



EMPIRICAL RESEARCH

The Detrimental Effects of Adolescents' Chronic Loneliness on Motivation and Emotion Regulation in Social Situations

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Abstract In adolescence, when establishing and maintaining satisfying social relationships is a key developmental task, chronic loneliness is related to a host of negative outcomes. This study aimed at examining motivational and regulatory factors related to chronic loneliness. Specifically, this study investigated chronically lonely adolescents' responses to hypothetical vignettes of social inclusion and exclusion, thereby focusing on (a) adolescents' willingness and motivation to approach social inclusion and (b) emotion regulation strategies to deal with social exclusion. A total of 730 adolescents ($M_{age} = 15.43$ years, 72% female) participated in this four-wave study with annual loneliness assessments and hypothetical vignettes of social inclusion and exclusion at the final wave. After each social inclusion vignette, participants rated their willingness to accept the invitation for social inclusion and five types of motivation to approach the situation. After each social exclusion vignette, participants rated nine cognitive emotion regulation strategies. Compared to individuals following other trajectories, chronically lonely adolescents were less likely to accept invitations for social inclusion and the quality of their motivation for accepting such invitations was lower. Further, they were more likely to employ maladaptive emotion regulation strategies. In sum, this study adds significantly to understanding the motivational and regulatory processes that differentiate chronically

lonely adolescents from adolescents following other trajectories.

Keywords Loneliness · Motivation · Emotion regulation · Inclusion · Exclusion

Introduction

Loneliness, defined as the negative emotional response to a discrepancy between one's desired and actual social network (Peplau and Perlman 1982), is a relatively common experience during adolescence. The relatively high prevalence of loneliness is likely due to various changes in social expectations, roles, and relationships during adolescence (Qualter et al. 2015). During late adolescence, for example, the transition to work life or college is challenging in terms of maintaining a satisfying social network, creating new relationships, and reshaping existing ones (Cutrona 1982). Although temporary loneliness may be normative, chronic loneliness during this period of life represents a serious cause for concern, as it is associated with various health outcomes. Specifically, previous research has found a strong association between chronic loneliness and depressive symptoms across childhood and adolescence (e.g., Ladd and Ettekal 2013; Qualter et al. 2013a). Moreover, chronic loneliness has been associated with anxiety (Vanhalst et al. 2013), suicidal ideation (Schinka et al. 2013), and an increased risk for physical health problems (Caspi et al. 2006). Relatively less is known, however, about motivational and regulatory processes that may explain why some adolescents remain lonely. In this study, we focused on (a) adolescents' inclination and motivation to accept

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invitations for social inclusion and (b) their emotion regulation strategies when confronted with social exclusion.

Loneliness: Adaptive or Maladaptive?

Despite the negative outcomes associated with (chronic) loneliness, feeling lonely can have an important adaptive role in individuals' social functioning. Many theoretical perspectives have proposed that feeling lonely—or, more broadly, experiencing a frustrated need to belong—may have a signaling function, representing a social pain mechanism that motivates people to regain social connection. In other words, a temporary experience of loneliness may have an adaptive function, that is, it may indicate a deficit in social interactions and therefore elicit a restorative attempt to seek or re-establish social contact. Examples of theories stressing the adaptive function of loneliness are the evolutionary theory of loneliness (Cacioppo et al. 2006), the social monitoring system theory (e.g., Gardner et al. 2000; Pickett et al. 2004), and the social reconnection theory (Maner et al. 2007). Consistent with these models, evidence shows that momentary social exclusion leads to a greater interest in making new friends and in working with others, and to more positive impressions and evaluations of others (Maner et al. 2007). Similarly, studies have shown that lonely people, relatively to non-lonely people, experience more positive affect in social inclusion situations and, thus, seem to benefit more from such situations. This effect has been documented in a laboratory virtual ball-tossing game in college students (Wesselmann et al. 2012) as well as in a real-life diary study among adolescents (van Roekel et al. 2013). Together, these findings suggest that loneliness can have an adaptive function, as lonely adolescents are highly motivated to approach social inclusion situations and to focus on restoring social bonds in social exclusion situations.

