

## Who Helps Whom? Investigating the Development of Adolescent Prosocial Relationships

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We investigated adolescent prosocial relations by examining social networks based on the question “Who helps you (e.g., with homework, with repairing a flat [bicycle] tire, or when you are feeling down?).” The effects of individual characteristics (academic achievement, symptoms of depressive mood, and peer status) on receiving help and giving help were examined, and we investigated the contribution of (dis)similarity between adolescents to the development of prosocial relations. Gender, structural network characteristics, and friendship relations were taken into account. Data were derived from the Social Network Analysis of Risk behavior in Early adolescence (SNARE) study, and contained information on students in 40 secondary school classes across 3 waves ( $N = 840$ ,  $M$  age = 13.4, 49.7% boys). Results from longitudinal social network analyses (RSiena) revealed tendencies toward reciprocation of help and exchange of help within helping groups. Furthermore, boys were less often mentioned as helpers, particularly by girls. Depressed adolescents were less often mentioned as helpers, especially by low-depressed peers. Moreover, lower academic achievers indicated that they received help from their higher achieving peers. Rejected adolescents received help more often, but they less often helped low-rejected peers. Last, low- and high-popular adolescents less often helped each other, and also high-popular adolescents less often helped each other. These findings show that (dis)similarity in these characteristics is an important driving factor underlying the emergence and development of prosocial relations in the peer context, and that prosocial behavior should be defined in terms of benefitting *particular* others.

*Keywords:* prosocial behavior, helping, adolescent, peer, social networks, RSiena

Helping behavior is part of prosocial behavior, which has been defined as “voluntary behavior that benefits others or promotes harmonious relations with others” (e.g., providing emotional or practical help; Dovidio, Piliavin, Schroeder, & Penner, 2006; Eisenberg et al., 1999). Giving and receiving help become salient already in the very early stages of life: Young children tend to respond prosocially to parental or peer distress, are willing to share objects, and comfort upset others (Eisenberg, Fabes, & Spinrad, 2006). As regards receiving help, children depend mainly on their parents, who take up a central role in the provision of practical and emotional support (Furman & Buhrmester, 1992; Larson & Richards, 1991). During the transition to adolescence, however, the context in which giving and receiving help take place partly shifts from parents to peers: Adolescents seek to achieve a higher degree of autonomy from their parents (Allen & Land, 1999; Berndt, 1982), and gradually spend less time with their parents from late childhood into adolescence (Larson & Richards, 1991). Adolescents spend a substantial portion of their waking hours at school in the presence of peers, diminishing the role of parents as help providers. Indeed, although parents

remain key instrumental help providers, peers become an important addition to adolescents’ social support system (del Valle, Bravo, & López, 2010; Hombrados-Mendieta, Gomez-Jacinto, Domingues-Fuentes, Garcia-Leiva, & Castro-Trav Travé, 2012), given their familiarity with the challenges age-mates face (Furman & Buhrmester, 1992) and their day-to-day contact.

This shift in context from parents to peers also influences how giving and receiving help are perceived: Given the importance of peers in shaping adolescents’ behaviors and relationships (Adler & Adler, 2003; Baumeister & Leary, 1995; Ormel, Lindenberg, Steverink, & Verbrugge, 1999), *which peers to give help to* and *which peers to receive help from* become salient questions at this age. Traditionally, research on adolescent helping in the peer context has overlooked this relational nature of prosociality, and mainly focused on explaining adolescent prosocial tendencies as an individual outcome (for a review, see Eisenberg et al., 2006; some exceptions notwithstanding; Baerveldt, van Duijn, Vermeij, & van Hemert, 2004; Lomi, Snijders, Steglich, & Torlò, 2011). Consequently, we know to some extent who is likely to help others, but which peers profit from this help, and what characterizes the development of these peer prosocial relations remain largely unknown.

To shift the focus to receivers of help and prosocial relations among peers, in this study we aimed to answer the question “*Who helps whom?*” We identified adolescent prosocial relationships with peers (i.e., peer relationships of help giving/receiving) by asking participants to nominate those peers that “. . . help you with problems (e.g., with homework, with repairing a flat [bicycle] tire,

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or when you are feeling down)?" In doing so, we aimed to examine (a) which characteristics predict receiving help, (b) which characteristics predict giving help; and (c) the extent to which (dis)similarity in characteristics between adolescents contributes to the development of prosocial relationships. Specifically, we were interested in the role of academic achievement, symptoms of depressive mood, and peer rejection, these being indicators of problems in the adolescent school context and arguably related to the need for help. Also, we were interested in how peer rejection and popularity shape prosocial relations, as social standing is a prominent predictor of prosocial behavior and relationship formation (Dijkstra, Cillessen, & Borch, 2013; Greener, 2000; Munsch & Kinchen, 1995). Because prosocial behavior is of higher saliency in girls' than boys' peer relations (Colarossi, 2001; Rose & Rudolph, 2006), we additionally took the role of gender into account.

The findings of previous relational studies show that relationships are not only a consequence of individuals' behaviors and characteristics, but may also emerge as the result of processes occurring in networks, such as repaying help received (reciprocity) and the tendency to form helping groups (transitivity; Veenstra, Dijkstra, Steglich, & van Zalk, 2013). Moreover, prosocial relations may emerge as a consequence of friendships, given their key role in (emerging) friendships and friendship quality (Bowker et al., 2010; Bukowski, Hoza, & Boivin, 1994; Parker & Asher, 1993). The social network approach implemented in RSiena (Snijders, van de Bunt, & Steglich, 2010) enabled us to map out adolescents' prosocial relations with peers, allowing us to investigate how characteristics and behaviors shape prosocial relations, while taking into account network processes and the overlap between helping and friendship.

In the current study we examined helping from the perspective of the receiver ("Who helps you?"). For that reason, we discuss why and from whom the receiver would seek help.

### Theoretical Background

In our introduction we described helping behavior as part of prosocial behavior, that is, voluntary behavior with the intent to benefit others. Looking at motivations for prosocial behavior, this definition seems to relate closely to the concept of altruism: Behavior with the intrinsic intent to benefit *others*, that is, helping without expecting anything in return, such as material or social benefits (Aronson, Wilson, & Akert, 2013; Eisenberg & Mussen, 1989). Of course, helpers are—at least in part—intrinsically motivated to benefit others, but other motives have been found to play a significant role as well. Individuals may also take into account the effort it takes to help others and the potential social or material benefits it may generate (Eisenberg et al., 2006; Schroeder & Graziano, 2015; Wentzel, Filisetti, & Looney, 2007). Not only givers, but also receivers of help are aware of the costs and benefits associated with helping, and they may consider whether they want to receive help from certain more or less able others (Ackerman & Kenrick, 2008; Nadler, 1987, 2015) or whether they want to associate with peers who have a particular status (Dijkstra et al., 2013; Dijkstra, Cillessen, Lindenberg, & Veenstra, 2010). Thus, whether engaging in prosocial relations is wholly voluntary and intrinsically motivated remains unclear, given that also extrinsic motivations play an important role in explaining the giving and receiving of help.

