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Development of a Measure of Adolescents' Online Prosocial Behavior

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Abstract

Research on adolescents' media use has focused predominantly on its negative aspects (risks) and far less on its positive side (opportunities). This is reflected in the lack of validated instruments to assess adolescents' online prosocial behavior. To address this issue, we developed the Online Prosocial Behavior Scale (OPBS) to assess adolescents' involvement in online prosocial behavior. Two subscales (performing and receiving online prosocial behavior) were constructed and their factor structure was evaluated and confirmed through parallel analysis, exploratory factor analysis, and confirmatory factor analysis. The OPBS-subscales displayed good reliability and correlated positively with offline prosocial behavior and use of digital media, supporting the scale's construct validity. Unexpectedly, the subscales also correlated positively with online antisocial behavior, which may be understood within the framework of the online disinhibition theory. The scale can be a useful tool for researchers and practitioners who need a global instrument to assess adolescents' online prosocial behavior.

Keywords: prosocial behavior, prosocialness, antisocial behavior, adolescents, online behavior, scale development, scale validation, measurement instrument.

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Development of a Measure of Adolescents' Online Prosocial Behavior

Adolescents are heavy users of digital technologies, which allow them to interact with others (Eurostat, 2015; Lenhart, 2015). Similar to offline interactions, online interactions can be positive, negative or neutral. Negative or antisocial online behaviors, such as cyberbullying, cyber harassment, and cyber aggression, have been researched extensively in recent years (Chen, Ho, & Lwin, 2015; Kowalski, Giumetti, Schroeder, & Lattanner, 2014; Zych, Ortega-Ruiz, & Del Rey, 2015). Considerably less has been published about adolescents' online prosocial behavior. Moreover, whereas validated scales exist to measure (forms of) online *antisocial* behavior (Palladino, Nocentini, & Menesini, 2015; Patchin & Hinduja, 2015; Schultze-Krumbholz & Scheithauer, 2009; Stewart, Drescher, Maack, Ebesutani, & Young, 2014) and *offline* prosocial behavior (Caprara & Pastorelli, 1993; Caprara, Steca, Zelli, & Capanna, 2005; Carlo & Randall, 2002; Goodman, 2001; Pastorelli, Barbaranelli, Cermak, Rozsa, & Caprara, 1997), so far no validated instruments to measure *online* prosocial behavior have been developed.

Yet, online prosocial behavior is important for several reasons. First, when many people display this behavior, a social norm of positive online interactions may be established, which could be a powerful counterweight against cyberaggression (Jang, Kim, & Jung, 2016). Positive online communication may also increase social connectedness and improve relationship quality, and foster adolescents' well-being and self-esteem (Valkenburg & Peter, 2009, 2011). Taken together, online prosocial behavior may lead to positive outcomes in individual, relational and societal domains. Therefore, our aim was to develop a measure of adolescents' online prosocial behavior, to assess the instrument's psychometric properties, convergent validity with offline prosocial behavior and use of digital media, and discriminant validity with online antisocial behavior. This empirically validated instrument will be useful to researchers and practitioners to obtain a more balanced view of how adolescents actually

behave online and to discover which individual, social, and contextual factors contribute to online prosocial behavior.

Prosocial Behavior in Adolescence

Prosocial behavior is voluntary behavior carried out with the intention of benefitting particular others or promoting harmonious relationships with others (Dovidio, Piliavin, Schroeder, & Penner, 2006; Eisenberg, Fabes, & Spinrad, 2006; Van Rijsewijk, Dijkstra, Pattiselanno, Steglich, & Veenstra, 2016), such as comforting, helping, and sharing (Veenstra, 2006). Adolescence is an especially significant phase for the development of prosocial behavior. In adolescence an important shift occurs in the context in which prosocial behavior takes place: As adolescents spend increasingly more time with their peers and less time with their parents (Larson & Richards, 1991), prosocial exchanges between peers become more important (Van Rijsewijk et al., 2016). Correspondingly, in (early) adolescence, peer relationships exert an increasing influence on behavior (Brown, 2004; Gardner & Steinberg, 2005), and peers influence each other's risk-taking or antisocial, as well as prosocial behaviors (Allen & Antonishak, 2008; Brown, Bakken, Ameringer, & Mahon, 2008; van Hoorn, van Dijk, Meuwese, Rieffe, & Crone, 2016). These can be influenced directly (e.g., by encouraging each other to act prosocially) or indirectly (e.g., by group norms, expectations, or friendship closeness) (Barry & Wentzel, 2006; Padilla-Walker, Fraser, Black, & Bean, 2015), and positively or negatively (van Hoorn et al., 2016).

