A study of the influence of altruism, social responsibility, reciprocity, and the subjective norm on online prosocial behavior in adolescence

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ABSTRACT

While the study of offline prosocial behavior has a long tradition, much less information is available about how these behaviors manifest and change in the digital environment, and little is known about their background. This paper evaluates differences by age and gender in a variety of attitudes and beliefs during adolescence and studies their influence on the online prosocial behavior emitted and received. A cross-sectional study was performed with 1299 participants aged between 14 and 20 from the Region of Madrid (Spain). The Spanish adaptation of the Online Prosocial Behavior Scale and a selection of items from various studies on attitudes and beliefs regarding altruism, direct and indirect reciprocity, social responsibility, and the perception of the subjective norm were administered. The results suggest that female adolescents maintain higher altruism, social responsibility, and indirect reciprocity than males, and that the older age group (18–20 years old) has higher scores in altruism, social responsibility, and direct reciprocity. Together with altruism, the subjective norm, social responsibility, and indirect reciprocity positively influence the online prosocial behavior emitted by adolescents. Indirect reciprocity, the subjective norm and altruism also influence the feeling of receiving online prosocial behaviors from others. Knowing the extent to which adolescents hold prosocial beliefs and which of these beliefs may favor prosocial online behaviors can be beneficial when promoting such beliefs and fostering more positive online conduct, as well as lessening cyberbullying, online hate and any other manifestation of aggressive behavior online.

1. Introduction

In recent decades, the digital environment has been gaining prominence and importance in the development of social relationships during adolescence and, thus, the development of prosocial behavior (Uhls et al., 2017). Online prosocial behavior (OPB) is the action conducted voluntarily in an electronic or virtual environment, intended to benefit others or promote pleasant and balanced relationships with other people (Erreygers et al., 2018). These behaviors include sharing information or resources online, making positive, supportive, or comforting comments to others, saying nice things to someone, helping, or even giving "likes". Among online prosocial behaviors, Wright and Pendergrass (2018) also include others such as making donations (of time, money, and knowledge), attending electronic discussion forums, creating wikis or blogs to share knowledge, mentoring, and providing support in virtual groups.

Currently, the occurrence of these types of behaviors in adolescents appears to be primarily linked to social networks.

There is an overwhelmingly positive relationship between prosocial behavior and adolescent mental health as shown in a recent scoping review study (Hirani et al., 2022). Prosocial behavior appears positively related to life satisfaction, affirmative emotions, such as happiness and positive self-identity, and to a lower prevalence of depression in adolescence and youth (Hirani et al., 2022). Prosocial behavior is not only related to greater well-being and mental health, but is also associated with a reduced risk of substance abuse and delinquency (Memmott-Elison et al., 2020) and facilitates social relationships, accommodating the expansion of the personal social network, companionship, sharing behaviors, and connections with others (Hirani et al., 2022; Layous et al., 2012). For several decades, prosocial behavior has been considered the flip side of aggressive behavior, and both

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behaviors show a negative relationship in studies during the adolescent stage (Caprara et al., 2001; Malonda et al., 2019).

The study of prosocial behavior in social media is therefore necessary not only because of the benefits it brings to mental health, well-being, and social relationships during adolescence, but mainly because it is a key element in the prevention of aggressive behavior online (Malonda et al., 2019). However, its study has been left out of the scientific literature, as researchers have paid increased attention to the risks involved in the use of social media, ignoring the fact that social networks also constitute a space for prosocial and socially supportive behaviors (Lysenstøen et al., 2021). The few studies carried out on this subject show that the higher the frequency of prosocial behaviors emitted on social media, the higher the happiness (Erreygers et al., 2019). Moreover, a review study with meta-analysis revealed that online social support – which is the direct consequence of the online prosocial behavior received – is positively and moderately associated with self-esteem in adolescents and negatively, but not significantly, associated with depressive symptoms (Zhou & Cheng, 2022). Isolated studies seem to suggest that online social support is linked to increased self-identity and life satisfaction, less loneliness and social anxiety, and acts as an antidote to the stress produced by cyberbullying (for a review, see Zhou & Cheng, 2022).

1.1. Prosocial beliefs as antecedent variables of online prosocial behavior

The study of the antecedent factors behind prosocial behavior in adolescence is an immense field (see, for example, Eisenberg et al., 2015). Among many other factors, certain beliefs seem to foster offline prosocial behavior. Beliefs constitute an antecedent of behavior that has been widely studied by experts in social psychology. Beliefs are understood as the unit of knowledge that people possess about the world, others, and social reality, the set of propositions that define the characteristics of an object that people take for valid. Each person constructs his or her own beliefs on the basis of his or her own experiences and the meanings he or she gives to them. These beliefs are nourished by the belonging groups in the socio-historical context in which one lives (Bar-Tal, 1990).

The study of beliefs that may underpin online prosocial behavior – prosocial beliefs – constitutes the focus of this paper. These beliefs can be a clear promoter of online and offline prosocial behavior, as well as a good antidote to aggressive and antisocial behavior. In fact, they constitute the opposite of antisocial beliefs, which can promote cyberbullying and aggression in different contexts (Carlo et al., 2014; Hofmann & Müller, 2018). Preventing aggression in social media involves promoting prosocial beliefs and behaviors as an effective alternative (Malonda et al., 2019). However, little is known about the extent to which these predispositions influence online prosocial behavior. Among the main beliefs that previous literature relates to prosocial behavior are altruism, reciprocity, social responsibility, and the prosocial subjective norm (Siu et al., 2012). This paper focuses on the study of these beliefs and their influence on online prosocial behavior during adolescence (the stage between 10 and 19 years of age, when youth begins).