Previous researchers have maintained that adolescents' behavior can be explained in part by their extrinsic wish to attain status and affection among peers (Adler & Adler, 2003; Baumeister & Leary, 1995; Ormel et al., 1999). Considering the consequences of asking for help at all, and asking peers with more or less helping potential in particular, we consider helping relations to be instrumental in the attainment of these goals. In this respect, asking for help may on the one hand intensify positive, interpersonal contact with peers, but might on the other hand pose a threat to one's self-image (Ackerman & Kenrick, 2008; Middleton & Midgley, 1997; Nadler, 2015). Thus, help-seeking is likely to play a role in gaining and maintaining affection and status. From this perspective, we argue that for adolescents with certain characteristics, asking for help may complicate the realization of their goals. At the same time, help-seekers' goals may sensitize them to specific qualities of their potential helpers.

### Which Adolescents Receive Help More often?

Intuitively, one would expect disadvantaged individuals (here, low achievers, adolescents showing symptoms of depressive mood, or adolescents with a low peer status) to ask for help more often. These individuals are more in need of help and may consequently mobilize their social network to fulfil their needs. However, the mobilizing of peers might have social repercussions as it requires disclosure of vulnerabilities and shortcomings. This disclosure may not only form a substantial threat to their self-esteem (Bohns & Flynn, 2010; Fisher, Nadler, & Whitcher-Alagna, 1982; Nadler, 2015) but may also hinder adolescents' goal achievement among peers as they may feel that admitting failure in the academic, emotional, or social domain signals that one is dumb, inferior, or "uncool" (Ackerman & Kenrick, 2008; Middleton & Midgley, 1997). In line with this reasoning, Ryan, Hicks, and Midgley (1997) found that lower achieving students perceived seeking help as a threat to their self-esteem, and tended to avoid help-seeking (see also Ryan & Shin, 2011). Moreover, Sawyer and colleagues (2012) found in their vignette study that adolescents showing symptoms of depression intended to seek help from their friends less frequently. Further evidence for this mechanism comes from studies showing that adolescents concerned with avoiding negative peer evaluations were more likely to not discuss or to trivialize their problems among friends (Ryan et al., 1997; Shin & Ryan, 2012) or schoolmates (Roussel, Elliot, & Feltman, 2011).

Thus, if asking for help is a costly venture and compromises goal achievement, adolescents experiencing problems may try to find solutions themselves instead of consulting others. Hence, our first hypothesis was as follows:

*Hypothesis 1:* Nominating others as helpers (i.e., receiving help) is associated negatively with symptoms of depressive mood and peer rejection, but positively with academic achievement and popularity.

### Which Adolescents Give Help More Often?

Our second question concerns who is attractive to approach for help. First, in order to advance personal interests, recipients may select helpers whose help they believe will be useful (Sullivan,

Marshall, & Schonert-Reichl, 2002; van der Meij, 1988). For academic problems, adolescents may turn to peers who do well at school (Lomi et al., 2011). Because academic performance can be an indicator for general improved cognitive capacities, these smarter peers may be capable of finding solutions for other types of difficulties as well, making them attractive as all-round helpers. Liable and popular peers might be attractive helpers as being helped by such peers has the benefit for the receiver of “basking in reflected glory” (Dijkstra et al., 2010, 2013), meaning that association with well-liked and popular peers positively affects a person’s own standing in the peer group.

The reverse holds for rejected and low-popular peers, who are likely to be avoided as help-givers, because affiliating with them might decrease one’s own status. In a similar way, adolescents might avoid asking help from peers with symptoms of depressive mood. Adolescents displaying symptoms of depressive mood typically show the ego-oriented need of relieving their own emotions when confronted with other’s problems, instead of showing the alter-oriented tendency to help (Carrera et al., 2013; Liew et al., 2011). Whereas this response is possibly evoked only when the person is confronted with others’ serious problems, it may make the person less attractive as a helper in general. Following this, we expected the following:

*Hypothesis 2:* Being nominated as a helper (i.e., giving help) is associated positively with academic achievement and popularity, but negatively with symptoms of depressive mood and peer rejection.

### Who Helps Whom?

Below, the goal perspective is again used to theorize about who forms prosocial relationships with whom. There are two competing views on prosocial relationships. On the one hand, the need for help and the preference for receiving help from a specific other suggest that prosocial relations emerge particularly among peers who possess complementary characteristics. That is, one would expect a prosocial relationship to emerge between, for example, a low and a high academic achiever. In line with this, it has been suggested that prosocial relations emerge among adolescents who differ from each other, as admitting incompetence to a person with different characteristics and behaviors may feel less threatening than doing so to similar peers (referred to as comparison stress; Nadler, 1987, 2015). This approach would, however, imply that help-seekers are placed in an unfavorable and dependent (status) position relative to their help-givers; from a goal perspective it is quite unlikely that help-seekers would maneuver themselves into such costly relationships. In line with a similarity-attraction approach (Byrne, 1971; McPherson, Smith-Lovin, & Cook, 2001), individuals would be more likely to establish relationships with similar others. Similarity ensures that needs are more easily understood and communication runs more smoothly. This mutual understanding means that the chances of being rejected or ridiculed by the similar peer are smaller, and that threats to the status position are minimized as a consequence. As an example, empirical research findings show that depressed adolescents select other depressed peers as friends (van Zalk, Kerr, Branje, Stattin, & Meeus, 2010) with whom they discuss their problems (Rose, 2002).

Building on this latter approach, we expected the following:

*Hypothesis 3:* Adolescents similar in academic achievement, symptoms of depressive mood, peer rejection, and popularity are more likely to nominate each other as helpers.

## Gender, Friendship, and Structural Network Effects

### Gender

Previous research has shown that prosocial behavior is particularly pronounced in girls, and more salient in girls’ relationships (Baerveldt et al., 2004). From the perspective of the help-seeker, girls may be more preferred as providers of support: They generally display higher levels of empathy than boys (Gorman, Schwarz, Nakamoto, & Mayeux, 2011; Sears, Graham, & Campbell, 2009). Also, girls mobilize their peers more easily than boys, given that sharing and helping are more salient aspects of girls’ peer relations (Colarossi, 2001; Furman & Buhrmester, 1992; Rose & Rudolph, 2006; Sears et al., 2009). Looking at mutual prosocial relations, however, a somewhat different picture emerges. Nelson-le Gall and DeCooke (1987) found that academic help exchanges took place more frequently in same-gender dyads, even though girls were viewed as academically more competent. This is in line with the findings of Baerveldt et al. (2004), who found that helping mainly occurred within same-gender relations. Given these findings, we expected the following:

*Hypothesis 4:* Girls (are) nominate(d) more (as) helpers, and adolescents of the same gender are more likely to nominate each other as helpers.

### Friendship

It is important to note that previous research has established a clear link between friendship and helping, implying that giving and receiving help may result from friendship affiliation. The association between helping and friendship was reflected in research that aimed at investigating friendship relations or friendship quality (Barry & Wentzel, 2006; Bowker et al., 2010; Bukowski et al., 1994; Parker & Asher, 1993): Helping has been associated with friendship emergence, stability, and mutuality, implying a significant overlap between helping relations and friendships. Moreover, prosocial children were found to form and maintain friendships more often than their less prosocial peers (Bowker et al., 2010), again suggesting that helping and friendship intersect. Not only do helping relations and friendships overlap, but the processes leading to the emergence of these relations also show common ground. For example, the aforementioned similarity-attraction approach (suggesting that similar peers tend to form relationships with each other) applies to friendships as well (Veenstra & Dijkstra, 2011). Given the findings on friendship and helping, we expected the following:

*Hypothesis 5:* Friends are more likely to nominate each other as helpers.

