis showed that only the depression measures of NEO-PI questionnaire are significantly correlated with age, $r = .21$, $p = .002$. BDI scores were not significantly correlated with age, $r = -.08$, $p = .272$, similar to OPA scores, $r = .04$, $p = .604$.

3.2. Sex effects

As gender differences have been repeatedly reported for prosocial tendencies and depressive affect, we next investigated potential sex effects on prosocial behavior and depression. Independent sample t-tests were used to compare the mean scores of males and females and revealed significant differences. More specifically, females scored higher ($M = 131.11$, $SD = 2.03$) in the prosocial questionnaire than did males ($M = 112.4$, $SD = 2.11$), with $t(261) = 6.37$, $p < .001$. As for depression, males and females were compared for two different measures, with females scoring higher than males in both measures. In the NEO-PI questionnaire, female ($M = 23.12$, $SD = .53$) and male ($M = 19.67$, $SD = .47$) scores were significantly different, $t(259) = 4.85$, $p < .001$. Similarly, in the BDI questionnaire females ($M = 9.40$, $SD = .85$) scored significantly higher than males ($M = 6.28$, $SD = .47$), $t(173) = 3.22$, $p = .002$.

3.3. Depression and Prosocial Behavior

In order to examine whether depressive symptoms negatively predicted prosocial behaviors, hierarchical regression analyses were conducted for the two measurements of depression, BDI and NEO-PI questionnaires. Considering that a significant correlation had been found between sex on the one hand and both predictors and outcome on the other, as well as between age and the scores of the NEO-PI questionnaire, age and sex variables were included in the first step and the scores of the two questionnaires were added in the second step. In Table 3.1 the results are presented. Similar results were found for both predictors. Regarding BDI scores the first model including age and sex variables explained 20.4% of the variance of prosocial behavior, while the second model did not improve the predictability of the model, R^2 change = $<.001$, F change = $.004$, $p = .95$. Similarly, NEO-PI scores did not improve the overall model, R^2 change = $.005$, F change = 1.29 , $p = .26$. We also examined whether there were differences in prosocial behavior among the groups that emerged from the BDI scores, controlling for the variables of age and sex. The results of ANCOVA analysis

showed that prosocial behavior did not differ between the 4 groups based on the severity of depressive symptoms, $F(3, 177) = .116, p = .95$. Finally, a hierarchical regression analysis was performed separately for males and females, including age in the first step and BDI and NEO-PI scores in the second step. Table 3.2 summarizes the results of the analysis. Again no significant relation between depression and prosocial behavior was found either for males, $R^2 \text{ change} = .022, F \text{ change} = 1.01, p = .37$, or females, $R^2 \text{ change} = .005, F \text{ change} = .23, p = .80$.

Table 3.1 Regression Analyses for BDI and NEO-PI scores

		B	SE B	β	p
BDI scores	Constant	99.99	12.33		<.001
	Model 1				
	age	1.98	.70	.19	.005
	sex	-21.32	3.46	-.41	<.001
Model 2	Constant	99.79	12.75		<.001
	age	1.98	.70	.19	.005
	sex	-21.27	3.56	-.41	<.001
	BDI scores	.016	.26	.004	.950
NEO-PI scores	Constant	126.25	7.87		<.001
	Model 1				
	age	.28	.42	.04	.510
	sex	-18.77	3.17	-.37	<.001
Model 2	Constant	131.69	9.21		<.001
	age	.39	.43	.06	.371
	sex	-19.79	3.29	-.39	<.001
	NEO-PI scores	-.32	.29	-.08	.257

Table 3.2 Regression Analysis split by sex

		B	SE B	β	p
Females	Constant	100.82	16.5		<.001
	Model 1				
	age	1.92	.94	.21	.044
Model 2	Constant	106.25	18.58		<.001
	age	1.99	.97	.22	.043
	BDI scores	.07	.39	.03	.856
	NEO-PI scores	-.32	.53	-.08	.544
Males	Constant	78.78	18.28		<.001
	Model 1				
	age	1.98	1.04	.20	.061

Model 2	Constant	84.89	19.36		<.001
	age	2.16	1.06	.22	.045
	BDI scores	.66	.58	.13	.254
	NEO-PI scores	-.69	.56	-.15	.223

4. Discussion

The current study investigated the relationship between depression and prosocial behavior in adolescence. Considering that literature on age and sex effects on both variables is extensive, these were also included in the analysis. It was hypothesized that depressive symptoms, as well as prosocial behavior, would increase with age, that females would score higher than males on both measures, and that depression would negatively predict prosocial behavior.

