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Antecedents and consequences of helping among adolescents

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Chapter 5

Consequences of receiving peer help for depressive symptoms in adolescents

In this study, we examined processes of social influence on depressive symptoms emerging from help relations of adolescents with their classmates. Specifically, it was expected that depressive symptoms ameliorate when one's helpers exhibit less symptoms of depression, but may worsen if one's helpers are depressed. Help was assessed by asking 1,623 adolescents (M age = 13.1) about which classmates help them with problems. The co-evolution of these help relations and depressive symptoms was assessed across three waves using longitudinal social network analyses in RSiena. Results suggested that depressed adolescents initiate and terminate help relations more often, that depressed adolescents are more often maintained as helpers, and that similarity in depression led to maintenance of help relations. It was also found that giving help decreased depressive symptoms. Unexpectedly, one's depressive symptoms decreased if one's helpers had higher levels of depressive symptoms, suggesting a downward comparison effect. Implications of these findings are discussed.

This chapter is based on:

Van Rijsewijk, L. G.M., Dijkstra, J.K., Steglich, C. E. G., & Veenstra, R. Consequences of receiving peer help for depressive symptoms in adolescents. *Currently under review by an international peer-reviewed journal*

INTRODUCTION

Adolescence is a critical period in life in which many changes take place in the biological, cognitive, and social domain. Not surprisingly, adolescents are exceptionally vulnerable to developing internalizing problems (Ge, Lorenz, Conger, Elder, & Simons, 1994; Hankin et al., 1998). Suffering from internalizing problems, such as depression, can heavily interfere with the developmental tasks that adolescents need to fulfill, such as achieving well in school (Riglin, Petrides, Frederickson, & Rice, 2014) and making friends (Agoston & Rudolph, 2013; Krygsman & Vaillancourt, 2017). Importantly, adolescents have a social support network helping them to deal with depressive symptoms, including parents, teachers, or professionals. Increasingly, however, adolescents turn to their peers for help. As adolescents spend a large portion of the day in the presence of their peers at school, and as peers may experience similar developmental challenges, they are a significant and valuable source of support, taking up a central role in adolescents' help network (Helsen, Vollebergh, & Meeus, 2000; Hombrados-Mendianta, Gomez-Jacinto, Dominguez-Fuentes, Garcia-Leive, & Castro-Travé. 2012; Del Valle, Bravo, & López, 2010).

The goal of this study is to examine whether being helped by peers can counter the development of depressive symptoms in adolescents. Specifically, we track the development of depressive symptoms in the receiver of help, to examine whether receiving help ameliorates depressive symptoms. Our research aligns with studies examining peer socialization, a tendency of connected peers to become behaviorally similar due to influence processes (Prinstein & Dodge, 2008). During the past decade, longitudinal social network models have been developed that opened up possibilities to examine the interplay between peer relations and behaviors (Burk, Steglich, & Snijders, 2007; Snijders, 2001). Many researchers adopted this method to investigate peer influence processes regarding, amongst others, risk behaviors and internalizing symptoms, demonstrating that adolescents adjust their behavior to their friends' behavior (Veenstra, Dijkstra, Steglich, & Van Zalk, 2013). However, the vast majority of studies examined influence within friendships. Although behavioral change may indeed be the consequence of interactions with friends, friends do not (always) have the explicit intention to elicit behavioral change. Surprisingly, interactions with such intentions, such as help, have not been examined in the context of peer influence (see for an exception: Lomi, Snijders, Steglich & Torló, 2011).

Depression socialization has also been particularly examined in the context of friendships. In general, it has been shown that adolescents tend to become similar to their friends in their level of depressive symptoms (Giletta et al., 2011; Kiuru, Burk, Laursen, Nurmi, & Salmela-Aro, 2012). For example, adolescents with friends suffering from depressive symptoms were more likely to show elevated levels of depression themselves (Brendgen, Lamarche, Wanner, & Vitaro, 2010; Conway, Rancourt, Adelman, Burk, & Prinstein, 2011). Relatedly, friends' depressive symptoms were associated with increases in adolescents' self-injury (Giletta et al., 2012).