1.1.1. Altruism

Altruism is understood as the belief that defends the need to do good or beneficial things for others without expecting anything in return (Pfattheicher et al., 2022). This belief seems to emerge at an early age, during the preschool stage (Paulus et al., 2020). Some studies have observed that, while adolescents weigh the costs and benefits of helping others more often and are more selfish than altruistic, in the juvenile stage, ideals about equity are taken into account more often (i.e., "I help others because they deserve it because of the way they act") (Chaikovska

et al., 2020). Youth[2] is defined by experts as the period of life after adolescence until a person becomes financially independent from his or her family, and there is no consensus on the specific ages covered by this period.

Some authors indicate that certain social networks (e.g. Facebook) foster egocentrism and thus reduce opportunities for altruism (Chiou et al., 2014). However, others argue that altruism in social networks strengthens the degree of bonding (i.e. how people become emotionally attached to other people) among virtual community members, as well as common identity and social ties (Wong et al., 2017). The interactive nature of social networks, with constant access through mobile phones, and the use of personal profiles seem to drive altruistic behaviors in this context (Zhu et al., 2020). Additionally, research has shown a greater number of prosocial responses in online games among youth who scored high on altruism (Wang & Wang, 2008), and adolescents who provide more information in their personal profiles and interact more online are more predisposed to help others in the digital environment (Zhu et al., 2020).

1.1.2. Reciprocity

Another belief guiding prosocial behavior is the reciprocity principle. This is understood as the obligation to benefit (and the urge not to harm) specific people from whom we have received help and favors in the past (Gouldner, 1960). Reciprocity is identified either as a pattern of exchange (receive what you have given) or as a moral prescription (give when you receive). Reciprocity seems to work well when the time between the benefit and the opportunity to reward is reasonably short (Burger et al., 1997), especially during childhood and adolescence.

In online environments, the study of reciprocity has gained some traction with regard to adults and youths. Among Tuenti (a Spanish social network that ceased to exist in 2022) and Facebook users between 18 and 44 years old, reciprocity has been found to influence affective trust (i.e. feelings of security and the perceived strength of a social relationship) and the perception of community support (Sánchez-Franco & Roldán, 2015). In online virtual communities of young people, reciprocity influenced information and knowledge-sharing behavior (Chiu et al., 2006; Liou et al., 2016; Tsai & Pai, 2014; Wasko & Faraj, 2005). However, the number of studies on the digital environment dedicated to assessing reciprocity and its influence on adolescents is very small. Nonetheless, it has been found that relationships and activities based on reciprocity promote higher levels of positive emotions in adolescents (Wenninger et al., 2019), a principle that explains between 24 % and 31 % of well-being in adolescents (Tuominen & Haanpää, 2022).

Recently, some authors distinguished between direct and indirect reciprocity (Nowak & Roch, 2007; Peng et al., 2020). Direct reciprocity arises after an exchange between the same individuals, generally with an investment of time and effort (Peng et al., 2020), while indirect reciprocity involves the appearance of a third party, that is, someone helped will be more likely to help someone else in the future, or someone who gives help at this time will receive it in times to come (Nowak & Roch, 2007). Although both concepts are linked to theories of social exchange in relationships, direct reciprocity can be seen as pay-it-forward reciprocity, while indirect reciprocity linked to third parties is associated more with generosity and altruism in relationships. In experiments on economic exchanges conducted with adolescents, indirect reciprocity is more prevalent at older ages (Hu et al., 2019).

1.1.3. Social responsibility

Beliefs about social responsibility are considered "a set of prosocial values representing personal commitments to contribute to community and society" (Wray-Lake et al., 2016, p. 130). From the point of view of psychological development, social responsibility is an indicator of

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[2] This paper considers youth as beginning at the age of 20 until economic independence is achieved.

psychological well-being and maturity, a positive developmental outcome, a key motivator for prosocial behaviors and collective actions as citizens in defense of human rights, and a fundamental element of civic life (for a review, see Wray-Lake et al., 2016). It therefore constitutes a key set of values or beliefs to explain prosocial behavior online. Regarding its evolution during the adolescent stage, a longitudinal study reports a progressive reduction in social responsibility between the ages of 9 and 16 (Wray-Lake et al., 2016), with these values being positively influenced by messages of family compassion and a democratic climate, school solidarity, community involvement, and intimate friendship. Social responsibility has also been identified as an antidote to cyberbullying (Cohen-Almagor, 2018). Zhan et al. (2022) found that social responsibility was a potent mediator between cyberbullying victimization and perpetration in college students, such that it can substantially reduce the promoter effect of cyberbullying victimization on cyberbullying perpetration. They considered social responsibility beliefs as the opposite of the moral disengagement process that favors online aggression.

1.1.4. Prosocial subjective norm

Another belief that can influence online prosociality[3] is the subjective norm, which refers to a person's perception of whether or not people important to them consider that they should perform a certain behavior (Venkatesh & Morris, 2000; Fishbein and Ajzen, 2009). The influence of the subjective norm on different behaviors in the adolescent stage has been widely studied and demonstrated (e.g. attitudes towards abusive behavior, the environment, alcohol consumption, etc.) (Molina-García et al., 2018; Nardi-Rodríguez et al., 2022; Zhao et al., 2020). In the online world, as Livingstone (2008) states, the activities of adolescents in networks are influenced by social pressure from their peers. The subjective norm influences the creation of private profiles (Lewis et al., 2008), the disclosure of personal information (Heirman et al., 2013), the acceptance of strangers as friends in social networks (Heirman et al., 2016), and the use of strategies to counteract hateful behaviors online (Heirman & Walrave, 2012; Jang et al., 2016). The application of the subjective norm to prosocial behavior has not been extensively studied. A research project conducted with Swiss adolescents showed that higher levels of prosocial behavior in classmates resulted in a lower frequency of antisocial behavior at the individual level after two years. These authors concluded that prosocial peer norms lessened antisocial behavior at this stage (Hofmann & Müller, 2018).