Offline Prosocial Behavior

In the offline domain several validated scales have been developed to measure prosocial behavior (Caprara & Pastorelli, 1993; Caprara et al., 2005; Carlo & Randall, 2002; Goodman, 2001; Pastorelli et al., 1997). Research has generally found that offline prosocial behavior increases during adolescence (Brittian & Humphries, 2015; Fabes, Carlo, Kupanoff,

& Laible, 1999) and shifts from the family to the peer context (Van Rijsewijk et al., 2016). Prosocial behavior can be based on several underlying motives, such as acting prosocially out of altruistic (selfless) reasons, behaving prosocially to gain approval and respect from others, and helping because others ask for it (Carlo & Randall, 2002).

Scholars have also examined the association between antisocial and prosocial behaviors. A negative association would seem logical, as prosocial and antisocial behavior appear to be opposites. Yet, evidence suggests that prosocial and antisocial behaviors can also be positively associated (Boxer, Tisak, & Goldstein, 2004; Veenstra, 2006). When prosocial behavior is driven by instrumental or proactive motivations, for instance, when a person helps someone in order to get something he or she wants, it relates positively to antisocial behavior (Boxer et al., 2004). Nevertheless, most studies have examined global prosocial behavior (a person's tendency to show prosocial behavior across situations and motives) and have reported negative (but often non-significant) correlations between global measures of prosocial and antisocial behavior (Carlo, Hausmann, Christiansen, & Randall, 2003; Crick & Grotpeter, 1995; Wyatt & Carlo, 2002).

Online Prosocial Behavior

Although there is a fair amount of research on *offline* prosocial behavior, so far adolescents' *online* prosocial behavior has received little research attention. In analogy with the definition of offline prosocial behavior, online prosocial behavior can be defined as voluntary behavior carried out in an electronic context with the intention of benefitting particular others or promoting harmonious relations with others. This includes behavior such as comforting a friend via electronic means, online sharing of resources and information with a classmate, and helping peers out online. Small actions such as liking a friend's post and sending someone a nice message are also considered online prosocial behavior, because these

actions help to maintain good relationships with others (Reich, Subrahmanyam, & Espinoza, 2012). As (offline) prosocial behavior between adolescents is mostly relational and directed towards particular others (Van Rijsewijk et al., 2016), online actions benefitting the general welfare, such as writing an article for Wikipedia, are rather categorized as a form of online civic engagement than as online prosocial behavior.

Similar to the various underlying motives for offline prosocial behavior (Carlo & Randall, 2002), it is likely that online prosocial behavior can also be driven by different motivations, and some may be facilitated or inhibited by the specific features of the online context. In particular, the potential to remain anonymous online, the possibility to reach a large audience almost instantly, the public nature of some platforms, and the lack of non-verbal cues in textual digital communication may influence people's prosocial motivations and their prosocial actions. On the one hand, the ease to act anonymously online may facilitate anonymous prosocial behavior; and the potential to reach large audiences through social media platforms or public fora and websites may promote prosocial behavior that is motivated by the desire to gain respect and approval from others (as these platforms allow for easy public displays of prosocial actions), but also compliant prosocial behavior, when others cry out for help publicly. On the other hand, the paucity of non-verbal behavior cues in text-based digital communication may decrease empathic responses (Konrath, 2012; but see Vossen & Valkenburg, 2016) and diminish altruistically and emotionally driven prosocial behavior.

Only a few studies have examined prosocial behavior online (Bosancianu, Powell, & Bratović, 2013; Lapidot-Lefler & Barak, 2015; Wang & Wang, 2008; Wright, 2014; Wright & Li, 2011). However, most involved adult samples and none relied on tested and validated instruments to measure online prosocial behavior. Wang and Wang (2008) investigated helping behavior in online gaming among young adults. They found that helping behavior

was influenced by both altruism and reciprocity (Wang & Wang, 2008). Lapidot-Lefler and

Barak (2015) conducted an experiment in which they examined the effects of anonymity,

invisibility, and lack of eye contact on self-disclosure and prosocial behaviors in dyads

discussing a dilemma in an online chatroom. They did not find evidence for a significant

effect of the online features on online prosocial behaviors. Two studies have examined the

association between online and offline prosocial behavior (Bosancianu et al., 2013; Wright &