Because the present study was focused on the effects of (similarity in) individual characteristics *over and above* the effects of friendship, it was necessary to take this key covariate into account,

in order to ensure that any association found would refer to (processes leading to) helping relations instead of friendships.

**Structural Network Effects**

Last, relationships may emerge not as a result of (similarity in) particular characteristics or friendship, but as a result of structural, endogenous network effects accounting for changes in relationships. Controlling for these effects overcomes bias in the effects of individual characteristics (see Veenstra & Steglich, 2012). Building on research on friendship relations, in our analyses, we controlled for the most common network effects (Veenstra et al., 2013): That is, the general tendency to nominate peers as helpers (*outdegree*) and the tendency to reciprocate helping nominations (*reciprocity*). Moreover, we accounted for group formation tendencies (*transitivity* and *balance*) and for the variation in the extent to which individuals nominate peers as helpers and receive nominations for helping (i.e., *out-* and *indegrees*). For a further explanation of these effects, we refer to the Method section and Table 1.

**Method**

**Participants**

In the present study we assessed all first- and second-year students ( $N = 854$ , 40 classrooms) of one secondary school in the northern part of the Netherlands. This school is part of the larger longitudinal Social Network Analysis of Risk behavior in Early adolescence (SNARE) project (see Dijkstra et al., 2015), and has four different school locations scattered across the (small) geographical region, covering the full range of academic tracks. The current study included the first three regular waves, capturing one school year; October 2011 (Wave 1;  $M$  age = 13.1; 49.6% boys), December 2011 (Wave 2;  $M$  age = 13.3; 49.8% boys), and April 2012 (Wave 3;  $M$  age = 13.7; 49.6% boys).

**Composition change.** Between Waves 1 and 2, four students entered the sample; and between Waves 2 and 3, five students left the sample and two students entered the sample. They were part of the network across all waves, but were assigned with structural zeros when they were not (yet/any more) in school, meaning that

Table 1  
*Explanation of Parameters in the RSiena Selection Effects Model*

Effect	RSiena effect name	Explanation	Graphical representation
Outdegree	density	Basic tendency to form relations	
Reciprocity	recip	Tendency toward reciprocation	
Transitivity	transTrip	Transitive closure ( $i \rightarrow h \rightarrow j; i \rightarrow j$ ): More intermediaries $h$ add proportionally to the tendency to form relation $i \rightarrow j$	
Balance	balance	Tendency of actors to form relations with others who have a similar set of outgoing nominations to themselves	
Outdegree Popularity	outPop	Tendency of actors with high outdegrees to attract incoming nominations because of their high current outdegrees	
Friendship	X	Tendency to send a nomination to actors with whom one has another type of relation	
Ego effect	egoX	Actors with higher values on X have a higher outdegree	
Alter effect	altX	Actors with higher values on X have a higher indegree	
Similarity Effect	same/simX	Relations occur more often between actors with the same (gender) or similar values (all other similarity effects) on X	

Note. Derived from Huitsing, Snijders, van Duijn, and Veenstra (2014).

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they could not (be) nominate(d) (by) classmates. Also, at Wave 1, one student's data were found to be unreliable and were deleted. Across the school year, a total of 15 students refused consent to participate in the study. All their data, including responses preceding their refusal, were deleted. This resulted in a sample of 838, 842, and 839 participants at Wave 1, Wave 2, and Wave 3, respectively.

## Procedure

All eligible students received an information letter for themselves and their parents, in which they were asked to participate. If students wished to refrain from participation, or if their parents disagreed with their children's participation, they were requested to send a reply card or email within 10 days. Using passive consent is in accordance with Dutch law, and has been used in previous social network studies among children and adolescents (e.g., Osgood et al., 2013; Verlinden et al., 2014). We emphasized during every assessment that participation was anonymous and could be terminated at any point in time. The SNARE study has been approved by the ethical committee and the Internal Review Board.

A teacher and research assistants were present during the assessments. The research assistant gave a brief introduction, and the participants then filled in the questionnaire on the computer during class. The questionnaire contained self-report items as well as peer nomination items. Data were collected via questionnaires using Cloud Solutions Socio Software ([www.sociometric-study.com](http://www.sociometric-study.com)). This software was developed for SNARE: It allowed participants to answer peer nomination questions more easily by looking up and selecting their class- or grademates' names from a database. The assessment of the questionnaires took place during regular school hours within approximately 45 min. The participants who were absent that day were, if possible, assessed within a month.

## Measures

In the present study, gender, academic achievement, symptoms of depressive mood, peer rejection, popularity, and friendship at Waves 1 and 2 were used to predict changes in prosocial relations from Waves 1 to 2 and 2 to 3. Peer nominations were examined within classrooms, and participants could nominate an unlimited number of same- and cross-gender classmates on each peer nomination question.

**Prosocial relationships.** Within classrooms, at Waves 1, 2, and 3, prosocial relationships were assessed using a peer nomination procedure. Participants were asked to nominate classmates who "helps you with problems (e.g., with homework, with repairing a flat [bicycle] tire, or when you are feeling down)?" (adapted from Baerveldt et al., 2004; Dijkstra, Lindenberg, Verhulst, Ormel, & Veenstra, 2009; Dunfield, Kuhlmeier, O'Connell, & Kelley, 2011; Tremblay, Vitaro, Gagnon, Piché, & Royer, 1992). Note that the implication of this question is that giving help is represented by an incoming nomination, and receiving help by an outgoing nomination. Prosocial networks for each classroom at all time points were represented by a directed adjacency matrix, with 0 and 1 representing absence and presence, respectively, of a nomination between actors  $i$  and  $j$ . Nominations made by participants who nominated everyone in their classroom were coded as structural zeros on that particular wave, as we deemed these nonselective

nominations to be less reliable. This was the case for five participants at Wave 1 and 2, seven at Wave 3, and one participant at all waves. On average, the number of helpers (outdegree) across the waves was 2.47 ( $SD = 2.73$ ).

**Academic achievement.** This was assessed at Waves 1 and 2 by asking participants to rate their performance on Dutch language and mathematics on a 5-point scale from 1 (*insufficient*) to 5 (*excellent*). Scores on these two items were summed to obtain the total performance for every student, resulting in an average score of 6.94 ( $SD = 1.44$ ) across Waves 1 and 2.

**Symptoms of depressive mood.** At Waves 1 and 2, symptoms of depressive mood were assessed using 3 items from a self-report scale on depression (based on Kandel & Davies, 1982). The internal consistency of these three items was  $\alpha = .81$  for Wave 1 and  $\alpha = .85$  for Wave 2. Participants were asked how often during the preceding month the participants felt unhappy, miserable, and down; felt nervous and tense; and worried too much. The items were rated on a 5-point scale ranging from 1 (*never*) to 5 (*always*). Scores on the items were summed and divided by three to obtain mean levels of symptoms of depressive mood for every student, resulting in an average score of 2.13 ( $SD = .92$ ) across Waves 1 and 2.

**Peer rejection.** This was assessed at Waves 1 and 2 and was based on the peer nomination question "which classmates do you dislike" (Card, 2010). A proportion score was computed by taking the number of nominations received on peer rejection and dividing them by the number of participants in the classroom minus 1. On average, participants scored .10 ( $SD = .13$ ) on peer rejection, which means that participants were rejected by 10% of the classroom on average.