When temporary loneliness becomes chronic, however, it has a maladaptive impact on social relationships. Chronic loneliness is considered a self-reinforcing and highly detrimental risk factor for maladjustment (e.g., Qualter et al. 2015). Indeed, according to a dominant theoretical model in the loneliness literature, lonely individuals display a hypervigilance for social threat, which causes them to see the social world as a more threatening place (Cacioppo and Hawkley 2009). Being hypervigilant to social threat is hypothesized to amplify lonely individuals' negative reactions to social exclusion, as well as to generate overly cautious and avoidant reactions to social inclusion. Although these cautious and avoidant interaction patterns are aimed at protecting oneself against the possibility of social rejection, paradoxically they undermine the success of social interactions (Gable 2006; Lucas et al. 2010) and presumably lead to more loneliness. Consistent with these

models emphasizing the dark side of loneliness, an fMRI study indicated that lonely college students, compared to their non-lonely peers, are less rewarded by positive social stimuli (Cacioppo et al. 2009). Similarly, college students with a continuous frustration of the need to belong anticipated and experienced less positive affect in new social situations (Moller et al. 2010). In situations of social exclusion, lonely children had more difficulties to disengage visual attention from videotaped social rejection (Qualter et al. 2013b), and lonely college students showed greater initial attention toward videotaped negative social interactions compared to their non-lonely peers (Bangee et al. 2014). Similarly, lonely adolescents experienced more negative affect in real-life negative social interactions (van Roekel et al. 2013). Together, these studies highlight possible maladaptive aspects of loneliness. That is, lonely individuals may experience and approach social inclusion and exclusion in a biased fashion, and more precisely in a way that is likely to perpetuate their loneliness.

In sum, to understand whether loneliness is adaptive vs. maladaptive and to reconcile previous contradicting research findings, it is important to take a temporal dimension into account. On the one hand, theories stressing the adaptive function of loneliness (e.g., the evolutionary theory of loneliness, the social monitoring system theory, and the social reconnection theory) focus on the situational experience of loneliness. Indeed, learning theories in general view temporary loneliness as a possibility to correct misbehavior. On the other hand, theories stressing the maladaptive function of loneliness (e.g., hypervigilance for social threat model) typically focus on more enduring or chronic loneliness experiences. Thus, whereas temporary loneliness may trigger healthy attempts to restore social bonds, chronic loneliness may result in emotional, cognitive, and behavioral processes that interfere with forming social bonds and that, in turn, would contribute to the maintenance of loneliness over time (for similar discussions, see Qualter et al. 2015; Sheldon 2011).

To date, only one study (which relied on the same dataset as the dataset used in this study) directly compared effects of temporary loneliness and chronic loneliness on adolescents' responses to social situations (Vanhalst et al. 2015).¹ This study compared chronically lonely adolescents and adolescents with other loneliness trajectories in terms of their responses (i.e., emotions and attributions) to hypothetical vignettes of social inclusion and exclusion. Chronically lonely adolescents displayed hypersensitivity to social exclusion (i.e., higher levels of negative emotions), hyposensitivity to social inclusion (i.e., lower levels of enthusiasm), as well as a self-defeating attribution style (i.e.,

¹ These findings were obtained in the same dataset as the one employed in the current study.

a stronger tendency to attribute social inclusion to circumstantial factors and social exclusion to stable internal characteristics). It seems likely that these affective and attributional responses to social situations contribute to the perpetuation of loneliness. In the current study, we examine additional psychological processes that may be involved in chronically lonely adolescents' responses to social situations. Specifically, we addressed adolescents' likelihood and quality of motivation to accept invitations for social inclusion as well as the quality of their efforts to regulate emotions in response to social exclusion.