Li, 2011). In a survey among young adults, Wright and Li (2011) reported that engaging in

offline and online prosocial behavior was positively related. Moreover, the more time

participants spent using a specific technology, the more often they behaved prosocially on that

platform. Similarly, Bosancianu, Powell, and Bratović (2013) studied instrumental online

prosocial behaviors (including online citizenship behaviors) among adult internet users in the

Balkans and reported a close relationship between offline and online prosociality. Finally, in

one study prosocial and antisocial behavior online ("cyberaggression") were studied

simultaneously. Wright (Wright, 2014) conducted a longitudinal peer-nomination and self-

report study among adolescents. The associations between peer-nominated and self-reported

online antisocial and prosocial behavior provided mixed results, with some negative and some

non-significant correlations.

The cited studies all assessed (some form of) online prosocial behavior with ad hoc

created scales and items. The six-item measure of helping behavior used by Wang and Wang

(2008) was an adaptation of a prosocial *values* subscale used previously in a study on

citizenship behaviors of Nigerian agriculture workers (Ladebo, 2004). In the online

experiment of Lapidot-Lefler and Barak (2015), prosocial behaviors specific to the

experimental situation were measured using expert judges' analysis of participants' chat text,

textual analysis of prosocial behavior, and self-reported prosocial behavior based on two

items of a questionnaire measuring self-disclosure in online chat ("I helped the person I talked

to and s/he felt it," "I helped the person I talked to without him/her noticing"). Wright and Li (2011) generated five equivalent four-item measures of prosocial behavior (one for face-to-face prosocial behavior and one for each of four technology types). These four items were also used in Wright's later study (Wright, 2014). Finally, Bosancianu, Powell, and Bratović (2013) used a self-designed 11-item scale that seemed to primarily assess instrumental helping. In sum, these studies did not use reliable and validated measures of online prosocial behavior.

This Study

To further advance the research on online prosocial behavior in adolescence, a reliable and validated instrument is needed. Therefore, this study aims to develop and psychometrically evaluate a scale to measure adolescents' online prosocial behavior. The purpose was to develop a global instrument for use in larger surveys with multiple scales so that associations with antecedents, outcomes, and other factors can be assessed, rather than to create an elaborate scale assessing all possible subtypes of online prosocial behavior. The instrument's primary aim is providing insight into the frequency of adolescents' online prosocial experiences. In order to facilitate the use of this scale in combination with measures of online antisocial behavior, which routinely measure both perpetration and victimization, two parallel subscales are created, analogous to the antisocial behavior subscales of perpetration and victimization: one for performing and one for being the recipient of online prosocial behavior. The decision to also measure experiences of being a recipient of online prosocial behavior, which is not included in most measures of offline prosocial behavior, is motivated by research showing that receiving help can produce feelings of gratitude or indebtedness, which in their turn influence recipients' attitudes toward helpers, well-being, and relational closeness to the helper (Tsang, 2006; Weinstein, DeHaan, & Ryan, 2010). Furthermore, health communication research has shown that both giving and receiving online

support are important in predicting individuals' well-being and health outcomes (Han et al., 2011; Namkoong et al., 2013). In the same vein, both being the beneficiary and the benefactor of online prosocial behavior may also have important effects on individuals' well-being and relationships with others.

To assess convergent validity, we will examine the association of online prosocial behavior with two related constructs: offline prosocial behavior and digital media use. Given the connectedness between people's offline and online networks (Reich et al., 2012; Subrahmanyam, Reich, Waechter, & Espinoza, 2008) and the previously reported positive associations between offline and online prosocial behavior in adults (Bosancianu et al., 2013; Wright & Li, 2011), we hypothesize that: (H1) Online prosocial behavior is positively associated with offline prosocial behavior. Furthermore, a precondition to be able to behave prosocially *online* is using digital media. In analogy with research on online antisocial behavior (i.e., cyberbullying) that has reported positive associations with use of digital media (Festl & Quandt, 2013, 2016; Meter & Bauman, 2015; Sticca, Ruggieri, Alsaker, & Perren, 2013; Walrave & Heirman, 2011), we hypothesize that: (H2) Online prosocial behavior is positively associated with the use of digital media.

To assess discriminant validity, we will examine the association of online prosocial behavior with online antisocial behavior, cyberbullying, and traditional (offline) bullying. Although findings on the association between online prosocial and antisocial behavior from a previous study yielded inconsistent results (Wright, 2014), most studies on the association between offline prosocial and antisocial behavior have reported negative correlations between global measures of prosocial and antisocial behavior (Carlo et al., 2003; Crick & Grotpeter, 1995; Wyatt & Carlo, 2002). Therefore, we hypothesize that: (H3) Online prosocial behavior is not or negatively associated with online antisocial behavior, cyberbullying, and traditional bullying.