**Popularity.** At Waves 1 and 2, popularity was also assessed using peer nominations. Participants nominated classmates on the questions "who are most popular?" and "who are least popular?" (LaFontana & Cillessen, 2002). Popularity was calculated by subtracting the proportion scores (i.e., the number of nominations received divided by the number of participants in the classroom minus 1) of *least popular* peer nominations from *most popular* peer nominations. On average, participants scored .00 ( $SD = .15$ ) on popularity, which means that students had as many nominations for most popular as for least popular on average.

**Gender.** This was measured at Wave 1, and was coded 0 for girls and 1 for boys.

**Friendships.** Within classrooms at Waves 1 and 2, friendships were assessed using the peer nomination procedure; participants nominated classmates on the question "who are your best friends?" Friendship networks for each classroom at all time points were represented by a directed adjacency matrix, with 0 and 1, respectively, representing absence and presence of a nomination between actors  $i$  and  $j$ . On average, the number of friends (outdegree) was 5.07 ( $SD = 3.60$ ).

## Analytical Strategy

**RSiena.** To predict the development of prosocial relationships, we used the Simulation Investigation for Empirical Network Analyses software package in R (RSiena; Ripley, Snijders, Boda, Vörös, & Preciado, 2015); software instantiating stochastic actor-based statistical models of social network dynamics (Snijders, 1996; Snijders et al., 2010). The focus of the present study was on

modeling changes in networks (i.e., prosocial relationships) from one observation moment to the next. The model interprets the observed, compound change of helping patterns as the result of a series of unobserved, smallest possible changes taking place between observation moments, where a smallest possible change is either the termination of an existing prosocial relation between two participants, or the creation of a new one. The nature of network changes is modeled by an objective function, expressing under which conditions actors will create, maintain, or dissolve a prosocial relation. The parameters in the model (see Model specification) express these different conditions. Estimates are obtained in an iterative Monte-Carlo procedure, alternating until convergence between the sampling of network change sequences (based on the model parameters), and the updating of model parameters (based on discrepancies between the observed data and the simulated end networks of the sampled change sequences; Snijders, 2001). Parameters are tested in the same way as in other generalized linear models, using *t*-ratios (parameter estimate divided by its standard error).

Parameter values are interpreted as the contribution to actor's objective function. Thus, the higher the value of an effect in the objective function, the stronger the tendency to create or maintain a helping nomination. A value of  $b = -0.5$  for the alter effect of peer rejection means that if alter increases one unit on the scale of peer rejection, this subtracts 0.5 on ego's objective function for asking help of that particular alter. These estimates are log-odds, and we also expressed the effects as odds by taking the exponential function of the parameter estimate, and calculated their confidence interval (for calculations see the RSiena manual: Ripley et al., 2015). Odds indicate the impact of an effect on the probability of a participant nominating a helper. For example, the odds of 2 for the reciprocity parameter means that a participant is twice as likely to reciprocate a nomination than *not* to reciprocate a nomination, all else being equal. Note, however, that this *ceteris paribus* assumption is problematic, given that network parameters correlate and co-occur, and given that ego, alter, and similarity effects are highly intertwined.

**Meta-analysis.** In order to increase statistical power, we combined the classrooms into four school-location networks. Because participants were not allowed to nominate helpers outside their classroom, we used the so-called structural zero coding between classrooms so that the software would not interpret these between-class nonnominations as regular nonnominations (i.e., as valid indicators that help was not sought). After fitting the same model specification to all school locations' data, we aggregated the results in a meta-analysis (Snijders & Baerveldt, 2003), in which a significant chi-squared test indicated heterogeneity between location parameters. In the meta-analysis, standard errors were determined based on random effects combinations; that is, between-location differences were accounted for and the total variance was (re-)partitioned into between- and within-location randomness.

**Goodness of fit.** Once convergence was reached for all four school locations, we assessed the goodness of fit (GoF) of our model by investigating to what degree the models could explain additional features of the prosocial networks that were not explicitly included in the model specification, namely, help-seeking activity (outdegree distribution), help-giving popularity (indegree distribution), and subgroup structure in the prosocial network (triad census).

## Model Specification

The first part of the analysis consisted of the specification of network effects. The network effects that were used in the final model and their explanations can be found in Table 1. While controlling for both reciprocal (i.e., mutual) and unidirectional (i.e., one-sided) nominations made in the friendship network, we included the following basic network effects: *Outdegree*, the general tendency to nominate others as helpers; *reciprocity*, the tendency to help those who help you; and group formation tendencies such as *transitivity*, the tendency to nominate helpers-of-helpers as your own helpers. In addition, we added degree-related effects to account for variation in degrees (the tendency to be nominated as a helper, and to nominate others as helpers, respectively). To increase the goodness of fit of our models, we added the *balance* parameter a posteriori; it indicates participants' (group formation) tendency to help each other because they are being helped by the same third-party helpers.

Individual-level attributes were included as so-called *ego*, *alter*, and *similarity* effects. The *ego effect* captures the effect of covariates on nominating others as helpers. The *alter effect* captures the effect of covariates on being nominated as a helper. The *same/similarity effect* captures the tendency to form prosocial relations with others who are similar on particular covariates.

In case of any significant effects (ego, alter, or similarity), we constructed ego-alter selection tables in order to fully understand the effect of the predictors on network evolution. These selection tables give a more comprehensive interpretation of the ego and alter parameters as they integrate these effects (Ripley et al., 2015). Also, individuals may not vary in the degree to which they receive or give help (ego and alter effects), but they might vary in whom they target as helpers (similarity effects). A selection table gives more insight into such findings. The values in this table represent the contribution to actors' objective function if they nominate completely *similar* peers (diagonal values in the table) versus completely *dissimilar* peers as helpers (off-diagonal values in the table).

## Results

### Descriptive Results

Descriptive statistics of the prosocial networks are presented in Table 2. In the following section, we provide the ranges over the waves. Participants indicated that they received help from two to three classmates (outdegree). Prosocial relations were quite common, as only 18% to 22% reported not being helped (zero outdegree), and 8% to 10% of the participants were not reported as helpers (zero indegree). Furthermore, 4% to 5% received help only (outdegree only) and 14% to 17% of the participants gave help only (indegree only).

The proportion of helping nominations given in the classroom, based on the ratio of actual and possible relations, was 13% (density). About 40% to 50% of the nominations were mutual (reciprocal). In 54% to 57% of the cases, helpers of helpers were nominated as one's own helper (transitivity), and about 80% of the prosocial relations were formed among participants of the same gender.