For all these reasons, beliefs appear to be important predictors of online prosocial behavior in adolescence. Adolescents with more internalized prosocial beliefs may engage in prosocial behaviors more frequently (Hardy et al., 2010; Kislyakov et al., 2020; Padilla-Walker & Fraser, 2014). There is evidence that people tend to behave similarly in social situations within the digital environment and in offline life (Surma, 2016). In line with Subrahmanyam and Šmahel's (2011) co-construction theory, adolescents are connected in the online world much as they are connected in the physical or offline world. Accordingly, many of the milestones and relationships related to prosocial attitudes and beliefs in offline behaviors could have similar associations with respect to online prosocial behavior.

1.2. Age and gender differences in prosocial beliefs

Another objective of this study is to observe age and gender differences in prosocial beliefs. Little information is available on how specific prosocial beliefs change with age during adolescence. Previous research on moral development – understood as the process whereby people form a progressive sense of what is right and wrong, proper and improper – and social thinking in adolescence shows a complex and progressive

improvement with advancing age (Chaikovska et al., 2020; Eisenberg et al., 2015; Malti et al., 2021; Sassenrath et al., 2022). Longitudinal studies by Eisenberg et al. (1999) indicated that moral reasoning capacity increased progressively between the ages of 11 and 20. Some forms of more advanced moral reasoning (empathic and internalized) emerge between middle and late adolescence and progressively increase until early adulthood (Chaikovska et al., 2020). As Eisenberg et al. (1999) observed, the development of moral reasoning is linked to the emergence of a prosocial orientation, the tendency to engage in prosocial behaviors. Both preadolescents and younger adolescents still tend to have a more egocentric perspective on social relationships, in which cost-benefit relationships have a propensity to predominate (Chaikovska et al., 2020); as a result, they are expected to hold prosocial beliefs less frequently. In contrast, in late adolescence, improved perspective-taking and cognitive development lead adolescents to take into account the thoughts, intentions, and feelings of others, which contributes to the expression of more prosocial beliefs (Sassenrath et al., 2022).

Regarding gender differences, many studies have shown that adolescent girls manifest prosocial behaviors to a greater extent than boys in the natural environment (Silke et al., 2018; Siu et al., 2012; Van der Graaff et al., 2018). In the digital context, it has been found that young people who belong to online support groups present more developed prosocial behaviors (Suriá, 2017), with females more frequently conveying supportive, caring, or empathetic expressions, and using more positive and avoiding negative emotions in their online communication, while males appear less concerned about being friendly and polite online (Erreygers et al., 2019).

The relationship of gender to prosocial behavior is a subject of much debate among experts. Female predominance in prosocial behavior has been attributed to differential gender socialization, which – despite the intense social changes in recent decades and their variability depending on the sociocultural context – continues to transmit gender binarism with a marked inequality in the norms and roles attributed to masculinity and femininity, omitting non-binary people (for a review, see Kågesten et al., 2016).

As a result of this differential socialization by gender, girls are expected to have higher prosocial beliefs to a greater extent than boys, as manifested in behavioral studies. One review paper found that adolescents themselves link masculinity to tenacity and physical strength, along with performance and competitiveness, as essential characteristics of boys, and that there is normative pressure on boys from family and peers not to "act like girls" by exhibiting traits typically associated with femininity (such as, for example, the expression of emotions or physical weakness). Femininity is linked in adolescence to emotional expression and vulnerability, physical weakness, correctness in behavior, physical attractiveness, and caring for others (Kågesten et al., 2016).

Some studies and authors question this female predominance in prosociality. Indeed, a review study with meta-analysis on the subject by Xiao et al. (2019) shows that gender differences in prosocial behavior in general, although they exist, are of small magnitude, and the typology of prosocial behavior analyzed must be considered. While women are oriented towards altruistic caring actions and supporting others, men are directed towards carrying out instrumental actions associated with strength or even heroic acts (Xiao et al., 2019). Therefore, current trends in the study of the relationship between gender and prosociality suggest that the observed differences are rather due to the occurrence of behavioral specialization by gender. While girls' prosocial behaviors show more empathy and emotional support, boys' behaviors involve heroic acts with a greater use of force (Eagly, 2009; Espinosa & Kovářík, 2015; Xiao et al., 2019). Men and women may even differ in what they consider prosocial (Siu et al., 2012).

Another aspect related to gender identity questioned by Silke et al. (2018) in their review paper is the absence of studies on prosocial behavior that use a conceptualization of gender from a non-binary point of view. This means that people who do not identify with masculinity or femininity in a static or exclusive way, and therefore are not defined by a

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[3] The term prosociality refers in general to prosocial behavior or the tendency to behave prosocially.

binary gender system, so-called non-binary individuals, are excluded. In one study, Durbeej et al. (2019) found that non-binary adolescents and youth exhibit greater activism and social engagement than binary individuals. It has also been found that during the COVID-19 pandemic, non-binary youth perceived greater social support from their peers (López-Sáez & Platero, 2022).

1.3. Aims and hypothesis

In this context, the aim of this study is twofold: first, to evaluate the differences by gender identity and age in different prosocial beliefs (such as altruism, reciprocity, social responsibility, and the prosocial subjective norm) during adolescence and, second, to study the influence of these variables on the online prosocial behavior emitted and received, controlling for the gender effect.