Co-rumination has been proposed as an underlying mechanism that explains

how adolescents may ‘contaminate’ each other with depressive symptoms (Rose, 2002; Schwartz-Mette & Rose, 2012; Stone, Hankin, Gibb, & Abela, 2011). Rumination within the context of depressive symptoms has been defined as recurrent thinking, mostly negative thinking, centered around a theme, sometimes in absence of cues that provoke this thinking (Mor & Winquist, 2002; Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). Specifically, ruminating adolescents may fixate on (their role in) the causes and consequences of a particular incident, or speculate excessively on how they are feeling and why this is the case. Co-rumination, then, occurs when peers respond to each other’s problem talk with speculation about the problem or rehashing the problem, encouragement of problem talk, and dwelling on negative feelings (Rose, 2002; Rose, Schwartz-Mette, Glick, Smith, & Luebke, 2014). Rehashing and speculating about problems has, however, been found to be an ineffective strategy to lift one’s mood, as it, amongst others, ‘*makes thinking more pessimistic and fatalistic*’ (Nolen-Hoeksema et al., 2008, pp. 401; see also Li, Starr, & Hershenberg, 2017). As such, a vicious cycle may arise in which negative thinking and depressive mood alternately trigger each other, and affect the thinking and mood of the peer.

In particular supportive social environments have found to be breeding grounds for co-rumination (Calmes & Roberts, 2008; Giletta et al., 2012; Rose, 2002; Rose, Carlson, & Waller, 2007; Rose et al., 2014). Arguably, supportive peers do not reject each other following ruminative disclosure, creating a safe environment in which rumination is accepted and stimulated (Rose et al., 2014). As such, paradoxically, supportive social contexts may form a risk for the development of depressive symptoms.

At the same time, support may buffer against the development of internalizing problems. This has particularly been examined in the context of experiencing distressing events. For example, the presence of supportive friends protects victimized children from developing internalizing problems (Hodges, Boivin, Vitaro, & Bukowski, 1999; Prinstein, Boergers, & Vernberg, 2001; Waldrip, Malcolm, & Jensen-Campbell, 2008), and negative experiences have a lower impact on adolescents’ self-worth when they occur in the presence of a friend (Adams, Santo, & Bukowski, 2011). Contrary to co-rumination findings, these results seem to suggest that help from peers aids adolescents to cope with stressful events, and to regulate negative emotions effectively. Moreover, the finding that adolescents adjust their level of depressive symptoms to that of their peers does not necessarily mean that they fall into a downward spiral of aggravating symptoms – the spiral might also go upward; depressive symptoms may ameliorate (Giletta, 2011; Kiuru et al., 2012). Arguably, whether help forms a buffer or risk for the development of depressive symptoms might depend on characteristics of the giver of support.

The spiral likely goes downward if helpers suffer from depressive symptoms themselves. Indeed, although adolescents all engage in problem talk, adolescents with clinical depression (Waller, Silk, Stone, & Dahl, 2014) and internalizing symptoms (Hankin, Stone, & Wright, 2010; Nezu, 1987; Rose et al., 2007; Rose et al., 2017) are more likely to co-ruminate and less likely to engage in more productive forms of addressing problems,

such as thinking of ways to improve a situation. Thus, although peers' encouragement to talk about problems might be perceived as supportive behavior, a depressed peer may actually reinforce negative thinking and intensify internalizing symptoms (Starr, 2015). Consequently, the protective effect of help may disappear (see Hodges et al., 1997). As such, it is expected that

receiving help from peers that have depressive symptoms increases symptoms in the focal adolescent, and that receiving help from peers who do not have depressive symptoms decreases symptoms in the focal adolescent

METHODS

PROCEDURE

We use data from the SNARE-project (*Social Network Analysis of Risk behavior in Early adolescence*; see Dijkstra et al., 2015), a study aimed at investigating the social and behavioral development among (early) adolescents. Prior to the data collection, all eligible students and their parents received an information letter, 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 ten days. 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 ethics committee of one of the participating universities. During the assessments, a teacher and research assistant(s) were present. The research assistant gave a brief introduction, and the students then filled in the questionnaire on the computer during class. The assessment of the questionnaires took place during regular school hours within approximately 45 minutes. The students who were absent that day were, if possible, assessed within a month.

PARTICIPANTS

We examined the networks of all first and second grade classrooms of secondary school participating in the SNARE study. For this study, we used the help networks and depressive symptoms as assessed in October 2011, December 2011, and April 2012 (referred to as wave 1, wave 2, and wave 3, respectively). Originally, the sample contained 80 classrooms. However, seven classrooms could not be analyzed due to convergence problems. Thus, in total, the study sample contained 73 classrooms (M classroom size = 22.2 students, $SD = 4.7$) and 1,623 students (M age = 13.1 years, $SD = 0.7$, 49.7% boys, 82.3% Dutch) at wave 1. Students had, on average, a slightly lower SES than the average Dutch SES. At the respective waves, 32, 54, and 51 students were absent, and their outgoing help nominations and information on depressive symptoms were missing. However, their incoming help nominations were retained. Furthermore, some participants named (almost) everyone in their classroom as helper, whereas they hardly named anyone at

the preceding and/or next assessment. Also, their help nominations were hardly or not reciprocated. These extreme (out)degree outliers may have interpreted the question differently from their classmates. We recoded their outgoing nominations as missing. This was the case for 11, 11, and 18 participants on the three respective waves. Their incoming nominations were retained. Similar strategies to handle extreme outdegree outliers have been used in previous research (e.g., Light, Greenan, Rusby, Nies, & Snijders, 2013).