Inclination and Motivation to Approach Social Inclusion

A first goal of the present study was to examine whether chronically lonely adolescents would be more versus less likely to engage in social contact when opportunities for social inclusion occur, compared to adolescents with a different history of loneliness. While models emphasizing the adaptive role of temporary loneliness would predict that lonely people will gratefully take opportunities for social inclusion (e.g., Gardner et al. 2005), models emphasizing the maladaptive role of chronic loneliness would suggest that lonely people may shy away from social situations to protect themselves (e.g., Qualter et al. 2015). In support of the latter, previous work indicated that chronic loneliness was related to social withdrawal in childhood (Jobe-Shields et al. 2011), although some studies have failed to replicate this finding (Qualter et al. 2013a). In the current study, we expected that chronic loneliness would relate to a lowered intention to accept invitations for social inclusion.

Second, the quality of adolescents' motivation to approach social inclusion situations may provide important additional information. In this study, quality of motivation was conceptualized on the basis of self-determination theory (Deci and Ryan 2000, 2014; Vansteenkiste et al. 2010). Self-determination theory posits that, in addition to the needs for autonomy and competence, the need for relatedness is one of the three basic psychological needs that are essential for psychological growth and well-being (Deci and Ryan 2000). According to self-determination theory, individuals' engagement in social activities (e.g., accepting an invitation) stems from an underlying motivation that may vary in its level of volition and self-endorsement (Deci and Ryan 2000, 2014), resulting in types of motivation that can be higher or lower in quality. Specifically, five types of motivation were examined in this study, which are described below ranging from low-quality to high-quality types of motivation.

When people are *amotivated*, they do not see value in a social activity or they feel helpless, resulting in low levels of volition. For example, adolescents may feel like it does

not matter whether they accept an invitation for a social event or not. Amotivation is considered the lowest-quality type of motivation. Further, self-determination theory distinguishes between two types of pressured or controlled motivation, which are also characterized by low levels of self-endorsement. With *external regulation*, people feel external pressure to engage in a particular activity. For instance, adolescents may accept an invitation for social inclusion because they feel others expect them to do so or because they want to avoid criticism. With *introjected regulation*, the second type of controlled motivation, people feel internal pressure. For instance, adolescents may accept an invitation for social inclusion to avoid feelings of guilt or to obtain feelings of self-worth. Self-determination theory further identifies two autonomous or volitional types of motivation that come with feelings of psychological freedom and volition. With *identified regulation*, people value and endorse the importance of a certain activity. For instance, adolescents may accept an invitation for a social event because they understand that attending the event is important and valuable, not only for themselves but also for the people who invited them. With *intrinsic motivation*, the second type of autonomous motivation, people engage in an activity because of the inherent pleasure and satisfaction from the activity itself. For instance, adolescents may accept an invitation for a social event because they think it will be fun and because they anticipate that they will enjoy the social contact. Intrinsic motivation is considered the highest-quality type of motivation.

Research increasingly shows that individuals' quality of motivation for social relationships and activities matters for their social adjustment and well-being (Deci and Ryan 2014). For example, it has been shown that the more adolescents have autonomous rather than controlled motives for friendships, the more they felt socially accepted by their peers (Soenens and Vansteenkiste 2005). Moreover, one's quality of motivation to be engaged in social relationships has been shown to contribute to the satisfaction of these relationships (La Guardia and Patrick 2008). No previous work, however, examined the association between loneliness and motivation for social inclusion, while taking the history of loneliness into account. Important for the current study, self-determination theory posits that a history of thwarted psychological needs can lead to a devaluation of the need and to lower-quality motivation (Deci and Ryan 2000; Ryan et al. 2016). Thus, it can be expected that people with a long history of loneliness (who are likely to have experienced enduring frustration of the need for relatedness) would give up on seeking satisfaction of the need for relatedness. This reaction, which is akin to a reaction of learned helplessness, would manifest in a lower inclination to accept invitations for social inclusion. To the extent that people would still have some inclination to get

involved in social interactions, their motivation to do so would be low in quality. Thus, we hypothesized that chronically lonely adolescents, compared to adolescents with other loneliness trajectories, would have higher levels of amotivation and controlled motivation (i.e., external regulation and introjected regulation), and lower levels of autonomous motivation (i.e., identified regulation and intrinsic motivation) in response to invitations for social inclusion.