4.1. Depression and Prosocial behavior

Based on the theoretical model of Self-Awareness and research findings, it was hypothesized that depressive symptoms would negatively predict prosocial behavior. Results did not confirm this hypothesis. In fact, no significant correlation was found between the two variables. We will try here to explore potential reasons why the results contradicted prior findings. Comparing this study with the studies presented above, a major difference is that some of them used child samples while the current study was focused on adolescent and adult populations. Adolescence is a developmental period during which major changes occur and is considered as a transition between childhood and adulthood (Crone & Dahl, 2012). This transition functions as a preparatory learning and adjustment period for coping with the demands of adult life. Many theorists (Crone & Dahl, 2012; Gestsdottir, Bowers, von Eye, Napolitano, & Lerner, 2010; Gestsdottir & Lerner, 2008; Steinberg, 2005) have highlighted cognitive, emotional, neurodevelopmental changes during the second decade of life that facilitate the individual use self-regulation strategies already since adolescence. Self-regulation is “the ability to flexibly activate, monitor, inhibit, persevere and/or adapt one’s behavior, attention, emotions and cognitive strategies in response to direction from internal cues, environmental stimuli and feedback from others, in an attempt to attain personally-relevant goals” (Moilanen, 2007, p.835). Therefore, as individuals mature and enter adolescence, they have increased ability to control their internal states and monitor their

behavior upon social values. Importantly, these advanced skills might mediate the effects of depressive/ negative affect on prosocial behavior. For instance, adolescents might be more able compared to children to inhibit their self-preoccupation as described by Self-Awareness theory, when an external condition alerts them to behave prosocially. Moreover, depressed individuals are characterized by elevated levels of empathy (Zahn-Waxler, 2000; Robins and Hinkley, 1989; Keenan & Hipwell, 2005), moral concerns (Gjerde and Block, 1991) and feelings of guilt and altruism (O'Connor, Berry, Weiss, & Gilbert, 2002), features that can elicit a prosocial behavior.

Another set of studies that was presented, was focused on adolescents who demonstrated depressive symptoms. These studies revealed a negative relationship between depression and prosocial behavior. As described, these samples consisted of adolescents from minorities who had experienced culture-related stress (i.e. discrimination, victimization). Considering that culture-related negative experiences such as discrimination lead to social exclusion (Major and O'Brien 2005), depressive phenomenology in these groups might exhibit different characteristics. For instance, discrimination, stigmatization and the associated social exclusion and depressive affect may contribute to isolation and social withdrawal, antisocial behaviors and/or social avoidance (Smart & Leary, 2009). Indeed, individuals who have experienced social exclusion might perceive intrapersonal relationships as sources of insecurity, resulting in reduced helping behaviors towards others. Social avoidance can also function as a protection from further exclusion (Davis et al., 2016).

Another issue that is important to consider before interpreting the results, is social desirability responding (SDR), which refers to the tendency of individuals to be presented in questionnaires in a socially accepted way. Considering that a large portion of studies using a social desirability scale found that SDR influenced their results (van de Mortel, 2008) and that the prosocial questionnaire OPA contains socially sensitive items, it could be that SDR obscured a potential relationship between depression and prosocial behavior. This issue could be addressed by including reports from multiple informants (i.e. peers, parents, teachers), and incorporating a social desirability scale.

4.2. Age Effects

In agreement with prior findings, we found that both prosocial behavior and depressive affect increased with age. It seems that increased responsibilities and social demands can lead to increases of both prosocial behavior and depression. For prosocial behavior, this increase may be related to increased intrapersonal and social transactions, which can

provide increased opportunities for perspective taking and prosocial action, as well as to requirements to behave according to social values (Brittain & Humphries, 2015). For depression, it might be that new responsibilities and demands expose individuals to more stressors, increased chances of failures and feelings of incompetency. For instance, perceived academic incompetence as well as perceived schoolwork as overly loaded is related to depression in adolescents (Fröjd, Nissinen, Pelkonen, Marttunen, Koivisto, & Kaltiala-Heino, 2008). Similarly, as young adults start working, they encounter new stressors that often increase depressed mood (Shanahan, Finch, Mortimer, & Ryu, 1991). It seems that periods of multiple and simultaneous changes bring about negative outcomes in terms of self-concepts and affect (Nottleman, 1987).