MEASURES

Participants could nominate an unlimited number of same- or cross-sex classmates for a large set of peer nomination questions. To assess help, we used the question ‘*who helps you with problems (for example, with homework, with repairing a flat [bicycle] tire, or when you are feeling down)?*’. Similar peer nomination questions were used in previous studies investigating adolescent help relations (e.g., Baerveldt, Van Duijn, Vermeij, & Van Hemert, 2004; Dijkstra, Lindenberg, Verhulst, Ormel, & Veenstra, 2009).

Depressive symptoms at all waves were assessed using three items from a self-report scale on depression (based on Kandel & Davies, 1982). The internal consistency of these three items was $\alpha = .82$ or higher for each wave. Participants were asked how often during the preceding month they felt unhappy, miserable, and down; felt nervous and tense; and worried too much. The items were rated on a 5-point scale ranging from *never* (1) *almost never* (2) *sometimes* (3) *often* (4) to *always* (5). Scores on the items were averaged to obtain mean level of symptoms for every participant. As behavioral data with a small number of categories is preferred (Ripley, Snijders, Boda, Vörös, & Preciado, 2018), we recoded mean levels of depressive symptom scores to discrete values 1 to 5 (see Table 5.1).

Help is an important feature of friendships, and friends are often nominated as helpers (Furman & Burhmester, 1992; Newcomb & Bagwell, 1995; Van Rijsewijk et al., 2016). Furthermore, having friends is negatively associated with the development of depressive symptoms (see Brendgen et al., 2010). Therefore, friendship was included in the models as factor playing a role in the development of help relations and depressive

Table 5.1
Category specification of depressive symptoms and frequency of this category at each wave (%)

Category	Original value range	Wave 1	Wave 2	Wave 3
1	1.00	18.8	22.2	19.9
2	1.01 - 2.00	37.5	34.9	34.8
3	2.01 - 3.00	30.4	29.1	29.8
4	3.01 - 4.00	12.0	11.5	12.6
5	4.01 - 5.00	1.4	2.3	2.9
Total N students		1528	1555	1550

symptoms. Friendship at all waves was based on a peer nomination question, for which students could nominate an unlimited number of same- and cross-sex classmates for the question '*who are your best friends*'.

Sex was measured at wave 1, and was coded 0 for girls and 1 for boys.

ANALYTICAL STRATEGY

To analyze the co-evolution of help relationships and depressive symptoms, we used the Simulation Investigation for Empirical Network Analyses software package in R (RSienaTest version 1.2.5; Ripley et al., 2018); software instantiating stochastic actor-based statistical models of social network dynamics (Snijders, 2001; Snijders, Van de Bunt, & Steglich, 2010). The model interprets the change in patterns of helping and depressive symptoms as the result of a series of unobserved, smallest possible changes taking place between observation moments. A smallest possible change is either the termination of an existing relation between two participants, the creation of a new one, or a one-unit change on the score on depressive symptoms. The probability of network and behavioral changes is modelled by an objective function, expressing under which conditions participants initiate, maintain, or dissolve a help relation, or change or remain stable in their level of depressive symptoms. 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 is reached.

To achieve high statistical power while sufficiently accounting for between-classroom heterogeneity, a random effects model was estimated (i.e., Bayesian longitudinal social network analysis; Ripley et al., 2018). All variables were allowed to vary randomly between classrooms. In short, Bayesian inference assigns a prior probability distribution to the parameters which is, in the light of new data, updated to a posterior probability. The posterior probability density is proportional to the product of the prior density and the likelihood of the data. Computations are made by Markov Chain Monte Carlo algorithms (Koskinen & Snijders 2007; 2018; Ripley et al., 2018).

For all parameters we give the posterior mean (m), the posterior across-classroom standard deviation (sd), and the posterior probability p that the parameter is greater than 0.