Based on differential gender socialization and suggestions from previous studies, females will present a higher proportion of these beliefs compared to males (hypothesis 1). Although few studies have yet to maintain a firm hypothesis, non-binary individuals may exhibit these prosocial beliefs to a greater extent than binary individuals, especially social responsibility (hypothesis 2). Likewise, considering the advances in moral development and social thinking that take place during the adolescent stage (Chaikovska et al., 2020; Eisenberg et al., 2015; Malti et al., 2021; Sassenrath et al., 2022) and based on previous literature on prosocial beliefs (Wray-Lake et al., 2016), there will be an increase in these prosocial beliefs with age (hypothesis 3). We also expect to find that the greater the altruism, social responsibility, direct and indirect reciprocity, and the prosocial subjective norm, the greater the frequency of online prosocial behaviors emitted (hypothesis 4) and received (hypothesis 5). However, a stronger association of these beliefs with the emitted prosocial behavior is expected.

2. Materials and methods

2.1. Participants

The sample consists of 1299 students (Mage = 16.23, SD = 1.13; Range = 14–20) in compulsory secondary education (ESO, 3rd and 4th year) or high school and vocational training (1st and 2nd year) in the Region of Madrid during the 2021-22 academic year. Around 52 % of the respondents were girls, compared to 45.8 % boys, and 2.2 % who identified themselves as non-binary. Nearly half of the participants attended public schools (48.4 %), 34.6 % to subsidized schools, and 16.9 % to private schools.

2.2. Variables and instruments

A questionnaire assessing sociodemographic variables (age, gender identity, academic year, and type of school), prosocial beliefs and attitudes, and online prosocial behavior was administered.

The variables included in the research were: prosocial subjective norm, altruism, social responsibility, direct and indirect reciprocity, and online prosocial behavior (emitted and received). To assess the prosocial subjective norm, a single item was used based on previous studies in the health field (e.g., Hagger et al., 2020). This assessed the extent to which "people who are important to me would want me to be nice, say nice things, help, support, and comfort others" through online social networks, using a 7-point Likert scale. Given that the subjective norm that prevails in an individual entails a global assessment of all the opinions and pressures received from significant others ((Ajzen & Fishbein, 1980)), it was decided to directly evaluate this assessment based on a single item.

Each of the prosocial beliefs assessed (altruism, direct or indirect reciprocity, and social responsibility) was evaluated with a four-item scale, a 5-point Likert-type response scale that expresses the degree of agreement or disagreement. The research done by Wang and Wang (2008) was used to assess altruism. An example of one item about altruism was: "It is great for me to be able to selflessly help other people." Items such as "Being useful to others is our moral obligation" were used to evaluate social responsibility. The social responsibility items were based on a subscale of the social values questionnaire used by McCollum (2005). The investigations by Perugini et al. (2003) and Wu et al. (2006) were considered for the development of the direct reciprocity items, such as "Helping someone is the best way for that person to help you in the future." The indirect reciprocity scale was based on studies by Hu et al. (2019) and includes items such as "By helping others, we help ourselves, since all the good we give closes the circle and comes back to us." Factor analysis was applied to each of these constructs. In all cases, the Kaiser-Meyer-Olkin (KMO) and Bartlett's test of sphericity indicated that the items were very suitable or suitable for factor analysis. The four items that made up the altruism scale explained 65.7 % of the variance and adopted factor loadings between 0.77 and 0.86 (α = 0.88). The items on indirect reciprocity explained 59.1 % of the variance of this scale and adopted factor loadings from 0.60 to 0.85 (α = 0.84). The items on direct reciprocity explained 37.4 % of the variance and adopted factor loadings between 0.55 and 0.69 (α = 0.70). The items on social responsibility explained 45.1 % of the variance and adopted factor loadings from 0.54 to 0.77 (α = 0.75).

To assess online prosocial behavior, we used a Spanish adaptation of the scale designed by Erreygers et al. (2018): Online Prosocial Behavior Scale. This instrument was translated and adapted to Spanish by two bilingual professionals following the iterative procedure designed by Ramada-Rodilla et al. (2013). It assesses how often in the last month an individual has performed or received different actions (such as encouraging someone or helping someone with their homework, etc.) through electronic media (social networks, WhatsApp, etc.), with a 5-point response scale that evaluates the frequency of each behavior, ranging from 1 (never) to 5 (every day). It consists of 20 items equally distributed in two subscales on prosocial behavior emitted and received. Following the analysis procedure of the original instrument (Erreygers et al., 2018), the factor structure of the two scales was analyzed separately. For both scales, the Kaiser-Meyer-Olkin (KMO) and Bartlett's test of sphericity indicated that the items were very suitable for factor analysis. The ten items on online prosocial behavior emitted saturated in a single factor, explaining 48.9 % of the variance and adopting factor loadings ranging from 0.35 to 0.86 (α = 0.89). The ten items on prosocial behavior received also saturated in a single factor explaining 55.5 % of the variance and presented factor loadings from 0.48 to 0.85 (α = 0.92).

2.3. Procedure

The procedure for this study was approved by the research ethics committee at our institution (reference number: 0203202106321). The researchers contacted 12 different schools in the Region of Madrid of different types (public, private, and subsidized) and from areas of varying socioeconomic status. Ten of them decided to participate in the data collection (83 %). After signing the collaboration agreement with the team, they were sent an informed consent form that had to be signed by the participants in the study. The regulations in Spain do not require parental consent to be requested since the participants were over 14 years of age. Despite this, some schools also wanted to request parental consent. After signing the consent forms, a member of the research team went to the school to administer the questionnaires in a computer room set up for this purpose, only to the adolescents who had the corresponding consent forms (93 %). The questionnaires were administered to all the groups from 3rd and 4th year secondary education, 1st and 2nd year high school and the equivalent vocational training courses.