Emotion Regulation Strategies in Response to Social Exclusion

In addition to examining responses to social inclusion, this study focuses on responses to social exclusion situations as well, in order to provide a more complete picture of lonely adolescents' responses to everyday social situations. This represents an addition to existing studies, which typically focused on either positive or negative social experiences, because both types of situations are assumed to have a signaling function and may elicit either adaptive or maladaptive responses. Specifically, this study examines whether adolescents' cognitive emotion regulation strategies (i.e., the processes through which people monitor, evaluate, and modify emotional reactions with the aim to decrease negative emotional experiences; Gross 1999) vary as a function of their loneliness trajectory.

The way in which individuals deal with their emotions following negative events (including social exclusion) is a key factor in understanding the effect of such situations on psychological and physical well-being. Adaptive emotion regulation may help individuals to keep control over their emotions and master negative experiences, whereas maladaptive emotion regulation may prolong negative affect and lead to psychopathology (Aldao et al. 2009; Gross 1999). Examples of adaptive cognitive emotion regulation strategies are positive reappraisal (i.e., reinterpreting the situation by focusing on the potential positive aspects) or focusing on planning (i.e., focusing on how you can make the situation better, such as coming up with a plan of what to do best in this situation). Examples of maladaptive cognitive emotion regulation strategies are rumination (i.e., repetitively and passively focusing on the negativity of the situation and on its possible causes and consequences) and catastrophizing (i.e., blowing things out of proportion and focusing on how terribly bad the situation is), which may prolong adolescents' negative emotional state. Building on the framework developed by Garnefski and Kraaij (2007), five adaptive (i.e., acceptance, focusing on other/positive things, focusing on planning, positive reappraisal, and putting into perspective) and four maladaptive (i.e., self-blaming, rumination, catastrophizing, and other-blaming) cognitive emotion regulation strategies are considered in this study.

Theories highlighting the adaptive aspects of temporary loneliness may argue that loneliness could be associated with a higher endorsement of adaptive strategies such as focusing on planning because these strategies may represent attempts to learn from the situation and to avoid future social exclusion and loneliness. In contrast, previous work often indicated that loneliness is associated with maladaptive emotion regulation strategies in adolescence (Heinrich and Gullone 2006). In this study, we hypothesized that chronically lonely individuals would have higher endorsement of maladaptive emotion regulation strategies and lower endorsement of adaptive emotion regulation strategies than adolescents following other loneliness trajectories.

The Present Study

Although abundant research has addressed psychological and health-related outcomes of loneliness, few studies to date examined specific motivational and regulatory processes among chronically lonely adolescents in particular. The current study investigated chronically lonely adolescents' willingness and quality of motivation to approach situations of social inclusion as well as their cognitive emotion regulation strategies in social exclusion.

To identify a subgroup of chronically lonely adolescents, loneliness trajectories over a 4-year time span were charted (see Vanhalst et al. 2015). At the final measurement wave, a hypothetical vignette methodology was employed to manipulate social inclusion and exclusion. We hypothesized that adolescents in a chronic loneliness trajectory—relative to adolescents in other trajectories—would (a) be less inclined to approach opportunities for social inclusion, (b) endorse low-quality motivation for social inclusion (i.e., amotivation and controlled motives rather than autonomous motives), and (c) display more maladaptive and less adaptive cognitive emotion regulation strategies in response to social exclusion.

Although not the central focus of this study, gender differences were examined given that girls and boys have been found to respond differently to the same social situations, with girls typically reacting more strongly to social inclusion as well as exclusion (Blackhart et al. 2009). Examining the role of gender was further deemed important given well-documented gender differences in emotion regulation strategies following interpersonal stress (Rose and Rudolph 2006; Seiffge-Krenke 2011), with girls for instance displaying more rumination than boys, and given that girls have been found to display higher-quality motivation in social relationships (Richard and Schneider 2005; Soenens and Vansteenkiste 2005). Evidence for gender differences in loneliness is mixed (Weeks and Asher 2012).