In order to be able to perform longitudinal social network analyses, a sufficient fraction of helping nominations should have

Table 2  
*Descriptives of the Sample, Prosocial Networks,  
 and Friendships*

Descriptives sample	W1	W2	W3
Cohort size	838.0	842.0	839.0
Number of locations	4.0	4.0	4.0
Number of classrooms	40.0	40.0	40.0
<i>M</i> classroom size	21.2	21.7	21.4
Respondents missing	11.0	29.0	30.0
Age	13.1	13.3	13.7
Boys (%)	49.6	49.8	49.6
Descriptives prosocial relations	W1	W2	W3
<i>M</i> prosocial relations <sup>a</sup>	2.5	2.5	2.4
<i>SD</i> outdegree <sup>a</sup>	2.6	2.8	2.8
<i>SD</i> indegree <sup>a</sup>	1.6	1.6	1.6
0 Indegree (%)	8.5	8.1	10.0
0 Outdegree (%)	18.5	20.3	21.9
Indegree only (%)	14.1	17.3	17.0
Outdegree only (%)	4.0	4.8	4.4
Density (%) <sup>a</sup>	13.0	13.0	13.0
Reciprocity (%) <sup>a</sup>	49.1	43.5	44.5
Transitivity (%) <sup>a,b</sup>	57.3	55.6	54.4
Same sex (%) <sup>a</sup>	79.5	80.4	79.1
No. of nominations	2,314.0	2,418.0	2,306.0
Descriptives prosocial relations	W1–W2	W2–W3	
Distance ( <i>n</i> of changed nominations)	1992	2049	
0–1	1027	1108	
1–0	1005	1194	
1–1	1218	1051	
Classroom level <sup>a</sup>			
0–1	25.7	27.7	
1–0	25.1	30.0	
1–1	30.5	26.3	
Jaccard index (%)	37.5	31.3	
Descriptives friendship relations	W1	W2	W3
<i>M</i> friendships <sup>a</sup>	4.7	5.3	5.2
<i>SD</i> outdegree <sup>a</sup>	3.3	3.7	3.8
<i>SD</i> indegree <sup>a</sup>	2.2	2.42	2.3
No. of nominations	4,163.0	4,726.0	4,615.0
Density (%) <sup>a</sup>	25.0	27.0	27.0

*Note.* All statistics were calculated over the full sample except as noted by superscripts and described below. W1 = Wave 1; W2 = Wave 2; W3 = Wave 3.

<sup>a</sup> Descriptives were calculated per classroom network and subsequently averaged (i.e., divided by 40). <sup>b</sup> Transitivity indexes the ratio of the number of actual and potential transitive triplets.

remained stable (Jaccard index). Averaged across the waves and classrooms, 27 new nominations emerged, 28 nominations dissolved, and 28 nominations remained stable from Wave 1 to Wave 3; the Jaccard indices were 37.5% for Wave 1 to Wave 2, and 31.3% for Wave 2 to Wave 3. Given that a Jaccard index of above 30% is recommended (Veenstra & Steglich, 2012), the stability of the networks was sufficient.

As for the friendship network, participants mentioned about 5 friends. Thus, this network was about twice as dense as the prosocial network (25–27%).

Descriptives of the study variables at Waves 1 and 2, and *t* tests for differences between boys and girls can be found in Table 3.

Girls were on average slightly younger, showed more symptoms of depressive mood, were less rejected by their peers at Wave 1, and gave and received help more often than boys.

Correlations between receiving help (outdegree) and giving help (indegree) and the study variables for boys and girls separately can be found in Table 4. The most consistent correlations are discussed. In general, giving and receiving help were positively related for both boys and girls. Also, giving help correlated negatively with peer rejection for both boys and girls. Giving help was positively related to popularity, and both giving and receiving help were positively related to giving and receiving friendship nominations, although more consistently and often more strongly for girls.

## RSiena Analyses

The results of the RSiena network analyses can be found in Table 5; mean parameter estimates (*b*), standard errors (*SE*), the corresponding levels of significance, odds, and their confidence intervals are presented. The results of the chi-squared test ( $\chi^2$  and *p* value) indicate heterogeneity between the four school locations. Table 6 presents the ego-alter selection results for significant similarity effects. For the interpretation of the *bs*, odds, and ego-alter selection table, we refer to the section Analytical Strategy.

## Who Receives and Gives Help, and Who Helps Whom?

**Academic achievement.** The negative ego effect for academic achievement suggests that higher achievers received help less often ( $b = -.17$ ,  $SE = .02$ ,  $odds = .84$ ). We found no significant alter or similarity effect ( $b = .01$ ,  $SE = .02$ ,  $odds = 1.01$ ;  $b = .17$ ,  $SE = .23$ ,  $odds = 1.02$ ). In Table 6, it can be seen that higher achievers less likely mentioned low- or high-achieving peers as their helpers ( $-.71$  and  $-.46$ ). Low-achieving students, however, tended to mention high-achieving peers as their helpers (.73). In sum, these results suggest that low-achieving adolescents generally received help more often, and in particular from high-achieving peers.

**Symptoms of depressive mood.** Symptoms of depressive mood did not predict receiving help ( $b = .01$ ,  $SE = .04$ ,  $odds = 1.01$ ), and negatively predicted giving help, but the effect size was small ( $b = -.02$ ,  $SE = .00$ ,  $odds = .98$ ). The similarity effect was significant ( $b = .26$ ,  $SE = .10$ ,  $odds = 1.07$ ). Table 6 shows that adolescents were unlikely to form prosocial relations with dissimilar peers based on symptoms of depressive mood: Whereas the values on the diagonal (expressing a preference for similarity) were relatively small (.08 and .04), the larger off-diagonal values show that high-depressed adolescents less likely received help from low-depressed peers ( $-.14$ ) and vice versa ( $-.26$ ). Thus, depressed adolescents gave help less often, and adolescents less likely received help from dissimilarly depressed peers.

**Peer rejection.** Peer rejection was associated positively with receiving help over time ( $b = 1.02$ ,  $SE = .42$ ,  $odds = 2.77$ ), and negatively with giving help ( $b = -.78$ ,  $SE = .27$ ,  $odds = .46$ ). Zooming in on these results, Table 6 shows that high-rejected adolescents mentioned low- and high-rejected peers as their help-

Table 3  
*Descriptives and t Tests for Differences Between Boys and Girls (Waves 1 and 2)*

Variable	Min-max	<i>M</i> girls	( <i>SE</i> )	<i>M</i> boys	( <i>SE</i> )	<i>t</i>
Age	11.43–15.35	13.09	(0.68)	13.21	(0.70)	–2.45*
	11.61–15.47	13.26	(0.68)	13.38	(0.70)	–2.35*
Academic achievement	0–10	7.00	(1.34)	6.91	(1.36)	0.96
		6.98	(1.41)	6.88	(1.62)	0.99
Symptoms of depressive mood	0–5	2.27	(0.85)	1.94	(0.82)	5.51**
		2.30	(0.96)	1.99	(0.97)	4.63**
Peer rejection <sup>a</sup>	0–1	0.08	(0.12)	0.10	(0.12)	–2.28*
		0.11	(0.14)	0.12	(0.13)	–1.47
Popularity <sup>a</sup>	–1–+1	0.00	(0.12)	–0.01	(0.15)	1.35
		0.00	(0.15)	0.00	(0.17)	0.07
Most popular <sup>a</sup>	0–1	0.19	(0.16)	0.22	(0.17)	–1.78
		0.22	(0.17)	0.25	(0.20)	–1.87
Least popular <sup>a</sup>	0–1	0.20	(0.19)	0.22	(0.19)	–1.13
		0.22	(0.19)	0.22	(0.19)	0.02
Indegree help <sup>b</sup> (giving help)	0–1	0.17	(0.10)	0.11	(0.08)	10.12**
		0.17	(0.10)	0.11	(0.08)	10.13**
Outdegree help <sup>b</sup> (receiving help)	0–1	0.17	(0.16)	0.12	(0.17)	4.15**
		0.18	(0.18)	0.12	(0.19)	5.19**
Indegree friendship <sup>b</sup> (being befriended)	0–1	0.25	(0.14)	0.24	(0.13)	0.51
		0.28	(0.14)	0.27	(0.14)	0.87
Outdegree friendship <sup>b</sup> (befriending)	0–1	0.25	(0.17)	0.28	(0.20)	–0.68
		0.28	(0.18)	0.30	(0.22)	–1.26

<sup>a</sup> Descriptives of these variables are based on proportion scores (i.e., indegree/outdegree divided by number of classmates). <sup>b</sup> Average indegrees and outdegrees are identical by definition (up to nonresponse, that is), but their standard deviations are not, which makes their separate testing meaningful.  
 \*  $p < .05$ . \*\*  $p < .01$ .

ers (.28 and .26). However, low-rejected adolescents were unlikely to report high-rejected peers as their helpers (–1.16; similarity effect;  $b = .60$ ,  $SE = .17$ ,  $odds = 1.81$ ). Thus, high-rejected students received help more often but gave help less often. Also, they received help from low- and high-rejected peers, but they did not give help to low-rejected peers.