Method

Procedure

This study comprised two waves of data collection separated by a six-month interval, administered between March and November 2015. Participants were recruited via randomly selected schools from one province in [anonymized]. Thirteen out of 30 contacted schools agreed to participate. Active informed consent was received from the principals and the pupils and passive consent from the participants' parents. The study received ethical approval from the Ethics Committee of [anonymized].

Administration of the questionnaire took place in classrooms during school hours. The first data collection took place when the participants were in the first year of secondary education (grade 7) and the second wave when they were in the second year (grade 8). Only 13 pupils opted out of participation. Participants were encouraged to give verbal feedback on the items to the author when answering the questionnaire.

For the development of the scale, we followed the first five steps of the scale development process outlined by Hinkin (1998): (1) item generation, (2) questionnaire administration, (3) initial item reduction, (4) exploratory factor analysis, and (5) confirmatory factor analysis.

Participants

This study was part of a larger longitudinal research project on adolescents' online social behavior. Most previous studies on this topic have focused on cyberbullying, and meta-analytical findings indicate that this behavior is most prevalent during middle school age (Kowalski et al., 2014) . To maximize the likelihood to observe this behavior and to enhance the comparability between participants from different schools and backgrounds, we opted to focus on a sample within this age range. In total, 1721 adolescents (45.7% boys) participated

in the first and 1747 (45.1% boys) in the second wave. Participants' mean age was 13.01

years ($SD = 0.55$) in the first and 13.55 years ($SD = 0.55$) in the second wave. 89.3% of wave

1- and 87.6% of wave 2-participants were in the general education track, the others in the

vocational education track. 79.7% of the adolescents in the second wave had also participated

in the first wave. The participants who dropped out after the first wave (19.1%) were slightly

older (13.16 vs. 12.98 years; $t(408.06) = 4.77$, $p < .000$) and more often male (53.5% vs.

43.9%) than non-dropouts. Attrition was due to absences due to illness, and a few entire

classes not participating because of practical issues during data collection (e.g., classes that

were absent because of a field trip).

Measures

Online Prosocial Behavior (Online Prosocial Behavior Scale, OPBS, see Table 1)

The generation of items started from the items used by Wright and Li (2011) (i.e., "say

nice things", "offer help", "cheer someone up", "let someone know I care about them"). The

first item was split into two by adding "*to* someone" and "*about* someone". The scale was

then elaborated to include different types of prosocial actions and different underlying

motivations, based on measures of offline prosocial behavior: the Prosocial Behavior Scale

(Caprara & Pastorelli, 1993), the Prosocialness Scale for Adults (Caprara et al., 2005), and the

Prosocial Behavior subscale of the Dutch Survey of Social Skills of Youngsters (Hulstijn et

al., 2006). Items were selected and adapted for the online context. The focus was on prosocial

interactional behaviors, therefore items reflecting empathy or related personality

characteristics (e.g., "I intensely feel what others feel"), actions involving material goods or

face-to-face interactions (e.g., "I hug my friends"), and social skills (e.g., "I can make

friends") were not included. This resulted in an initial pool of 14 items. Two parallel

subscales were created: one for performing (POPB; e.g., "Cheer up someone") and one for

being the recipient of online prosocial behavior (ROPB; e.g., "Someone cheered me up"). The

instructions were: "How often have you [done]/[experienced] the following via electronic media (smartphone, computer, tablet…) in the past month?" The response options consisted of a 5-point Likert-type scale from 1 = "Never" to 5 = "Every day". The initial pool of items was tested for comprehension and content in a pilot study among 22 pupils in two first year classes from the lowest (i.e., vocational education) track. The pupils were asked to give their feedback about their understanding and the content of the questions and minor adjustments were made to wording. All items were retained for the main study. Cronbach's alpha's for the pilot study were .899 for POPB and .900 for ROPB.

Offline Prosocial Behavior

Offline prosocial behavior was assessed with the prosocial subscale of the Dutch version of the Strengths and Difficulties Questionnaire (e.g., "I try to be nice to other people. I care about their feelings," "I usually share with others, for example CD's, games, food"; Van Widenfelt, Goedhart, Treffers, & Goodman, 2003). Participants rated how they usually behave on a 5-point Likert-type scale (1 = "I am not like that at all" to 5 = "I am exactly like that"), with higher scores representing more prosocial behavior (five items, α_{w1} = .645, α_{w2} = .674).