Model specification: Help network dynamics. In the stochastic actor-oriented model, parameters can be either rate parameters or parameters in the objective function. Rate parameters for help network dynamics refer to the rate of change in network relations between time points of observations. The objective function determines the probabilities of tie creation and tie maintenance. For some effects, parameters for creation of new ties and maintenance of existing ties are equal, and are called evaluation parameters; in order to gain deeper insight into the effect of depressive symptoms on help they are distinguished, and called creation parameters and maintenance parameters, respectively. To model the dynamics of the help network, we included the most basic structural effects

in the objective function, and controlled for the main effect of sex and friendship. As these are not the focus of our analyses, we refer to Table 5.2 for an explanation of these effects. The effects of depressive symptoms on help were included as so-called ego, alter, and egoalter effects. The ego effects capture the effect of symptoms on initiating or maintaining help relations with others. The alter effects capture the effect of symptoms

Table 5.2
Explanation of effects in the RSiena model

Effect	Effect name	Explanation
Help dynamics		
Outdegree	density	Tendency to nominate others as helper
Reciprocity	recip	Tendency to reciprocate help
Transitive triplets	transTrip	Tendency to have ties with helpers-of-helpers
Transitive reciprocated triplets	transRecTrip	Tendency to have reciprocated ties with helpers-of-helpers
Three cycles	cycle3	Tendency to have ties with those whom perceive ego as helper-of-helper
Outdegree activity	outAct	Tendency of actors with already high outdegrees to send extra nominations
Indegree activity	inAct	Tendency of actors with already high indegrees to send extra nominations
Indegree popularity	inPop	Tendency of actors with already high indegrees to attract extra nominations
Friendship	X	Tendency to send a help nomination to those to whom one sends a friendship nomination
Ego effect	egoX	Tendency of actors with higher values on X to create and maintain a higher number of help relations
Alter effect	altX	Tendency of actors with higher values on X to be nominated as helper more often and be maintained as helper more often
Similarity effect	sameX / egoXaltX	Tendency for relations to be created and maintained more often between actors with the same (sex) or similar (depressive symptoms) values on X
Depressive symptoms dynamics		
Outdegree	outdeg	Effect of nominating helpers on depressive symptoms
Indegree	indeg	Effect of receiving nominations as helper on depressive symptoms
Average alter effect	avAlt	The tendency of students to adjust their level of symptoms to that of their helpers
Covariate effect	effFrom	Main effect of a covariate (sex, number of friendships) on depressive symptoms

on receiving new or existing nominations as helper. The egoxalter effect captures the tendency to initiate or maintain help relations with others who are similar on symptoms.

Model specification: Depressive symptoms dynamics. To model the dynamics in depressive symptoms, we included the following parameters: Rate parameters indicate the rate of change in students' depressive symptoms between the waves. The objective function determines the probabilities of increasing or decreasing one unit in depressive symptoms, or remaining stable. To model changes in depressive symptoms, we included the indegree and outdegree effect, capturing the tendency of students who give help or receive help from more classmates, respectively, to change their value for depressive symptoms. We also included the average alter effect, expressing the tendency of students to adjust their symptoms to that of their helpers. We did not distinguish between creation and maintenance here, as there is no empirical research demonstrating how these effects should be interpreted regarding behavior dynamics (see for an exception Haas & Schaefer, 2014 using the total similarity effect). As such, we included these effects using the evaluation function. Finally, we controlled for the overall distributional linear/quadratic shape of depressive symptoms, and for the main effect of students' sex and number of friends on depressive symptoms.

RESULTS

DESCRIPTIVE STATISTICS

Descriptive statistics of the sample, help networks, and depressive symptoms are presented in Table 5.3.

Help network. The average outdegree demonstrates that students mentioned two to three classmates as helpers on average. The help network was quite sparse, as the density was about 13% across waves, meaning that 13% of possible help relations were actual relations. Furthermore, about half of all help relations were reciprocal (reciprocity), and help relations tended to cluster in groups (transitivity). The majority of help nominations (about 81-83%) were between classmates of the same sex (sex homophily). Lastly, most students tended to nominate different helpers over time, as 62%-65% of the nominations were new or were terminated between the waves (distance). To be able to perform longitudinal social network analyses, however, a sufficient fraction of help nominations should remain stable (Jaccard index). About 35-38% of nominations were stable in between waves. Given that a Jaccard index of above 30% is recommended (Veenstra & Steglich, 2012), the stability of the help networks was sufficient.

Depressive symptoms. Table 5.3 shows that students on average scored around 2.40 ($SD = 1.01$) on depressive symptoms across waves, indicating that students in general experienced depressive symptoms sometimes. In addition, there was about 40% stability in depressive symptoms and 60% change. Table 5.4 provides a more detailed image of changes, and shows that changes primarily relate to students who experienced depressive

Table 5.3
 Sample description and descriptive statistics of the help networks and depressive symptoms