Finally, the present study takes into account adolescents' depressive symptoms in order to examine the unique association between loneliness trajectories and responses to social inclusion and exclusion. This was deemed necessary because loneliness and depressive symptoms are strongly related in adolescence (Vanhalst et al. 2012). Moreover, previous studies on loneliness trajectories found an association between chronic loneliness and depressive symptoms. This finding was replicated across different countries, different age ranges and using self-reports as well as teacher-reports and parent-reports of depression (e.g., Ladd and Ettekal 2013; Qualter et al. 2013a; Vanhalst et al. 2013), suggesting the robustness of the association between chronic loneliness and depressive symptoms. Furthermore, depressive symptoms are also related to social motivation (Dykman 1998) and maladaptive emotion regulation strategies such as rumination (Gross and Muñoz 1995), which further stresses the importance to control for depressive symptoms in the current study.

Method

Pilot Testing

First, a measurement development study was conducted to develop, test, and refine the vignettes employed in the present study, which resulted in ten vignettes: five hypothetical situations describing social inclusion and five hypothetical situations describing social exclusion (for details of this measurement development study, see Vanhalst et al. 2015). An example of a social inclusion vignette reads "One of your favorite bands is giving a concert in town. A friend calls you to ask whether you would like to go to the concert together with him/her and some other friends." An example of a social exclusion vignette reads "You receive a text message from one of your friends asking why you are not at the party. You don't know which party s/he is talking about and send back a text asking which party s/he means. It turns out that one of your friends is throwing a party and you were not invited."

Second, a pilot study was conducted to examine the reliability and mean scores of the responses to social inclusion and exclusion (i.e., willingness to approach social inclusion, quality of motivation in social inclusion, and emotion regulation in social exclusion), and their association with loneliness. For this purpose, cross-sectional data were collected in a sample of 114 Belgian adolescents (73% female) between 17 and 23 years old ($M = 20.19$, $SD = 2.20$). Note that, because of the cross-sectional nature of the pilot data, no subgroup of chronically lonely adolescents could be distinguished, and no conclusions could be drawn about the effects of the duration of loneliness.

All participants completed an online questionnaire including (1) the eight-item short version of the UCLA loneliness scale ($\alpha = .82$; Roberts et al. 1993; Russell et al. 1980) and (2) the ten vignettes and response formats developed in the measurement development study. Specifically, after each social inclusion vignette, participants were asked to rate the likelihood to accept the invitation ("Would you go?") on a 7-point Likert scale ranging from 1 (*certainly not*) to 7 (*certainly*). Subsequently, after being instructed to imagine they would actually accept the invitation, participants were asked to rate (on the same 7-point Likert scale) five possible motives why they would accept the invitation, derived from self-determination theory (Deci and Ryan 2000): intrinsic motivation ("Because I would think I would enjoy myself"), identified regulation ("Because it would be important for me to be there"), introjected regulation ("Because I would feel guilty not to go"), external regulation ("Because I would be expected to be there"), and amotivation ("Because I would not know how to turn down the invitation"). For each item, a mean score across the five inclusion vignettes was calculated.

After each social exclusion vignette, participants were asked to rate what they would think or do in the situation, thereby assessing nine cognitive emotion regulation strategies based on the Cognitive Emotion Regulation Questionnaire (CERQ; Garnefski and Kraaij 2007). The five adaptive cognitive emotion regulation strategies were acceptance ("I would think that I have to accept what happened to me"), focusing on other/positive things ("I would think about nicer things"), focusing on planning ("I would come up with a plan of what I can do best given this situation"), positive reappraisal ("I would think this situation could make me stronger as a person"), and putting into perspective ("I would think that there are worse things in life"), whereas the four maladaptive cognitive emotion regulation strategies were rumination ("I would not be able to stop thinking about it")², catastrophizing ("I would think about how terribly bad it all is"), self-blaming ("I would think it is all my fault"), and other-blaming ("I would think that others have caused this situation"). For each of those nine items, a mean score across the five exclusion vignettes was calculated.