Online Antisocial Behavior

Performing and receiving online antisocial behavior was assessed with the European Cyberbullying Intervention Project Questionnaire (Del Rey et al., 2015; Schultze-Krumbholz et al., 2015), measuring cyberbullying and cybervictimization (e.g., "Create a false account and pretend to be that person"). This measure was originally developed to measure cyberbullying involvement, but when potentially offensive practices are not framed within the context of cyberbullying (by mentioning the term "cyberbullying" and providing a definition), adolescents often do not perceive these practices as acts of cyberbullying (Vandebosch & Van

Cleemput, 2009). Therefore, this scale was used as a broader measure of online antisocial behavior. Participants were asked to rate how often they had performed and experienced 11 acts in the past month on a 5-point Likert-type scale (1 = "Never" to 5 = "Every day"; performing: α_{w1} = .718, α_{w2} = .771; receiving: α_{w1} = .789, α_{w2} = .813).

Cyberbullying and Traditional Bullying

First, a definition of bullying was provided, highlighting the three key features of repetition, intention to hurt, and power imbalance, and distinguishing it from teasing or conflicts between friends. Examples of bullying and cyberbullying were provided. Then, participants were asked to indicate how often they had bullied others via internet or mobile phone (cyberbullying) or in the "real" world (traditional bullying) in the past six months on a 6-point Likert scale (1 = "Never" to 6 = "Multiple times per week").

Use of Digital Media

Use of digital media was assessed with a measure on internet use of the Dutch version of the EU Kids Online Questionnaire (EU Kids Online, 2014). Participants rated how often they had performed 17 online activities (e.g., "used instant messaging") in the past six months on a 6-point Likert-type scale (1 = "Never" to 6 = "Multiple times per day"). Two items were omitted from analysis because most respondents were not familiar with these practices and did not understand the items ("visiting chatrooms" and "using file-sharing websites"): Instant messaging has superseded visiting chatrooms, and most of our respondents did not know what file-sharing websites were. This yielded a reliable scale of 15 items (α_{w1} = .824, α_{w2} = .796), with higher scores representing more intensive digital media use.

Results

Exploratory and Confirmatory Factor Analysis

To evaluate the relations between the items and to examine the scale's dimensionality, exploratory factor analysis (EFA) was conducted on the data of the first wave, followed by confirmatory factor analysis (CFA) on the data of the second wave.

The items were measured on ordinal scales and showed non-normality, therefore robust weight least squares with polychoric correlations was the most suited method for the exploratory factor analysis (Barendse, Oort, & Timmerman, 2015). The software FACTOR (Lorenzo-Seva & Ferrando, 2006) was used to determine the number of factors to retain, and Mplus 7.4 (Muthén & Muthén, 2015) for the EFA and CFA. Three individuals from the first wave did not answer any of the items and were removed from analysis. Missing data were handled using pairwise deletion, based on the default setting in Mplus. Bartlett's test of sphericity (POPB: $\chi^2 = 9935.2$, $df = 91$, $p \leq .000$; ROPB: $\chi^2 = 11590.4$, $df = 91$, $p \leq .000$) and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (both subscales: .92) supported factorability of both subscales.

Prior to the analyses, two items ("[help someone]/[someone helped me] not to get into trouble" and "[help someone]/[someone helped me] to get out of trouble") were removed. These items seemed to be associated more with antisocial than prosocial behavior, which some of the participants pointed out during data collection.

To determine the number of factors, parallel analysis based on principal component analysis, as suggested by Garrido, Abad, and Ponsoda (2013), was executed. The suggested number of dimensions, based on both the mean and 95 percentile of random eigenvalues, was one for both subscales.

Next, EFA with Geomin rotation was conducted using the weighted least squares means and variance adjusted (WLSMV) estimation method, which is most suitable for non-normal categorical data (Barendse et al., 2015). All items had high loadings (>.5) on their

factor, except for two items ("share information with others"/"someone shared information with me" and "[involve someone]/[someone involved me] in a group conversation"), which demonstrated factor loadings of less than .4. During data collection, these items generated a lot of questions from pupils and participants often interpreted them in a negative rather than a positive way. Therefore, the EFAs were rerun without those items, yielding factor loadings that were all between .510 and .885, as can be seen in Table 1 (see Appendix for the Dutch version of the scale). The 10-item subscales demonstrated good to excellent reliability (α_{POPB} = .896; α_{ROPB} = .910). The mean scores were 3.331 (SD = .803) on the performing and 2.989 (SD = .890) on the receiving subscale. The correlation between the subscales was .805 (p <.001).