2.4. Analyses

In order to describe the different prosocial beliefs, several descriptive

statistics (percentages, median, and interquartile range) were used. The Kruskal-Wallis nonparametric test and the Bonferroni adjustment for pairwise comparisons were used to assess gender and age differences, since the variables were not normally distributed and there was no equality of variance in the subgroups considered, probably due to the unequal size of the gender identity groups (evaluated with three categories: males = 45.8 %, females = 52 %, non-binary individuals = 2.2 %) and age groups (evaluated with 3 groups: g1[14–15 years old] = 29.5 %, g2 [16–17 years old] = 54.2 % and g3 [18–20 years old] = 16.3 %).

To assess the influence of the different variables (altruism, direct reciprocity, indirect reciprocity, social responsibility, and the prosocial subjective norm) on OPB emitted (DV1) and received (DV2), two models were tested with hierarchical multiple linear regression (see Fig. 1). To control for the influence of gender identity, this variable was entered at the first level of the hierarchy in both models, and the different variables in each model were entered at the second level. In both models, the stepwise method was used, with the probability criterion of F for entry of each variable $p < .05$ and for removal $p > .10$.

The SPSS V27 statistical package was used for data analysis.

3. Results

Table 1 shows the median and IQR of the prosocial beliefs and the subjective norm by gender identity. The Kruskal-Wallis test showed differences in terms of gender identity in altruism, $H(2) = 41.19$, $p < .001$, indirect reciprocity, $H(2) = 30.00$, $p < .001$, and social responsibility, $H(2) = 37.42$, $p < .001$. In all cases, females showed significantly higher scores than males ($p < .001$). There were no significant differences between the non-binary individuals and the other two groups (males and females) in any of the variables studied.

When comparing age differences in these variables, the Kruskal-Wallis test showed significant differences in altruism, $H(2) = 10.01$, $p < .01$, direct reciprocity, $H(2) = 15.18$, $p = .001$, and social responsibility, $H(2) = 8.65$, $p < .05$. Descriptive statistics and pairwise comparisons are shown in Table 2.

We tested whether the different prosocial beliefs predicted the OPB emitted and received, controlling for the effect of gender identity. The hypothesized model explained 19.7 % of the variance of the emitted OPB ($R^2 = 0.19$, $F(5, 1293) = 63.44$, $p < .001$, Cohen's $f^2 = 0.234$). The variable that explains the highest percentage of the variance of the OPB emitted is altruism (9.3 %; $R^2 = 0.093$), followed by the control variable (gender: 6.1 %; $R^2 = 0.061$), prosocial subjective norm (2.7 %; $R^2 = 0.027$), social responsibility (1 %; $R^2 = 0.010$), and indirect reciprocity (0.6 %; $R^2 = 0.006$). Table 3 shows the results obtained in detail.

Regarding the prosocial behavior received, the hypothesized model explained 12.2 % of the variance ($R^2 = 0.12$, $F(4, 1263) = 44.99$, $p < .001$, Cohen's $f^2 = 0.136$). In this case, indirect reciprocity is the variable that explains the highest percentage of variance (7.3 %; $R^2 = 0.073$), followed by the control variable (gender: 3.7 %; $R^2 = 0.037$), the prosocial subjective norm (1.1 %; $R^2 = 0.011$), and altruism (0.4 %; $R^2 = 0.040$). Table 4 shows the results obtained in detail.

4. Discussion

An individual's beliefs toward others and their relationships guide their behavior. Prosocial beliefs, such as altruism, reciprocity, and social responsibility, undoubtedly influence online behavior during adolescence. Likewise, the perception one has about how others think they should behave online – the subjective norm – influences them to act. The aim of this study has been to describe these beliefs in Spanish adolescents and any differences by gender identity and age in their manifestation, as well as to analyze their influence on online prosocial behavior.

Consistent with previous studies indicating a female predominance in prosocial behavior (Silke et al., 2018; Siu et al., 2012; Van der Graaff et al., 2018; Xiao et al., 2019), our data indicate that Spanish adolescent girls show higher beliefs about altruism, social responsibility, and indirect reciprocity than boys, partially fulfilling hypothesis 1. These observed differences are in line with differential gender socialization, which directs women towards behaving properly, caring for others, and expressing emotions, while men are generally inhibited about expressing such emotive responses to others, as they are "unmanly" (Kågesten et al., 2016). It is also in line with the assumed gender specialization of prosocial responses (Eagly, 2009; Xiao et al., 2019). In this respect, considering the content of the beliefs evaluated in this study, altruism, indirect reciprocity, and social responsibility are all beliefs that seem closer to feminine role norms (the ideal of motherhood, caring for others, giving without receiving anything in return), while direct reciprocity reflects the concept of a commercial exchange of help, with the idea of "I help you, so that you can help me" and vice-versa. Therefore, perhaps there are no significant differences by gender in this variable. Moreover, as the prosocial subjective norm has been evaluated with a single item that captures both instrumental exchanges of support – linked to masculinity – and other more expressive or emotional exchanges – more closely related to femininity – any possible gender differences are cancelled out. Thus, this result may be consistent with the literature on gender specialization in prosocial behavior (Espinosa & Kovářík, 2015). This gender differentiation has also been observed in online prosocial behavior; where girls tend to use more supportive actions, empathy, and positive emotions in social networks, boys focus on more instrumental behaviors such as sharing information and promoting ideas or opinions (Erreygers et al., 2019; Keresteš and Štulhofer, 2020; Suriá, 2017). Our results point to a greater pressure toward this kind of prosociality in the case of females, related to acts of generosity, helping, and caring for others online. Furthermore, from a sociocultural point of view, the differences observed in prosocial behaviors correspond to the paradigms on the construction of masculinity and femininity (López-Sáez & García-Dauder, 2020). In this sense, although we have advanced towards a certain gender syncretism, the logics of the patriarchal system continue to be reproduced, which assumes that people socialized in femininity are more focused on the optics of caring for
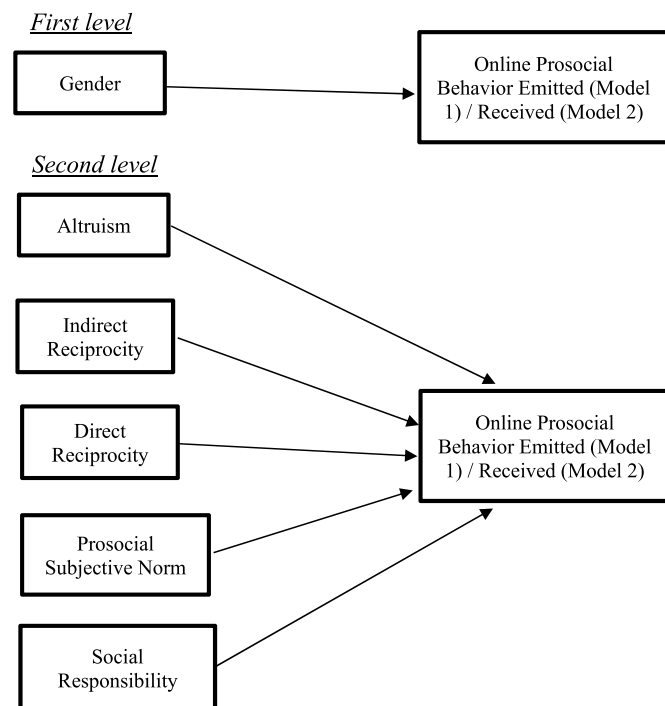