Sample							
	Wave 1	Wave 2	Wave 3				
Sample size	1623	1627	1626				
<i>N</i> classrooms	73	73	73				
<i>M</i> class size	22.23	22.29	22.27				
<i>SD</i> class size	4.73	4.66	4.57				
<i>M</i> age	13.06	13.21	13.55				
<i>SD</i> age	0.72	0.71	0.72				
% boys	49.66	49.57	49.50				
<i>N</i> absent students	32	54	51				
Help				Depressive symptoms			
	Wave 1	Wave 2	Wave 3		Wave 1	Wave 2	Wave 3
<i>N</i> ties ^a	4498	4607	4205	<i>M</i>	2.40	2.37	2.44
<i>M</i> outdegree ^a	2.56	2.63	2.42	<i>SD</i> (<i>M</i>)	.97	1.02	1.04
<i>SD</i> outdegree ^a	2.96	3.10	2.72	Minimum	1	1	1
<i>SD</i> indegree ^a	1.72	1.68	1.69	Maximum	5	5	5
% density ^a	13.1	13.5	12.5	Moran's <i>I</i>	-.03	.00	-.01
% reciprocity ^a	46.3	43.2	43.7	<i>SD</i> (<i>I</i>)	.12	.19	.17
% transitivity ^a	54.3	51.2	52.0				
% same-sex ^a	81.1	82.8	82.5				
Changes in help				Changes in depressive symptoms			
	1 ^b	2 ^b			1 ^b	2 ^b	
<i>N</i> 0- 1 ^a	29	25		<i>N</i> steps down	461	498	
<i>N</i> 1- 0 ^a	26	29		<i>N</i> steps up	501	581	
<i>N</i> 1- 1 ^a	33	30		<i>N</i> steps stable	694	631	
% jaccard index	37.6	35.5					
% distance	62.4	64.5					

Note: ^a averaged over number of classrooms ^b 1 and 2 refer to the transition between wave 1 and 2, and wave 2 and 3, respectively.

Table 5.4

Change matrix presenting students' changes in depressive symptoms between wave 1 and 2, and between wave 2 and 3

		Depressive symptoms wave 2				
		1	2	3	4	5
Depressive symptoms wave 1	1	230	127	43	5	1
	2	87	335	150	19	0
	3	28	148	268	66	4
	4	4	16	68	146	7
	5	4	4	9	12	80
		Depressive symptoms wave 3				
		1	2	3	4	5
Depressive symptoms wave 2	1	200	98	39	13	5
	2	117	320	146	44	2
	3	40	139	266	63	11
	4	7	24	64	133	21
	5	3	1	2	10	77

Note. Changes refer to changes on the recoded scale of depressive symptoms as explained in the 'Measures' section.

symptoms (almost) never or sometimes (scores 1, 2, and 3). They usually moved up one category at the next wave. The majority of students who experienced depressive symptoms often or always remained stable in their level of depressive symptoms across waves.

To get an indication of depression similarity between nominators and nominees, we present Moran's I , a measure of spatial autocorrelation assessing the extent to which receivers and givers of help are similar with respect to depressive symptoms. Values range from -1 to $+1$. Values close to 0 represent perfect independence, and values close to -1 or $+1$ represent perfect dependence, respectively. Although the majority of classrooms had a Moran's I close to zero ($-.02$ to $-.03$ across waves), there was large variation between classrooms (it ranged from $-.5$ to 1). To understand similarity between connected students, differences between adolescents and their helpers are presented in Table 5.5. Because the results did not show remarkable differences between waves, we averaged the percentages over the waves. Results show that the vast majority of helpers and receivers of help showed differences of up until 1 or 2 in absolute value. Differences larger than 2 were very scarce. This indicates that receivers are quite similar to their givers with regards to depressive symptoms, pointing towards possible selection similarity and/or influence effects.

RSIENA RESULTS

Help network dynamics. Structural network effects as well as effects of depressive symptoms on the help networks are presented in the top part of Table 5.6. Concerning

Table 5.5

Frequency (%) of differences in depressive symptoms scores between receivers and the average score of their givers

Size of difference	%
-4.00 to -3.01	0.2
-3.00 to -2.01	1.6
-2.00 to -1.01	12.0
-1.00 to 1.00	71.2
1.01 to 2.00	12.4
2.01 to 3.00	2.3
3.01 to 4.00	0.4

Note: As frequency percentages were similar across waves, the table presents averages across waves.

the creation of new help relations, results indicate that depressed adolescents nominate more new helpers (positive ego effect; $m = 1.68, sd = 0.27, p > .99$). However, depressive symptoms do not affect being nominated for giving help (alter effect; $m = -0.01, sd = 0.10, p = .46$), and depressed adolescents do not selectively initiate new help relations with other depressed adolescents (egoxalter creation effect; $m = -0.00, sd = 0.12, p = .49$). Concerning the maintenance of existing help relations, we find that depressed adolescents discontinue nominating the same helpers (negative ego effect; $m = -1.77, sd = 0.47, p < .01$). Furthermore, we find that depressed adolescents are maintained as helpers more often (positive alter effect; $m = 0.34, sd = 0.17, p > .99$) and that depressed adolescents maintain help relations with other depressed adolescents (positive egoxalter effect; $m = 1.25, sd = 0.36, p > .99$).