To confirm the factor structure of the scale, a confirmatory factor analysis was conducted on data from wave 2, again using WLSMV-estimation. Four participants who had not responded to any of the items were excluded, resulting in a sample size of 1743. Missing data were handled using pairwise deletion. The CFA with the ten selected items per subscale and two factors (one for POPB and one for ROPB) revealed significant, moderate to high standardized loadings (between .568 and .873) of the items on their respective factor, but the model did not fit the data well (χ^2(169) = 6477.247, p < .001; CFI = .881; TLI = .866; RMSEA = .146 [.143, .149]). However, this model was very restrictive as it did not allow any covariations between item errors. The items of the subscales mirror each other, with each item having two versions (one on performing, one on receiving). Furthermore, items 1 and 2 (say nice things [to]/[about] someone) are similar in their wording, and item 9 and 10 ("support someone" and "comfort someone") are closely related in meaning. Therefore, correlated errors for the mirrored and related items were allowed in a less restrictive model, which had

an acceptable fit ($\chi^2(155) = 1603.920$, $p < .001$; CFI = .973; TLI = .966; RMSEA = .073 [.070, 0.077])[1]. The standardized factor loadings are presented in Table 1.

[Table 1 about here]

To further evaluate the factorial validity of the scale, we split the sample in boys and girls to test for measurement invariance across gender. The model fit statistics indicated scalar invariance across the groups, as this model had the best fit and the change in CFI was smaller than .01 (Cheung & Rensvold, 2002): configural invariance model $\chi^2(230) = 1776.253$, CFI = .970, TLI = .964, RMSEA = .074; metric invariance model $\chi^2(212) = 1752.989$, CFI = .971, TLI = .967, RMSEA = .071; scalar invariance model $\chi^2(154) = 1730.731$, CFI = .973, TLI = .973, RMSEA = .063. Furthermore, the reliability statistics differed only slightly between the groups: POPB $\alpha_{boys} = .903$, $\alpha_{girls} = .877$; ROPB: $\alpha_{boys} = .910$, $\alpha_{girls} = .894$.

Construct Validity

Associations between the two subscales of the OPBS and the measures of offline prosocial and online antisocial behavior, cyberbullying and traditional bullying, and digital media use, were computed to assess convergent and discriminant validity (see Table 2). As predicted by hypotheses 1 and 2, correlations with offline prosocial behavior and digital media use were significantly positive. Hypothesis 3 was only partly confirmed: POPB and ROPB were not correlated with traditional bullying, but they were positively (albeit weakly) correlated with online antisocial behavior and cyberbullying.

[Table 2 about here]

Discussion

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[1] Because CFA is based on a restrictive measurement model which specifies a simple structure, allowing no cross-loadings and no within scale correlated residuals (Asparouhov, Muthén, & Muthen, 2009), subtle nuances in the data (such as variations in correlations between scale items) are not taken into account, which might explain why the fit of the model is not better.

This article aimed to develop a global scale to measure adolescents' engagement in online prosocial behavior. Based on instruments of offline prosocial behavior and items used in previous research about online prosocial behavior, two subscales were constructed to assess how often adolescents perform and are the subject of ("receive") online prosocial behavior. To evaluate the scale's validity, the associations of these subscales with offline prosocial behavior, online antisocial behavior, and use of digital media were examined.

Parallel analysis of the two subscales suggested that they represent one-dimensional constructs. After exploratory factor analysis, ten items were retained for each subscale. The factor structure of the scale was confirmed through confirmatory factor analysis. As hypothesized, the subscales correlated positively with offline prosocial behavior and use of digital media, supporting convergent validity of the OPBS. Contrary to hypothesis 3, weak but significant correlations were also found between online prosocial and antisocial behavior and cyberbullying. Although unexpected, previous research on offline social behaviors has sometimes also found that prosocial and antisocial behavior are positively related, when the motivation underlying the prosocial behavior is instrumental or proactive (Boxer et al., 2004; Veenstra, 2006). Because our global measure of online prosocial behavior was not designed to identify the motivations underlying this behavior, unfortunately we have no information about the reasons behind the respondents' behavior. However, this positive association with online antisocial behavior might indicate that self-interest can be an important motivator of online prosocial behavior. Alternatively, individuals who spend more time online are likely to be engaged more in social interactions online overall, prosocial as well as antisocial. The fact that the OPBS is not correlated with traditional bullying supports this idea.