Means, standard deviations, Cronbach's alphas, and correlations with loneliness are displayed in Table 1. In line with our expectations, loneliness was negatively related to the likelihood to accept invitations for social inclusion.

² Note that the rumination item was not adopted from the CERQ, because an examination of that subscale indicated that this subscale measured adaptive self-reflection rather than maladaptive rumination. Therefore, we replaced the rumination item by an item from the Leuven Adaptation of the Rumination on Sadness Scale (LARSS; Raes et al. 2008). Detailed information is available upon request from the first author.

Table 1 Cronbach’s alphas, means, standard deviations, and correlations with loneliness (pilot study)

Responses	α	M (SD)	r loneliness
Social inclusion			
Would you go?	.66	6.24 (0.57)	-.36***
Intrinsic motivation	.77	6.33 (0.60)	-.55***
Identified regulation	.86	5.12 (1.16)	-.09
Introjected regulation	.87	3.32 (1.33)	.18
External regulation	.88	3.16 (1.25)	.21*
Amotivation	.91	2.19 (1.11)	.20*
Social exclusion			
Acceptance	.92	3.99 (1.31)	-.04
Focus on positive things	.92	4.26 (1.30)	-.44***
Focus on planning	.91	3.46 (1.30)	-.13
Positive reappraisal	.94	3.44 (1.35)	-.17
Putting into perspective	.92	4.68 (1.31)	-.32***
Rumination	.90	3.41 (1.35)	.30***
Catastrophizing	.90	2.72 (1.19)	.40***
Self-blaming	.91	3.60 (1.38)	.41***
Other-blaming	.88	3.25 (1.12)	-.03

M mean, SD standard deviation

* $p < .05$; ** $p < .01$; *** $p < .001$

Further, adolescents with higher loneliness levels reported significantly less intrinsic motivation, whereas they reported significantly more external regulation and amotivation. Moreover, adolescents with higher loneliness levels were more likely to use self-blaming, rumination, and catastrophizing to cope with social exclusion, whereas they were less able to focus on positive things or to put things into perspective. To conclude, the responses to the social inclusion and exclusion vignettes showed adequate reliability and revealed interesting correlations with loneliness. Thus, we made no further adaptations to the vignettes and response format for the main study.

Participants and Procedure

All students in Grades 9 through 12 from three schools in the Dutch-speaking part of Belgium were invited to participate in a four-wave study with annual measurement waves (see also Vanhalst et al. 2015). Parents were informed about the study via a letter before the start of the study, and could indicate if they did not wish their child to participate in the study. This resulted in an exclusion of less than 1% of the potential sample. On the day of data collection, all adolescents received a letter describing the study, and were asked to indicate whether or not they wanted to participate. This resulted in an additional exclusion of 4% of the potential sample at each measurement wave. At T1, all participants completed measures in their classroom. At T2-T4, the same

procedure was repeated, but adolescents who had graduated or had left the school were sent a questionnaire packet at home, together with a pre-stamped and addressed return envelope. Adolescents who had left the school received a cinema ticket upon completion of the questionnaire (78% of the questionnaires returned at T1, 69% at T2, and 66% at T3). The study consent process and procedures were approved by the university’s Institutional Review Board.