Depressive symptoms dynamics. Effects of the help network on depressive symptoms can be found in the bottom part of Table 5.6. Results suggest that the number of classmates adolescents nominate as helper do not affect depressive symptoms over time (outdegree effect; $m = -0.01, sd = 0.18, p = .48$), and that adolescents who receive more nominations for giving help have less depressive symptoms over time (negative indegree effect; $m = -0.43, sd = 0.21, p = .02$). Finally, over time, depressive symptoms become lower the more depressive symptoms one's helpers have (negative average alter effect; $m = -4.26, sd = 0.74, p < .01$).

DISCUSSION

This study is the first to examine processes of social influence on depressive symptoms emerging from help relations among adolescents with their classmates. Specifically, the aim of this study was to examine how receiving help from classmates affects depressive symptoms in adolescents. We expected depressive symptoms in receivers of help to ameliorate when one's helpers have lower levels of depressive symptoms, and worsen if

Table 5.6

RSiena results on the effects of help on depressive symptoms and vice versa ($N = 73$ classrooms)

	Random effects		
	m	$SD(m)$	p
Network dynamics: Help			
Outdegree (density)	-2.18	0.19	< .01
Reciprocity	1.89	0.14	> .99
Transitive triplets	0.77	0.10	> .99
Transitive reciprocated triplets	-0.29	0.12	.01
Three cycles	-0.27	0.11	.01
Indegree popularity	-0.12	0.08	.07
Outdegree activity	0.06	0.08	.81
Indegree activity	-0.56	0.12	< .01
Sex ego	-0.48	0.17	< .01
Sex alter	-0.10	0.11	.18
Same sex	0.86	0.11	> .99
Nominating as friend	1.51	0.11	> .99
Nominating new helpers			
Depressive symptoms ego	1.68	0.27	> .99
Depressive symptoms alter	-0.01	0.10	.46
Depressive symptoms egoxalter	-0.00	0.12	.49
Maintaining existing helpers			
Depressive symptoms ego	-1.77	0.47	< .01
Depressive symptoms alter	0.34	0.17	> .99
Depressive symptoms egoxalter	1.25	0.36	> .99
Behavior dynamics: Depressive symptoms			
Linear shape	1.06	0.30	> .99
Quadratic shape	-1.16	0.13	< .01
Sex	-2.61	0.34	< .01
Number of friends	-0.00	0.09	.47
Help outdegree	-0.01	0.18	.48
Help indegree	-0.43	0.21	.02
Average depressive symptoms of helpers	-4.26	0.74	< .01

Note. The table presents posterior means and standard deviations SD for the random parameters m , and the estimated posterior probability p that the parameter is greater than 0.

one's helpers have higher levels of symptoms.

RESULTS ON DEPRESSION DYNAMICS

Counter to our expectations, we found a negative influence effect, meaning that depressive symptoms tended to decrease when one's helpers were depressed. A straightforward explanation would be that depressed helpers are better helpers, were it not for the body of research indicating that depressed adolescents tend to employ less appropriate problem-solving strategies, such as rumination or talking about problems without offering solutions (Hankin et al., 2010; Nezu, 1987; Rose et al., 2007; Rose et al., 2017; Waller et al., 2014). However, in our study, there were only some adolescents who frequently or always felt depressed (about 13%), whereas in other studies clinical depression was assessed (Waller et al., 2014), or as much as 20 to 25% of the sample met the 'clinical' cut-off point of depressive symptoms (Hankin et al., 2010; Rose et al., 2017). As such, it might be that adolescents in our sample, who generally experienced mild symptoms of depression, did not ruminate as much as adolescents in other samples. Therefore, it might be that depressed adolescents in our sample were better suited to provide support in comparison to peers who do not experience depressive symptoms; experiencing depressive symptoms might increase the ability to empathize with peers who feel the same way, and give the receiver of support a feeling of being understood (McPherson, Smith-Lovin, & Cook, 2001).

The negative influence effect could also reflect downward social comparison (Festinger, 1954; Gerber, Wheeler, & Suls, 2018; Wills, 1981), meaning that adolescents compare themselves with peers who are relatively worse off. This may improve their own well-being by boosting one's self-esteem or self-evaluation (Wood, 1989). As such, being helped by peers who experience depressive symptoms may actually make depressed adolescents feel better. In a study amongst US undergraduate students, downward comparison indeed played a role in the development of depressive symptoms: Depressed students felt better after reading about others who felt very bad (Gibbons, 1986). According to another study, depressed individuals tend to avoid others who feel better and tend to inform about negative things about happy individuals (Wenzlaff & Beevers, 1998).