**Popularity.** Popularity did not predict variation in receiving and giving help ( $b = .15$ ,  $SE = .21$ ,  $odds = 1.16$ ;  $b = -.41$ ,  $SE = .25$ ,  $odds = .67$ ). However, the similarity effect was significant ( $b = .79$ ,  $SE = .12$ ,  $odds = 2.21$ ). Table 6 shows that low-popular adolescents were more likely to report low-popular peers (.29) than high-popular peers (–1.20) as helpers. High-popular adolescents did not report both low- and high-popular peers as helpers (–.25 and –.15). Thus, low-popular peers did not receive help from dissimilarly popular peers, and high-popular adolescents did not receive help from similarly and dissimilarly popular peers.

**Gender.** Gender was not associated with receiving help over time ( $b = .08$ ,  $SE = .10$ ,  $odds = 1.09$ ), but negatively predicted giving help ( $b = -.15$ ,  $SE = .03$ ,  $odds = .86$ ). Thus, boys were less often reported as helpers. Also, the similarity effect was significant ( $b = .50$ ,  $SE = .12$ ,  $odds = 1.65$ ). The selection table suggests an aversion to (receiving) help (from) cross-gender peers, and this tendency appeared to be stronger for girls (–.36) than for boys (–.13).

**Friendship.** The positive friendship covariate indicates that befriended adolescents tended to help each other more often over time ( $b = .88$ ,  $SE = .06$ ,  $odds = 2.41$ ).

**Structural network effects.** The outdegree (density) parameter reflects the basic tendency to nominate helpers. It was negative and significant ( $b = -1.99$ ,  $SE = .09$ ,  $odds = .14$ ), indicating that actors were highly selective in nominating classmates as

helpers. The positive value of the reciprocity parameter ( $b = 1.72$ ,  $SE = .09$ ,  $odds = 5.59$ ) indicates that helping relations tended to become mutual, and the positive transitive triplets effect ( $b = .45$ ,  $SE = .08$ ,  $odds = 1.58$ ) signifies the tendency to nominate helpers of helpers as one’s own helper. The small negative balance parameter indicates that people tended not to help each other if they were being helped by the same third-party helpers ( $b = -.08$ ,  $SE = .02$ ,  $odds = .93$ ). Last, the negative outdegree popularity effect ( $b = -.29$ ,  $SE = .03$ ,  $odds = .75$ ) indicates that participants who received help more often tended to give help less often over time.

**School location heterogeneity.** According to chi-squared tests there was significant school location heterogeneity in several parameter estimates (which is common in meta-analytic network studies). However, this did not give rise to concerns about the validity of our results (results available upon request): Significant parameter estimates in the meta-analysis were generally significant in all locations, and differed in size only, not in sign (i.e., they were more pronounced in some locations). Also, most nonsignificant parameter estimates in the meta-analysis were not significant across all locations or significant in only one location. However, in two school locations we found a tendency toward helping similar peers with respect to academic achievement (positive similarity effect). Moreover, in one school location, depressed adolescents were found to receive help *more* often, whereas in another school location, they were found to receive help *less* often (positive and negative depression ego effect, respectively). Generally, though, we could not distinguish a clear pattern in this heterogeneity; that is, there was no location that consistently showed stronger effects or a greater number of significant effects.

**Table 4**  
**Correlations Among Indegree Help (Giving Help) and Outdegree Help (Receiving Help) With the Study Variables, and Gender Differences**

Variable name	Wave	Indegree help (giving help)				Outdegree help (receiving help)				
		Girls W1	Boys W1	Z score <sup>P</sup>	Girls W2	Boys W2	Z score <sup>P</sup>	Girls W2	Boys W2	Z score <sup>P</sup>
Academic achievement	1	—	—	—	—	—	—	—	—	—
	2	-.12*	—	—	.13**	—	—	—	—	—
Symptoms of depressive mood	1	.15**	—	—	—	—	—	—	—	—
	2	-.23**	-.17**	—	-.35**	.10*	—	—	—	—
Peer rejection <sup>a</sup>	1	-.24**	-.23**	—	-.36**	-.15**	—	—	—	—
	2	.20**	.19**	—	.15**	-.20**	—	—	—	—
Popularity <sup>a</sup>	1	.10*	—	—	.24**	.17**	—	—	—	—
	2	.61**	.46**	3.05**	.45**	.33**	2.02*	.11*	.19**	—
Indegree friendship (being befriended) <sup>a</sup>	1	.45**	.38**	—	.69**	.55**	3.26**	.15**	.19**	—
	2	.16**	.19**	—	.21**	.10*	—	.28**	.11*	2.52*
Outdegree friendship (befriending) <sup>a</sup>	1	.21**	.14**	—	.28**	.14**	2.08*	.45**	.24**	3.41***
	2	.39**	.42**	—	.39**	.42**	—	.39**	.30**	—
Indegree help (giving help) <sup>a</sup>	1	.39**	.42**	—	.13**	—	—	.13**	—	—
	2	.25**	.13**	—	.17**	—	—	.13**	—	—
Outdegree help (receiving help) <sup>a</sup>	1	.16**	.19**	—	.17**	.19**	—	.13**	.30**	-2.54*
	2	.16**	.19**	—	.17**	.19**	—	.13**	.30**	-2.54*

Note. Non-significant correlations (in absolute value, all below .094) are left out of the table for clarity. Significant gender differences for significant correlations are indicated with Z score and *p* value. W1 = Wave 1; W2 = Wave 2.

<sup>a</sup> These variables are proportion scores (i.e., indegree/outdegree divided by number of classmates).  
 \* *p* < .05. \*\* *p* < .01. \*\*\* *p* < .001.

## Discussion and Conclusion

The present study is, to our knowledge, the first in which adolescent prosocial relations with peers were examined using a longitudinal social network framework to shed light on the relational instead of individual aspects of prosocial behavior. Our findings show that this framework is suitable for investigating prosociality (i.e., our prosocial networks were stable enough to analyze, and the results across school locations were fairly constant). The approach we took turned out to be meaningful. We showed that giving and receiving help were steered partly by tendencies to form relations with others regardless of others' characteristics, and by a preference for (not) forming helping relations with (dis)similar others.

### Who Receives Help, Gives Help, and Who Helps Whom?

From the perspective that adolescents are driven by status and affection goals (Adler & Adler, 2003; Baumeister & Leary, 1995; Ormel et al., 1999), we expected that especially well-adjusted adolescents (here: higher academic achievers, adolescents showing fewer symptoms of depressive mood, and higher status adolescents) would be involved in receiving and giving help more often, and that adolescents would tend to (receive) help (from) similar others.