Students were retained in the sample if they had participated in the final measurement wave, as the hypothetical situations vignettes were administered only at T4. A total of 730 adolescents participated at T4, of whom 395 (54%) participated in all four measurement waves, 201 (28%) participated in three of the four waves, and 134 (18%) participated in two of the four waves. Participants with and without complete data were compared using Little’s (1988) Missing Completely At Random (MCAR) test. This comparison yielded a non-significant chi-square value (χ^2 (7707) = 147.18, *ns*), and the full-information maximum likelihood (FIML) procedure was used to account for missing data. Mean age of the participants at T1 was 15.43 years ($SD = 1.26$) and 72% were female.³

Measures

Loneliness

The subscale peer-related loneliness of the Loneliness and Aloneness Scale for Children and Adolescents (LACA; Marcoen et al. 1987).⁴ was administered at the four measurement waves. This instrument was developed for use with Dutch-speaking participants and has high internal consistency and construct validity (Goossens et al. 2009). The peer-related loneliness subscale contains 12 items answered on a 4-point Likert-type scale, ranging from 1 (*never*) to 4 (*often*). A sample item reads “I feel isolated from other people”. Cronbach’s alphas ranged from .89 to .92.

As reported elsewhere (Vanhalst et al. 2015), loneliness trajectories were identified using semi-parametric group-

³ The unbalanced gender ratio is mainly due to a predominantly female student body in one of the participating schools. The program of that school focuses on arts (with courses such as fine arts, visual arts, interior design, and architecture) and attracts mainly female students.

⁴ Note that a different loneliness measure was used than the measure that was used in the pilot study (i.e., the UCLA loneliness scale). Although both measures stem from different research traditions, in which the UCLA Loneliness scale is a unidimensional loneliness measure whereas the LACA is a multidimensional loneliness measure, previous work repeatedly showed that the UCLA loneliness measure and the peer-related subscale of the LACA are strongly correlated ($r = .76$ in Goossens et al. 2009; $r = .83$ in Maes et al. 2017) and that both scales load on the same factor in factor analyses (Goossens et al. 2009; Maes et al. 2017).

based modeling (Nagin 1999, 2005), using the four annual loneliness assessments. Specifically, models with 2 to 6 classes were compared using the Bayesian information criterion, Entropy, and bootstrap likelihood ratio test (Nylund et al. 2007). In line with previous studies (Ladd and Ettekal 2013; Schinka et al. 2013; Vanhalst et al. 2013), the five-class solution had the best fit to the data (see Vanhalst et al. 2015, Table 2). As shown in Fig. 1, a small subgroup of adolescents with stable high loneliness scores was identified (i.e., chronically high trajectory; $N = 22$; 3% of the sample). Further, the majority of adolescents consistently reported very low (i.e., low stable trajectory; $N = 360$; 47%) or moderate low (i.e., moderate stable trajectory; $N = 196$; 27%) loneliness levels. In addition, we identified a subgroup of adolescents who reported high initial loneliness scores but who decreased in loneliness over time (i.e., high decreasing trajectory, $N = 56$; 9%), and a subgroup of adolescents with moderate loneliness scores and an increasing trend over time (i.e., moderate increasing trajectory, $N = 96$; 14%). A cross-tabulation indicated that boys and girls were equally distributed across the loneliness trajectories ($\chi^2(4) = 1.68$; *ns*).

Depressive symptoms

Depressive symptoms were measured at T4 using the Dutch translation (Hooge et al. 2000) of the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff 1977).

To avoid item overlap with the loneliness measure, the item “During the last week, I felt lonely” was dropped and we proceeded with a 19-item version. Each item asks participants to indicate how often they had experienced symptoms of depression during the week prior to assessment, by using a 4-point Likert-type scale ranging from 0 (*seldom*) to 3 (*most of the time or always*). A sample item reads “During the last week, I felt depressed”. Cronbach’s alpha was .92 at T4.

Motivation and emotion regulation

The ten vignettes and responses described in the pilot study were used. Specifically, participants rated (1) the likelihood to accept invitations for social inclusion, (2) five different motives to approach situations of social inclusion, and (3) nine cognitive emotion regulation strategies in response to social exclusion on a 7-point Likert scale. Cronbach’s alpha was good for all scales (see Table 2).