Importantly, descriptive findings demonstrated that adolescents in our sample who always or frequently experienced depressive symptoms were resistant to peer influence; that is, they tended to remain stable in their symptoms despite receiving help. Perhaps, adolescents suffering from mild symptoms might be more able to 'see light at the end of the tunnel', and may still be able to tackle their problems, whereas adolescents experiencing severe symptoms (e.g., always feeling miserable) may be less able to see and do so, and are stuck in a downward spiral. In such instances, perhaps only professional help may break this cycle.

Furthermore, we examined main effects of receiving and giving help on the development of depressive symptoms. Whereas the number of helpers did not affect

depressive symptoms, we found that helping others decreased depressive symptoms. Perhaps, this again refers to a downward social comparison effect: Hearing about others' problems or depressed mood may make helpers feel better about themselves. Alternatively, as peers self-disclose to helpers about their problems, helpers might become aware of the normativity of having problems, referring to that peers experience problems as well. The notion that struggling with daily hassles or having negative feelings is normative or acceptable may induce relief and temper distress. Moreover, as helpers likely aim to make their peers feel better, helping might force helpers to think about positive and productive ways to tackle problems and to put problems into perspective instead of engaging into self- or other-destructive thoughts or behaviors. As such, helping others may actually also help oneself. That is, through helping, helpers may expand their productive problem-solving skills, and may use their own advice to cope with their daily struggles. It is, thus, encouraging to find that helping others decreases depressive symptoms, and that helping others does not come at a cost to helpers' well-being (Smith & Rose, 2011; Tone & Tully, 2014).

The finding that receiving help was not associated with decreases in depressive symptoms is notable. Receiving help has many benefits, such as access to others' knowledge and skills, and receiving attention and affection, suggesting that more helpers improves access to these benefits. Future research might look into how (early) adolescents specifically exchange help. Some empirical findings suggested that early adolescents are generally not yet equipped with all necessary interpersonal problem-solving skills (Clark, MacGeorge, & Robinson, 2008). As such, the help strategies early adolescents employ might generally not be fully appropriate to tackle problems. Another explanation for this finding might be that adolescents' 'problem-disclosure skills' are still in development. That is, adolescents may not yet be able to clearly put into words whether and how problems affect their moods and what kind of support may help them deal with these problems or lift their moods. As such, it might be difficult for helpers to tailor their support to receivers' needs.

Notably, we found no association between the number of best friends and the level of depressive symptoms, which was surprising given previous findings on this association (Brendgen et al., 2010). Perhaps, this finding illustrates that it matters more whether you have best friends rather than how many best friends you have.

RESULTS ON HELP DYNAMICS

We also examined the impact of depressive symptoms on the emergence and maintenance of help relations. Findings indicated that adolescents who experience depressive symptoms more often initiate as well as terminate help relations. This high turn-over in help relations among depressed adolescents may indicate that depressed adolescents are less capable of maintaining relations with the same peer over time. It has been suggested that depressed individuals have more monotonous and less comprehensible speech, engage in unsolicited negative talk or self-disclosure, and rate their own social competencies as

lower (Segrin, 2000). This may complicate their ability to maintain healthy relationships, but may also make them less attractive individuals to interact with (Schaefer, Kornienko, & Fox, 2011). In line with this, earlier research found that depressed adolescents were less often selected and more often deselected as friends, and also tended themselves to terminate friendships more often (Van Zalk, Kerr, Branje, Stattin, & Meus, 2010).

In contrast with the finding that depressed adolescents have a higher turn-over in relations in general, we found that depressed adolescents were maintained as helper more often- despite their possible social skill deficits. Potentially, they were maintained as helper by other depressed individuals, because we also found that similarity in depressive symptoms contributes to the maintenance of help relations. We explained how depressed adolescents are potentially better able to empathize and understand their depressed peers, and are as such better suited to provide help in comparison to peers who do not experience depressive symptoms. This notion might explain the preference of adolescents to maintain depressed adolescents as helpers. It could also be a default selection effect (Deptula & Cohen, 2004; Sijtsema, Lindenberg, & Veenstra, 2010), meaning that whereas depressed adolescents may *want to* associate with non-depressed peers, they are not *able to*, given that they perceive themselves as socially less competent and are generally deemed less attractive to interact with. As a result, depressed adolescents are in a position that forces them to interact with other depressed adolescents. Indeed, depressed youth have been found to withdraw themselves from the friendship network, resulting in friendships with other (depressed) peers who are equally bad embedded in the friendship network (Schaefer, Kornienko, & Fox, 2011).