Another possible explanation for the positive association between online prosocial and antisocial behavior could be that increased prosocial behavior towards one's in-group is associated with increased antisocial behavior towards one's out-group. Social identity theory

(Tajfel & Turner, 1979) posits that people's sense of self depends on the groups to which they belong. When people perceive themselves as part of a group, this becomes an in-group for them, whereas other groups to which they do not belong, are out-groups. This in-group versus out-group phenomenon entails favoring the in-group over the out-group, which might translate into increased prosocial behavior towards the in-group and increased antisocial behavior towards the out-group. Therefore, future research could benefit from taking into account with whom people are interacting when they behave prosocially or antisocially online.

Limitations and Future Directions

Some limitations can be formulated for this study. First, although the measure of offline prosocial behavior was validated and previously used with similar samples, it demonstrated low reliability in this study (as indicated by Cronbach's alpha < .70). However, previous research with the Dutch SDQ yielded similarly low alpha-values (Muris, Meesters, & van den Berg, 2003). In future research using more reliable scales of offline prosocial behavior, the reported correlations with the OPBS can be confirmed with more certainty.

Second, a social desirability bias may have inflated the scores on the OPBS, because the adolescents may have wanted to present themselves in a positive light. We tried to address this by emphasizing anonymous participation. Further, the items of the OPBS and the European Cyberbullying Intervention Project Questionnaire (Brighi et al., 2012; Schultze-Krumbholz et al., 2015) were presented together (mixed) so that it was not obvious which items addressed positive or socially desirable behaviors and which negative ones.

Third, as the aim of the study was to develop a global measure of online prosocial behavior, we did not attempt to distinguish between subtypes of prosocial behavior. However, research on offline prosocial behavior has suggested different subtypes of this behavior that

are differently related to antisocial behavior (Boxer et al., 2004; McGinley & Carlo, 2007).

Therefore, if researchers are particularly interested in the motivations underlying online

prosocial behavior (e.g., altruistic or egoistic), the OPBS might not be sufficient. Our scale,

together with scales measuring subtypes of offline prosocial behavior (Carlo & Randall, 2002)

and theoretical models of prosocial behavior, such as the empathy-altruism hypothesis

(Batson, 2011), could be used as an inspiration for the development of a more elaborate

measure on subtypes of online prosocial behavior.

Fourth, the scale development process, as outlined by Hinkin (Hinkin, 1998), consists

of a sixth step, replication. We encourage the administration of our scale in other samples to

confirm the generalizability of this new instrument.

Finally, future studies could examine the convergent validity of the OPBS further by

correlating adolescents' self-ratings with other-ratings or with observational analyses of their

actual online behavior. Explorations of correlations of the OPBS with related constructs, such

as online civic engagement, and with more elaborate measures of adolescents' offline antisocial

behavior, could provide added support for the instrument's discriminant validity.

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Tables

Table 1.

Factor loadings and descriptives of the online prosocial behavior subscales from EFA on wave 1 (N = 1718) and CFA on wave 2 (N = 1743).

	Item	Factor loadings EFA W1	Factor loadings CFA W2	Mean W1	Mean W2	SD W2	SD W2
1.	Say nice/friendly things *to* someone	.793	.770	3.494	3.512	1.032	0.955
	Someone said nice/friendly things *to* me	.885	.839	3.199	3.209	1.095	1.032
2.	Say nice/friendly things *about* someone	.759	.717	3.127	3.157	1.067	1.045
	Someone said nice/friendly things *about* me	.865	.770	2.859	2.812	1.130	1.111
3.	Help someone or offer to help	.699	.655	3.196	3.111	1.078	1.025
	Someone helped me or offered help	.709	.707	2.714	2.688	1.162	1.107
4.	Cheer up someone	.743	.782	3.474	3.375	1.068	1.059
	Someone cheered me up	.747	.785	3.159	3.130	1.211	1.177
5.	Let someone know that you like him/her	.729	.770	3.170	3.151	1.351	1.276
	Someone let me know that he/she likes me	.769	.808	3.011	3.051	1.331	1.225
6.	Let know that you like something (e.g., like something, send a smiley…)	.510	.579	3.968	4.088	1.122	1.095
	Someone let me know that he/she liked something I did (e.g., liked something, sent a smiley)	.590	.618	3.445	3.483	1.256	1.207
7.	Compliment or congratulate someone	.757	.768	3.505	3.442	1.008	0.994
	Someone complimented or congratulated me	.766	.771	3.095	3.055	1.101	1.052
8.	Help someone with his/her school work	.536	.571	3.000	3.104	1.120	1.050
	Someone helped me with my school work	.555	.548	2.780	2.902	1.180	1.121
9.	Support someone	.876	.806	3.357	3.255	1.112	1.061
	Someone supported me	.883	.789	2.976	2.940	1.224	1.172
10.	Comfort/console someone	.852	.764	3.017	2.908	1.195	1.138
	Someone comforted/consoled me	.848	.737	2.638	2.612	1.284	1.223