4.3. Sex effects

We also found sex effects on both variables. In agreement with prior research, females scored higher in prosocial and depression questionnaires. Sex differences in prosocial behavior have been repeatedly reported (Fabes, Carlo, Kupanhoff, & Laible 1999, Eisenberg & Fabes, 1996; Carlo and Randall, 2002). Drawing on gender roles theories, one possible explanation for the female predominance in prosocial behavior could be that girls are raised with a model of caregiving and nurturance (Miller, 1976), which predisposes them to behave in a more helpful and caring way. Indeed, already from childhood girls show more interpersonal behaviors than do boys, an orientation that increases in adolescence (Zahn-Waxler, 2000). We should also consider that females are characterized by higher levels of empathy (Schulte-Rüther, Markowitsch, Shah, Fink, & Piefke, 2008; Rueckert & Naybar, 2008; Eisenberg, & Lennon, 1983), which is an important factor for prosocial development.

Sex differences have also been reported for depressive affect (Twenge & Nolen-Hoeksema, 2002; Wade, Cairney, & Pevalin, 2002; Angold, Erkanli, Silberg, Eaves, & Costello, 2002). Similarly to what we described above, the female role of caregiver might increase their vulnerability to interpersonal failures or to other's distress ("cost of caring" hypothesis; Kessler & McLeod, 1984, p. 620). Another theory suggests that women have different responses from men to depressive affect (Nolen-Hoeksema, 1986 as cited in: Nolen-Hoeksema, 1987). While men are more likely to engage in an action that will distract them from depression, women are more prone to rumination (increased mental preoccupation with depression), an attitude that may maintain depressive state (Beck, Rush, Shaw, & Emery, 1979; Teasdale, 1985). Additionally, there are findings that support the notion that women are more susceptible than men to hypothalamic-pituitary-adrenal (HPA)

dysregulation (Weiss et al., 1999). HPA has a central role in the regulation of stress responding, as it is responsible for hormonal regulation. Some of these hormones (e.g. cortisol) take part in biochemical procedures that influence mood. It is therefore proposed that women can develop depression due to less effective stress responses. An integrative model (see Nolen-Hoeksema, 2001) combining these theories could explain sex differences in depression more completely.

4.4. Limitations

Although no association was found between depression and prosocial behavior, a better understanding of this issue would require the investigation of more aspects of negative affect in relation to prosocial behavior. Neuroticism, for instance, is traditionally measured by assessing six personality characteristics, namely self-consciousness, vulnerability, impulsiveness, hostility, anxiety and depression. If we had also included measures of the rest facets, we could have found correlations for some of these facets. Moreover, the sample of this study derived from uniquely one cultural background. The results might differ for minority samples or samples from a non-western culture. Another limitation of this study was that it was based exclusively on self-reports. Reports from other informants (i.e. peers, parents) could give a different perspective on the relation between one's depressive affect and prosocial proclivity.

4.5. Conclusions and Future directions

The relationship between depression and prosocial behavior in adolescence is a complex issue and needs to be understood through several pathways. For example, it could be that prosocial behavior is not affected by depressive affect per se, but by confound mechanisms (i.e. emotion regulation) that might mediate this relationship. Therefore, future research might reveal significant correlations between underdeveloped self-regulation strategies and decreased prosocial behavior. It is also of great importance to investigate other forms of negative affect (i.e. anxiety, anger) in relation to prosocial behavior, as the effects of depression might be mediated by other features, such as empathy. Cross-cultural research will help identify more specific features of negative affect that might impair prosocial functioning. Future research should also consider including reports from multiple informants and a social desirability scale. Being prosocial behavior of major importance for social functioning and well-being, and understanding its relationship with depression in adolescence is crucial for identifying compensation mechanisms and promoting a healthy development.

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