**Who receives help?** Our hypothesis with respect to receiving help was not supported. Generally speaking, adolescents seemed to receive help to the same extent: Gender, depression, and popularity were all unrelated to receiving help. Also, contrary to our expectations and this general trend, we found that lower achievers received help *more* often. They might be needier than high-achievers and are thus more likely to ask. In addition, in contrast with our idea, lower achievers might not at all be embarrassed to ask for help. Some literature suggests that doing well in school is not necessarily associated with a higher status (Cillessen & van den Berg, 2012; Schwartz, Gorman, Nakamoto, & McKay, 2006): It could signal being *nerdy*, whereas not fulfilling teachers' expectations might be labeled as *cool*. Arguably, lower achievers are not concerned about their status, and might therefore feel comfortable with asking for help. It is surprising that also peer-rejected adolescents indicated to receive help more often. Although this result was unexpected, some researchers suggest that rejection may stimulate (re-)establishing relationships with peers (Maner, DeWall, Baumeister, & Schaller, 2007). Thus, socially excluded adolescents may actively seek to reconnect with their peers by (strategically) asking them for help (see Erdley & Asher, 1999; Hawley, Little, & Pasupathi, 2002; Wentzel & Erdley, 1993).

**Who gives help?** Our hypothesis about giving help was partly supported. In line with our expectations, adolescents showing symptoms of depressive mood and peer-rejected adolescents gave help less often. Academic achievement was, however, not related to giving help. On the one hand, higher achievers are ideal help providers given their increased cognitive capacities, but, as argued, this positive effect might have been cancelled out by the assertion that higher (*nerdy*) achievers might be unappealing to associate with in terms of social status. Also counter to what was expected, popularity was not related to helping. Arguably, associating with popular others may be intimidating instead of desirable, as it might

Table 5  
RSiena Estimates of Selection Effects in Prosocial Networks and Differences Across the Four School Locations

Parameter	Mean parameter			Standard deviation			
	<i>b</i>	<i>SE</i>	odds	lower	upper	estimate	$\chi^2(df = 3)$
Structural network effects							
Outdegree	-1.99***	(0.09)	0.14	0.12	0.16	0.18	18.27***
Reciprocity	1.72***	(0.09)	5.59	4.65	6.72	0.19	4.23
Transitivity	0.45***	(0.08)	1.58	1.35	1.83	0.15	36.66***
Balance	-0.08***	(0.02)	0.93	0.86	0.97	0.05	54.18***
Outdegree popularity	-0.29***	(0.03)	0.75	0.70	0.80	0.07	9.53*
Friendship	0.88***	(0.06)	2.41	2.13	2.74	0.13	11.83**
Ego effects: Which adolescents receive help more often?							
Sex (boy = 1)	0.08	(0.10)	1.09	0.90	1.32	0.19	15.24**
Academic achievement	-0.17***	(0.02)	0.84	0.82	0.87	0.03	5.59
Symptoms of depressive mood	0.01	(0.04)	1.01	0.93	1.09	0.08	13.05**
Peer rejection	1.02**	(0.42)	2.77	1.21	6.32	0.84	13.25**
Popularity	0.15	(0.21)	1.16	0.77	1.74	0.41	6.64
Alter effects: Which adolescents give help more often?							
Sex (boy = 1)	-0.15***	(0.03)	0.86	0.81	0.91	0.06	1.63
Academic achievement	0.01	(0.02)	1.01	0.98	1.05	0.04	6.07
Symptoms of depressive mood	-0.02***	(0.00)	0.98	0.97	0.98	0.01	0.07
Peer rejection	-0.78**	(0.27)	0.46	0.27	0.77	0.53	6.95
Popularity	-0.41	(0.25)	0.67	0.41	1.09	0.50	8.37*
Similarity effects: Which adolescents help each other more often?							
Sex	0.50***	(0.12)	1.65	1.30	2.08	0.24	42.73***
Academic achievement	0.17	(0.23)	1.02	0.97	1.07	0.46	13.98**
Symptoms of depressive mood	0.26**	(0.10)	1.07	1.02	1.12	0.21	4.12
Peer rejection	0.60***	(0.17)	1.81	1.31	2.51	0.33	4.62
Popularity	0.79***	(0.12)	2.21	1.75	2.79	0.24	1.75

Note. 95% confidence interval(odds) =  $\exp(\ln(OR) \pm (1.96 \times SE(\ln(OR))))$ .  
\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

trigger feelings of inferiority. This idea might have mitigated the expected association.

**Who helps whom?** In line with our hypothesis, we found that adolescents preferred to (receive) help (from) others who were similar on a particular characteristic. However, this result seemed to be largely driven by an aversion to receiving help from dissimilar peers. Thus, the results seemed to support Rosenbaum’s (1986) dissimilarity-repulsion hypothesis rather than the similarity-attraction approach (McPherson et al., 2001), stating that instead of similarity being the driving force of relationship formation, it is mainly dissimilarity that prevents individuals from establishing (prosocial) relations (cf. Laursen et al., 2010).

Turning to the results, we found that well-adjusted and maladjusted adolescents were hardly connected with each other through helping. For example, the results indicated that depressed adolescents tended to help each other, and that they were less likely helped by their low-depressed peers. This is in line with the finding that friendships more likely occur among similarly depressed peers (van Zalk et al., 2010). Previous findings suggest that this might entail negative consequences for depressed adolescents, such as mutual encouragement to talk about problems, and exacerbation of problems (corumination; Rose, 2002). In essence, however, helping is intended to benefit others, not to evoke negative talk (Bergin, Talley, & Hamer, 2003; Eisenberg et al., 1999). By investigating the impact of helping on depressed adolescents’ well-being,

future researchers could investigate whether helping among depressed adolescents evokes corumination or results in alleviation of problems.

For peer rejection, we found that rejected adolescents received help from peers who were low- and high-rejected. This aligns with the proposed idea that rejected adolescents try to connect with (any) other peer in order to gain acceptance. It is surprising, however, that these rejected adolescents did not help their low-rejected peers. From the viewpoint of higher status peers, it could indicate that they refuse help from rejected peers; by accepting their help, high-status adolescents may signal dependency on low-status peers, which may negatively affect their higher status position.

This notion of status competition is also reflected in the results for popularity; adolescents that were popular did not receive help from other popular peers. Again, through signals of dependency, accepting help from other high-status adolescents may jeopardize one’s status maintenance. Second, also for popularity we found support for the dissimilarity-repulsion hypothesis, as popular adolescents did not help low-popular classmates, and vice versa.

In conclusion, not everyone receives and gives help to the same extent, and adolescents seem to be selective regarding their helping relationships. It is important to note that these results suggest that prosocial behavior might be defined in terms of benefitting (relationships with) particular others (see Kuhlmeier, Dunfield, &

Table 6  
*Selection Table for Prosocial Networks Showing Strength of Attraction for Each Variable Separately, Based on Symptoms of Academic Achievement, Symptoms of Depressive Mood, Peer Rejection, and Popularity (Low, High), and Gender (Girl, Boy)*

Variable	Value ego	Value alter	
Academic achievement	Low	Low -.05	High .73
	High	-.71	-.46
Symptoms of depressive mood	Low	Low .08	High -.26
	High	-.14	.04
Peer rejection	Low	Low .07	High -1.16
	High	.28	.26
Popularity	Low	Low .29	High -1.20
	High	-.25	-.15
Gender	Girl	Girl .29	Boy -.36
	Boy	-.13	.22

*Note.* Values are derived from Table 5. Calculations are based on Ripley, Snijders, Boda, Vörös, and Preciado (2015).