Note. All factor loadings are significant ($p < .01$). EFA loadings are Geomin-rotated, CFA loadings are standardized. W1 = wave 1; W2 = wave 2; SD = standard deviation.

Table 2

Correlations.

Measure	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. W1 POPB	--															
2. W1 ROPB	.878***	--														
3. W1 Offline PB	.434***	.364***	--													
4. W1 POAB	.237***	.224***	-.410***	--												
5. W1 ROAB	.351***	.257***	-.172***	.685***	--											
6. W1 DMU	.389***	.395***	-.028	.431***	.315***	--										
7. W1 CBP	.106**	.129**	-.383***	.639***	.492***	.260***	--									
8. W1 TBP	.010	.005	-.324***	.514***	.385***	.127**	.707**	--								
9. W2 POPB	.713***	.642***	.636***	.162***	.243***	.307***	.058	.006	--							
10. W2 ROPB	.633***	.689***	.308***	.167***	.161***	.306***	.094	.018	.894***	--						
11. W2 Offline PB	.218***	.187***	.849***	-.429***	-.219***	-.080*	-.363***	-.280***	.373***	.290***	--					
12. W2 POAB	.209***	.212***	-.276***	.763***	.561***	.297***	.520***	.404***	.254***	.244***	-.430***	--				
13. W2 ROAB	.256***	.165***	-.097*	.462***	.641***	.256***	.423***	.343***	.239***	.202***	-.251***	.758***	--			
14. W2 DMU	.307***	.314***	-.062	.418***	.303***	.698***	.297***	.171***	.454***	.433***	-.165***	.495***	.393***	--		
15. W2 CBP	.134**	.159**	-.216**	.571***	.445***	.275***	.683***	.649***	.053	.108**	-.396***	.638***	.534***	.385***	--	
16. W2 TBP	.069	.093	-.178**	.559***	.382***	.244***	.590***	.696***	.036	.059	-.323**	.582***	.433***	.326***	.771***	
M	3.336	2.996	2.533	1.228	1.220	3.016	1.136	1.189	3.309	2.986	2.485	1.215	1.202	3.063	1.189	1.127
SD	0.807	0.893	0.367	0.307	0.346	0.933	0.489	0.591	0.789	0.852	0.405	0.310	0.333	0.780	0.476	0.494

Note. POPB = performing online prosocial behavior, ROPB = receiving online prosocial behavior, PB = prosocial behavior, POAB = performing online antisocial behavior, ROAB = receiving online antisocial behavior, DMU = digital media use. * $p < .05$, ** $p < .01$, *** $p < .001$

Appendix: original (Dutch) version of the OPBS

Performing

1. Lieve/vriendelijke dingen zeggen *tegen* iemand

2. Lieve/vriendelijke dingen zeggen *over* iemand

3. Iemand helpen of voorstellen om te helpen

4. Iemand opvrolijken

5. Iemand laten weten dat je om hem/haar geeft

6. Laten weten dat je iets leuk vindt (bv. iets liken, smiley sturen,…)

7. Iemand een compliment geven of feliciteren met iets

8. Iemand helpen bij schoolwerk (bv. door notities te delen, tips uit te wisselen,…)

9. Iemand steunen

10. Iemand troosten

Receiving

1. Iemand zei lieve/vriendelijke dingen *tegen* mij

2. Iemand zei lieve/vriendelijke dingen *over* mij

3. Iemand hielp mij of stelde voor om mij te helpen

4. Iemand vrolijkte me op

5. Iemand liet weten dat hij/zij om me geeft

6. Iemand liet weten dat hij/zij iets dat ik deed leuk vindt (bv. iets liken, smiley sturen,…)

7. Iemand gaf mij een compliment of feliciteerde me met iets

8. Iemand hielp me bij schoolwerk (bv. door notities te delen, tips uit te wisselen,…)

9. Iemand steunde me

10. Iemand troostte me