First level

Fig. 1. Models tested with Hierarchical Multiple Linear Regression Analysis: Influence of prosocial beliefs on online prosocial behavior emitted (Model 1) and on online prosocial behavior received (Model 2).

Table 1
Descriptive statistics (Mdn, IQR) and pairwise comparisons of prosocial beliefs by gender identity.

| | Gender Identity | | | | | | Pairwise comparisons[a] |
| | Male | | Female | | Non-binary | | |
Variables	Mdn	IQR	Mdn	IQR	Mdn	IQR	
Altruism	3.75	4.5–3	4.25	5–3.5	4	3.75–3.5	Female > Male
Social responsibility	3.5	4–3	3.75	4.25–3.25	3.75	4.5–2.87	Female > Male
Direct reciprocity	3.5	4–3	3.5	4–3	3.5	4.1–2.9	n.s.
Indirect reciprocity	3.25	4–2.5	3.75	4.5–2.75	3.25	3.75–2.3	Female > Male
Subjective norm	6	7–4	6	7–5	6	7–5	n.s.

[a] Post-hoc Mann-Whitney tests with Bonferroni correction (p < .05).

Table 2
Descriptive statistics (Mdn, IQR) and pairwise comparisons of prosocial beliefs by age group.

| Variables | Age group | | | | | | Pairwise comparisons[a] |
| | 14–15 | | 16–17 | | 18–20 | | |
	Mdn	IQR	Mdn	IQR	Mdn	IQR	
Altruism	4	4.5–3.25	4	4.75–3.25	4.25	5–3.5	18-20 > 14–15, 16-17
Social responsibility	3.75	4.25–3.25	3.5	4.25–3	3.75	4.25–3	18-20 > 16-17
Direct reciprocity[2]	3.5	4–3	3.5	4–3	3.25	4–2.5	18-20 > 14–15, 16-17
Indirect reciprocity	2.75	4.25–2.75	3.25	4.25–2.5	3.5	4–2.5	n.s.
Subjective norm	6	7–5	6	7–5	6	7–5	n.s.

[a] Post-hoc Mann-Whitney tests with Bonferroni correction (p < .05).

Table 3
Regression analysis of prosocial beliefs on OPB emitted.

| Variables | Estimate | SE | 95 % CI | | p |
			LL	UL	
Intercept	.964	.127	.715	1.214	<.001
Gender identity	.300	.041	.220	.379	<.001
Altruism	.162	.027	.108	.215	<.001
Subjective norm	.085	.016	.054	.116	<.001
Social responsibility	.107	.033	.043	.171	.001
Indirect reciprocity	.073	.024	.025	.121	.003

Table 4
Regression analysis of prosocial beliefs on OPB received.

| Variables | Estimate | SE | 95 % CI | | p |
			LL	UL	
Intercept	1.227	.146	.942	1.513	<.001
Gender identity	.267	.048	.173	.360	<.001
Indirect reciprocity	.208	.027	.155	.262	<.001
Subjective norm	.063	.018	.028	.099	<.001
Altruism	.071	.029	.013	.129	.016

others (Ahmed, 2006). This differential socialization by gender is reflected in the prosocial beliefs held by adolescents.

Our results refute hypothesis 2, since non-binary individuals do not show higher prosocial beliefs than binary boys and girls, not even in terms of beliefs about social responsibility, as previous research might suggest (Durbeej et al., 2019). This could be because earlier research reported greater behavioral involvement in social activism and human rights activities (Durbeej et al., 2019), but this is not actually reflected in differences in prosocial beliefs. Such activism could be more of a personal response or struggle in the face of increased discrimination against non-binary people. A study of how people who experience discrimination due to their expression and experience of gender identity do or do not manifest differences in their development of social judgment and thinking is a necessary and novel area for future research.