Regarding the role of depression similarity in help relations, we found that- although similarity contributed to help relation maintenance- similarity was not salient for the formation of new help relations. Although creation and maintenance effects have hitherto not been distinguished for the contribution of depression similarity to help relations, it echoes results from previous research, suggesting that some characteristics are not clearly observable, and may therefore not play a role as 'selection criterion' on the basis of which individuals establish relations (Van Duijn, Zeggelink, Huisman, Stokman, & Wasseur, 2003). Indeed, individuals tend to suppress or hide negative emotions and are less able to detect them in others (Jordan, Monin, Dweck, Lovett, John, & Gross, 2011). Importantly, this finding implies that it is relevant to distinguish between newly created relations and the maintenance of existing ones in future network studies that assess the role of selection similarity in depressive symptoms as well as other characteristics.

LIMITATIONS AND FURTHER DIRECTIONS FOR FUTURE RESEARCH

When interpreting the results, it is important to bear in mind some limitations to our study. First, the peer nomination question we used to examine who helps whom tapped into multiple types of support; not only emotional support, but also practical support. Therefore, it is not known whether helpers help their peers specifically with regards to emotional problems. As such, our results may pertain to the effects of general peer support

on depressive symptoms rather than to effects of helping one another to overcome depressive symptoms or co-rumination. Future studies investigating associations of peer help with depressive symptoms should employ a peer nomination question pinpointed at measuring emotional support. If we would have assessed help relations in such a way, we would have likely found stronger associations between receiving help and depressive symptoms.

Second, we have focused in this study on the exchange of help within the classroom, as adolescents spend much time at school in the presence of their classmates. However, adolescents' support network may also include other peers than classmates. For example, students may tell older or out-of-school peers about their problems: Adolescents may want to reveal problems to peers outside the boundaries of the classroom to minimize chances of being ridiculed or teased by peers with whom one spends most part of the day. Adolescents may also turn to other sources of support than peers, such as parents, especially when their problems take more serious forms (Sawyer et al., 2012). A fruitful avenue for future research may be to examine the role peers and parents together play in the provision of emotional support. Additionally, socialization effects emerging from relations with parents may play a role in adolescents' depressive symptoms: Indeed, whereas parental support is associated with better mental health in adolescents (e.g., Needham, 2008), at the same time, parental depressive symptoms are associated with the depressive symptoms of their children (Lewis, Neary, Polek, Flouri, & Lewis, 2017). Thus, parental depressive symptoms may mitigate the beneficial effects of support.

Third, the impact that peers' depressive symptoms may have on givers and receivers of help may differ for boys and girls. Importantly, studies found that socialization effects of depressive symptoms were more pronounced (Conway et al., 2011; Giletta, 2011) or found exclusively within girl friendships (Giletta, 2012). This may in part be explained by the finding that girls tend to engage in co-rumination more than boys do (Hankin et al., 2010; Stone, 2011). On top of that, girls are more likely to become distressed as the result of others' distress (Smith, 2015) and are generally more vulnerable to developing depressive symptoms (Hankin & Abramson, 2001; Shih, 2006). Thus, peer influence effects might differ for female helpers or receivers of help. As such, future research should address these potential sex differences.

Further potential for theory development lies in exploring the mechanisms underlying influence in help relations. As mentioned, mechanisms of friendship influence have been relatively well researched. Arguably, however, mechanisms of influence in help relations are different than those underpinning friendship influence. Common influence mechanisms refer to copying behaviors or attitudes through, for example, encouraging talk about a particular behavior (Dishion, Piehler, & Myers, 2008) or social modeling (Bandura, 1978; Brechwald & Prinstein, 2011). Influence in help relations would, however, less likely pertain to imitation, but rather to improving others' well-being. This might directly take place through the transfer of knowledge or information, addressing practical problems or

improving ability. Indirectly, receiving help may contribute to feelings of being cared for and belongingness. As such, help may not address problems, yet improve one's emotional well-being. In addition, we found that helping others also affects helpers' well-being. As such, future research may examine how help affects the receiver as well as the giver of help, and how the effectiveness of help depends on characteristics of givers, receivers, and their 'compatibility'.

CONCLUDING REMARKS

This study examined associations of peer help with depressive symptoms in adolescents, and showed that having depressed helpers may lower adolescents' depressive symptoms, suggesting a downward comparison effect. Our results also suggested that depressed adolescents initiate and terminate help relations more often, and that depressed adolescents are more often maintained as helpers. Moreover, helping peers decreases depressive symptoms, and help relations are more likely sustained if giver and receiver are similar with regard to their depressive symptoms. Future research should further specify the mechanisms and conditions underlying the ameliorating effects of giving and receiving peer help on depressive symptoms. Results suggest that peer help is beneficial for the receiver and not harmful for the giver, and that peers might be mobilized to prevent emotionally unstable adolescents from cascading into more severe internalizing problems.