O'Neill, 2014; Martin & Olson, 2015; Nadler, 2015). That is, prosocial behavior is likely more exclusive than some conceptualizations suggest.

### Network Characteristics

In addition to individual characteristics that predict helping relations, we were interested in the general pattern describing the prosocial network. The results show that prosocial networks partly reproduce the behavior of other types of positive networks, although differences remain. Similar to friendship and likability networks, helping relations were mutual and clustered in groups (Huitsing et al., 2012; Sentse, Kiuru, Veenstra, & Salmivalli, 2014; Veenstra et al., 2013). However, these tendencies were less pronounced in helping networks (Huitsing et al., 2012; Veenstra et al., 2013); we found that adolescents who received help *more often* gave help *less often* over time, suggesting an inclination counter to mutuality. Also, adolescents did not receive help from peers who were helped by the same helpers, indicating a reduced tendency to form helping groups. Thus, there are differences in the preconditions leading to friendship and liking on the one hand, and helping on the other hand. A possible explanation for this discrepancy is that mutuality and group formation in liking or friendship networks may occur when peers positively evaluate each other, whereas mutuality and group formation tendencies in helping networks may additionally depend on (the ability to meet others) needs, and may thus be more atypical of prosocial networks.

To conclude, the prosocial networks in the present study showed characteristics typical of networks, but also some distinct features; in our view, it is worthwhile to investigate these networks.

### Limitations, Strengths, and Future Research

In interpreting the results, it is prudent to bear in mind the limitations of the method we chose to assess the giving and receiving of help. It is important to note that given the general nature of the question, it was not known what kind of help was exchanged. Specific instances of help would probably have related more clearly to specific individual characteristics; helping with homework would have shown stronger associations with givers' and receivers' academic achievement, and emotional help with their symptoms of depressive mood. Also, similarity between givers and receivers may be more salient with respect to emotional help, which likely requires more intimacy and mutual understanding than practical help (Nadler, 2015). Essentially, our results suggest that general helping relates less to specific cognitive skills, and more to general predictors of relationship formation, such as network tendencies, similarity, and social standing. Second, use of more specific measurements would allow examination of whether different forms of helping show distinct relational (network) patterns. For example, whereas (seeking) emotional help is likely to be directed to a few trustworthy peers, practical help may face less strict boundaries (Baerveldt et al., 2004). This may have consequences for the way in which networks are structured, such as their density and the extent to which peers are clustered in helping groups.

A second issue pertains to the testability of our theorized underlying mechanism. We argued that status and affection concerns influence who helps whom. However, these are two different concepts, referring to popularity and acceptance, respectively (Parkhurst & Hopmeyer, 1998). Consequently, they may relate differently to behavioral outcomes, including the giving and receiving of help. For example, helping may be a strategy to gain peers' acceptance (Erdley & Asher, 1999; Maner et al., 2007; Wentzel & Erdley, 1993) but helping *only* does not necessarily lead to popularity, unless it is combined with dominant, aggressive behaviors (Dijkstra et al., 2009; LaFontana & Cillessen, 2002). Similarly, asking for help may trigger acceptance in peers, but may decrease popularity as it signals incompetence and dependency (Ackerman & Kenrick, 2008; Middleton & Midgley, 1997). Given the complexity of social standing, more research is needed to examine its interaction with individual characteristics for the prediction of helping relations; in this way, we may gain more insight into the motivations behind prosocial behavior.

Last, because we asked participants to name their helpers, we interpreted our findings in such a way that receivers were assumed to ask specific peers for help more often. However, it is unclear whether our interpretation is correct: Do receivers indeed ask their helpers more often, or do helpers decide to help? Conceivably, this problem does not distort the structure of networks, but it complicates research into why people give or receive help, as this could depend on the skills or willingness of helpers, or on the courage and initiative of help-seekers. As a first step toward exploring this question in a network context, future network researchers may examine whether perceptions of givers and receivers about their helping relation align (cf. Oldenburg et al., 2015).

Given these limitations, what is the strength of this peer nomination question? The measure of its strength can be characterized by the finding that 30% to 40% of the receivers mentioned the same helper across a time span of three months. This means that

the stability of prosocial relations falls within the range of stability found in friendships (25% to 60%; Veenstra et al., 2013). Presumably, we measured longstanding prosocial relations: “whom do you generally turn to for help with problems?” Given that it may measure a longer standing, relatively stable relationship, the potential of future research will be in focusing on the influence of prosocial relations on behaviors (e.g., well-being); the overlap with other peer relations; or their development in different contexts.

The strength of this measure is further substantiated by the finding that the general pattern of associations was consistent across the school locations included in our meta-analysis. Nonetheless, we found heterogeneity in the strength of associations. Although this is typical for network studies (see DeLay, Laursen, Kiuru, Salmela-Aro, & Nurmi, 2013; Light, Greenan, Rusby, Nies, & Snijders, 2013; Ojanen, Sijtsema, & Rambaran, 2013), our findings underline the importance of including contextual factors to explain the emergence and development of peer (prosocial) relations (Carlo, Fabes, Laible, & Kupanoff, 1999; Harris, 1995). An example has been set by Wölfer, Cortina, and Baumert (2012), who highlighted the role of embeddedness in affective networks for the development of empathy. Others suggested that classroom norms may impact the degree to which help is given and sought (Chang, 2004; Ryan, Gheen, & Midgley, 1998; Wentzel, Battle, Russell, & Looney, 2010). These findings inspire to further explore the role of wider network features and contextual norms in peer prosocial relations.

Not only should broader network features and classroom characteristics be taken into account in explaining prosocial relations, also the peer helping context should be integrated in adolescents’ wider social support system. It is important to note that although peers are salient helpers at this age, peers do not substitute but complement parental and teacher support (Levitt et al., 2005; van Beest & Baerveldt, 1999; Wentzel, 1998; Wentzel et al., 2010). Surely, although peers are familiar with the problems age-mates face, they do not have as much life experience as parents or teachers, and may provide less accurate or suitable advice than adults. Moreover, some problems (such as being rejected) may be discussed with adults, as they might be too embarrassing to discuss with peers. These suggestions encourage a deeper inquiry into the roles peers, parents, and teachers fulfill in adolescents’ helping networks.

Relatedly, age likely influences the organization of helping relations. The increasing dependency on the help of peers from childhood into adolescence implies that the peer helping network becomes larger, and its actors more interconnected. Also, gender similarity is an important organizing factor of peer relationships in childhood, as indicated by, for example, gender-segregated play (Fabes, Martin, & Hanish, 2004; Maccoby, 1990). In adolescence, other selection criteria than gender may gain importance as relationships with cross-gender peers become more appealing (Sipola, 1999). In sum, more research is needed to better capture changes in helping networks over time, taking into account the role of the multitude of contexts in which helping behavior takes place, distinguishing the types of help that are provided, and taking into account age-related differences in network structure and predictors.

In spite of its limitations, the present study has moved forward in conceiving of prosocial behavior as inherently relational, and has shown that it is fruitful to do so. Thus, care should be taken

when giving and receiving help are considered in isolation from the network context in which they take place, especially since our relational approach has underlined that prosocial behavior is exclusive (i.e., directed toward particular others). The findings of this study indicate that adolescents less likely (receive) help (from) dissimilar peers, emphasizing (dis)similarity as an important driving factor underlying the emergence and development of prosocial relations in the peer context.

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