In line with advances in moral development and social thinking during adolescence (Chaikovska et al., 2020; Eisenberg et al., 2015;

Malti et al., 2021; Sassenrath et al., 2022), our results point to certain differences due to age in some prosocial beliefs, partially confirming hypothesis 3. The older age group (between 18 and 20) showed higher scores in altruism and direct reciprocity than those aged 14 to 15 and 16 to 17. They also showed greater social responsibility than adolescents between 16 and 17 years of age. Our results suggest that these prosocial beliefs are more developed in the late adolescent years than in the middle adolescent stage. Some of our results contradict the scarce previous research carried out in this area. For example, while earlier studies reported an increase in indirect reciprocity between the ages of 11 and 20 (Hu et al., 2019), no differences in this variable due to age were observed in our participants. This could be due to differences between the two studies in the age range analyzed. However, in accordance with Wray-Lake et al. (2016), who observed a decrease in social responsibility from childhood to middle adolescence, our data show that the lowest scoring group is middle adolescents and finds an increase at the end of this stage. Longitudinal studies are needed to understand how prosocial beliefs change and develop with age in the adolescent and youth stages.

This study also focused on analyzing the influence of these beliefs on online prosocial behavior emitted and received. With respect to the emission of behaviors, after controlling for gender, our data showed that altruism, the prosocial subjective norm, social responsibility, and indirect reciprocity all positively influence the online prosocial behavior emitted. Hypothesis 4 of our study is thus confirmed, except for the lack of influence by direct reciprocity. These results confirm the observed trend in the studies for each specific variable: altruism (Zhu et al., 2020), social responsibility (Cohen-Almagor, 2018), and the subjective norm (Heirman et al., 2013, 2016; Heirman and Walrave, 2012; Jang et al., 2016; Lewis et al., 2008). With respect to altruism, it reflects the belief or value that emphasizes giving to others without expecting anything in return. It is the belief more linked to values of generosity and perhaps for this reason it is the belief that has the greatest weight in explaining the emission of online prosocial behaviors. Beliefs about social responsibility and the subjective norm have a nuance more linked to moral duty and personal commitment (the former), and to what others expect of me (the subjective norm). Both have less influence on the online prosocial behavior emitted than altruism. In contrast, reciprocity reflects the idea of giving and receiving in return. Direct reciprocity does not appear to be related to the emission of online prosocial behavior in

our data, contradicting previous research about offline contexts (Chiu et al., 2006; Liou et al., 2016; Tsai & Pai, 2014; Wasko & Faraj, 2005). This may be because it is a belief that establishes an exchange between two people (that is, pay-it-forward reciprocity). The online environment is a place open to multiple interactions, which can be observed by many other viewers not involved in the relationship. Much of the current research has not distinguished between direct and indirect reciprocity, the latter being more closely linked to generosity and altruism (Hu et al., 2019), and perhaps its influence in the online world makes more sense. Online relationships in adolescence could foster learning indirect reciprocity, which is beneficial for the development of prosociality.

Regarding the influence of prosocial beliefs on the perception of receiving prosocial behaviors online, the variable that contributes most to this perception is indirect reciprocity. This belief considers a third party in an exchange relationship, such that someone who receives support or help expects to be able to return this in the future to another person (Nowak & Roch, 2007). Holding such a belief may bolster the perception of receiving support and help in networks and vice-versa. The characteristics of the digital interaction context may also explain why indirect reciprocity is related to the feeling of receiving support online. The relationships established in this context are not only with people who are close in real life, but also with acquaintances or even strangers. There are many anonymous and non-anonymous observers of these online interactions. Consequently, it is expected that sooner or later, but not immediately, one would be able to repay the help provided or be repaid (Hu et al., 2019; Nowak & Roch, 2007). Altruism and the pro-social subjective norm have less explanatory weight in receiving online prosocial behavior. These variables maintain a weak positive relationship with the feeling of receiving more help or support online. This could reflect the fact that individuals with a more prosocial orientation in turn feel that they receive more support. It should be noted that, as expected, these beliefs have a weaker relationship with prosocial behavior received than with behavior emitted. These beliefs guide our behavior and also influence, although less so, how we interpret the behavior of others towards us. These results on online prosocial behavior received allow us to partially confirm hypothesis 5.

While the study of problematic and antisocial behaviors in networks during the adolescent stage currently occupies thousands of pages in academic journals, this is not the case with the analysis of online pro-social behavior (Erreygers et al., 2019). Thus, it necessary to delve into how it manifests itself and the antecedent variables that may favor it. This paper adds to the existing information about which beliefs may be facilitating or promoting these behaviors in the digital environment, in order to promote those beliefs through educational programs. As other authors have noted (Malonda et al., 2019), the promotion of prosocial beliefs and behaviors is a key element in preventing aggression in the online context, with benefits for the well-being and mental health of adolescents (Hirani et al., 2022).

Digital environments facilitate the emission of prosocial online behaviors based on prosocial beliefs, as they promote interaction, community or group membership, and common identity (Jang et al., 2016; Wong et al., 2017; Zhu et al., 2020). The digital world is another space for socialization, in the same way as families, peers, and schools (Subrahmanyam & Šmahel, 2011). It is common for adolescents interacting within social networks to make positive or comforting comments to others, offer help to their network of contacts, or establish beneficial interactions through "likes" (Erreygers et al., 2019; Suriá, 2017). Thus, digital environments help adolescents learn prosocial beliefs (Subrahmanyam & Šmahel, 2011). The appropriate acquisition of prosocial beliefs, especially during middle and late adolescence, fosters the emission of more prosocial behaviors (outside and inside the digital world) and the development of an ethical code to guide this behavior (Chaikovska et al., 2020; Kislyakov et al., 2020).

Future research should address how prosocial beliefs are learned and/or activated in the digital environment. It would be especially interesting to expand upon what is known about the variables of the online communicative and social environment that can further this learning and those that do not. In particular, more research on the role of direct and indirect reciprocity in the online context is needed to unravel the positive role it appears to be playing. The online world is not only a source of problems and discomfort, but also an important source of positive and beneficial teachings for well-being and healthy development during adolescence. The beliefs held by adolescents can be both prosocial and antisocial, i.e., they can foster either online collaboration and cooperation or, on the contrary, bullying and disrespect towards others. Prosocial beliefs are the antithesis of antisocial behaviors and beliefs (Carlo et al., 2014; Hofmann & Müller, 2018). Therefore, designing and validating education interventions aimed at promoting prosocial beliefs useful for preventing not only cyberbullying, but also other aggressive or antisocial online and offline behaviors should be another priority for future research.

This study is not free of limitations, beginning with the sample characteristics. Since this was a cross-sectional and not a longitudinal study, conclusions cannot be drawn about the directionality and causality of the relationships. Moreover, it uses an incidental sample, albeit a large one, which makes it difficult to generalize the results. Given that the subjects and schools freely chose to participate in the study, a sample selection bias may exist that could diminish the validity of the results obtained. Additionally, the ethnic characteristics of the participants and their sociocultural background were not assessed. Another sampling weakness is the over-representation of medium and large urban areas in the Madrid region, with small municipalities and rural areas being absent. This also makes it difficult to generalize the results to regional or national level. However, the inclusion of schools from areas with different socioeconomic backgrounds guarantees some degree of sample diversity. Another sampling limitation was the unequal size of the age groups considered, which led us to create three subgroups with different age ranges. Moreover, the age range of our study sample spans from middle adolescence to the end of this period (14–20 years). It would be interesting to conduct longitudinal studies with samples of pre-adolescents and early adolescents to assess the development and influence of prosocial beliefs from the beginning of their contact with social networks. Additionally, regarding gender, despite having been evaluated with three categories including non-binary persons, the extent to which this is representative of the population is not known. Indeed, we believe that the number of non-binary individuals is too low with regard to the current situation in Spain. There is a possibility that – since the questionnaires were administered in the schools themselves, albeit by researchers instead of school personnel – the adolescents did not feel free to choose their desired option for this variable, due to the discrimination they perceive in their environment. Furthermore, the questionnaire used to assess prosocial behaviors online was designed to evaluate small everyday acts of support and care for others, but does not include larger and less frequent prosocial acts, such as supporting someone who is being harassed or defending important social causes, among others. Instruments and research that address these behaviors of greater personal cost and social impact are still required. Additionally, the assessment of the prosocial subjective norm using a single item constitutes a limitation of this study, since it does not make it possible to capture the diversity of the different subjective norms that may be emerging from online relationships. Further exploration of this aspect poses a new challenge for future research. Moreover, the moderate percentage of variance explained by the proposed models merits attention. Given the multicausality of human behavior, there is a need to delve deeper into the many other factors that may be influencing online prosocial behavior.

5. Conclusions

This paper highlights the study of prosocial behaviors in the online context and the influence of beliefs on them. Our data confirm that girls and older adolescents have higher scores on prosocial beliefs, especially

those that relate to altruism, social responsibility, and indirect reciprocity. In addition, the results show that – in order of importance – beliefs about altruism, the prosocial subjective norm, social responsibility, and indirect reciprocity influence the emission of prosocial behaviors online, and that beliefs about indirect reciprocity, the prosocial subjective norm, and altruism influence the perception of receiving good treatment online during the adolescent stage. All these beliefs promote online prosocial behavior and vice-versa. From a theoretical perspective, this paper emphasizes the role of some prosocial beliefs as promoters of healthy online behavior, specifically beliefs about altruism, social responsibility, indirect reciprocity, and the prosocial subjective norm. In contrast, direct reciprocity does not emerge as a belief that favors online prosociality. From an applied point of view, there is a need to create spaces for learning and reflection related to the beliefs and norms perceived in the digital environment to promote the acquisition and predominance of prosocial behavior. These beliefs can help spread prosocial behaviors in this context and constitute a necessary antidote to online antisocial behaviors (Cohen-Almagor, 2018). Psychoeducation in prosocial behavior has beneficial effects on the psychological well-being of adolescents and encourages a more respectful and accepting peer interaction climate, both online and offline (Erreygers et al., 2018; Memmott-Elison et al., 2020; Schacter & Margolin, 2019). Moreover, considering that people behave in social interactions similarly in both contexts (Subrahmanyam & Šmahel, 2011; Surma, 2016), it is to be expected that the behaviors benefit from a bidirectional effect, as demonstrated by a study that found that the higher the salience of the online audience, the greater the intentions of adolescents to engage in offline prosocial behaviors (Lavertu et al., 2020).

Future research must delve deeper into informal learning and the activation of prosocial beliefs and norms in the digital environment, in order to foster prosocial and prevent antisocial behaviors. In short, a new approach centered on positive psychology that pays attention to prosocial behaviors in networks (generosity, reciprocity, social responsibility, etc.) needs to be adopted.

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CRediT authorship contribution statement

Yolanda Pastor: Conceptualization, Formal analysis, Methodology, Writing – original draft. **Vanesa Pérez-Torres:** Investigation, Writing – original draft, Conceptualization, Funding acquisition. **Helena Thomas-Currás:** Investigation, Writing – review & editing. **Luis Lucio Lobato-Rincón:** Investigation, Writing – review & editing. **Miguel Ángel López-Sáez:** Data curation, Investigation, Writing – review & editing. **Alejandro García:** Methodology.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The authors do not have permission to share data.

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