Plan of Analyses

First, gender differences and correlations are presented as preliminary analyses. Next, the main research questions are examined, that is, (1) whether adolescents’ willingness and quality of motivation to approach situations of social inclusion vary as a function of the five loneliness trajectories, and (2) whether adolescents’ emotion regulation strategies in social exclusion vary as a function of the five

Table 2 Cronbach’s alphas, correlations with loneliness, and gender differences in means and standard deviations

Responses	α	r loneliness	Overall M (SD)	Males M (SD)	Females M (SD)	F	η_p^2
Social inclusion							
Would you go?	.74	-.28***	6.40 (0.68)	6.27 (0.74)	6.45 (0.64)	10.08**	.01
Intrinsic motivation	.83	-.30***	6.42 (0.72)	6.26 (0.81)	6.49 (0.67)	14.99***	.02
Identified regulation	.84	-.07	5.73 (1.15)	5.56 (1.25)	5.79 (1.11)	5.81*	.01
Introjected regulation	.86	.26***	2.71 (1.45)	2.74 (1.42)	2.70 (1.46)	0.15	.00
External regulation	.89	.28***	2.58 (1.41)	2.74 (1.46)	2.52 (1.39)	3.55	.00
Amotivation	.89	.38***	1.71 (1.02)	1.76 (1.06)	1.69 (1.01)	0.61	.00
Social exclusion							
Acceptance	.89	.03	3.97 (1.50)	4.05 (1.47)	3.94 (1.51)	0.72	.00
Focus on positive things	.93	-.24***	3.90 (1.60)	4.05 (1.54)	3.83 (1.63)	2.67	.00
Focus on planning	.93	.05	3.29 (1.63)	3.23 (1.59)	3.31 (1.64)	0.28	.00
Positive reappraisal	.94	-.06	2.99 (1.62)	3.05 (1.58)	2.97 (1.64)	0.42	.00
Putting into perspective	.92	-.20***	4.66 (1.61)	4.57 (1.59)	4.69 (1.62)	0.75	.00
Rumination	.93	.34***	3.22 (1.72)	2.68 (1.54)	3.43 (1.74)	28.79***	.04
Catastrophizing	.92	.37***	2.34 (1.38)	2.09 (1.21)	2.43 (1.43)	8.82**	.01
Self-blaming	.93	.39***	2.85 (1.61)	2.55 (1.52)	2.96 (1.62)	9.67**	.01
Other-blaming	.89	.09*	3.02 (1.32)	3.07 (1.33)	3.00 (1.32)	0.46	.00

M mean, SD standard deviation

* $p < .05$; ** $p < .01$; *** $p < .001$

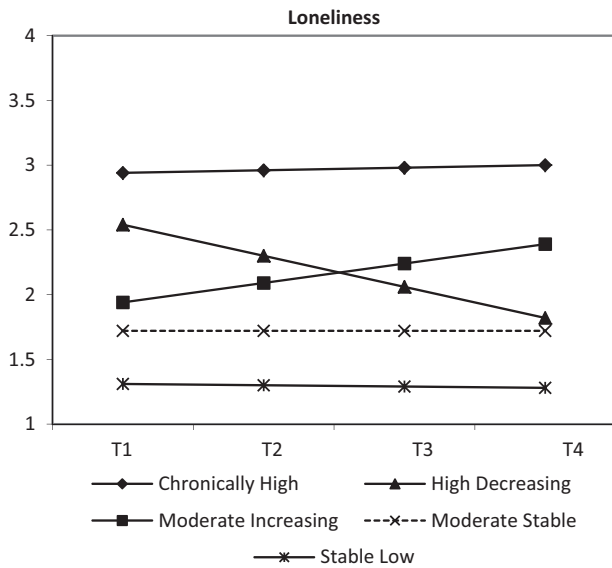


Fig. 1 Estimated mean trends for the five loneliness trajectory classes (adapted from Vanhalst et al. 2015¹)

loneliness trajectories. To this aim, a series of (M)ANOVAs was performed, including follow-up Tukey’s HSD post-doc comparisons. The results without controls for gender and depressive symptoms are presented first. Next, all analyses are repeated by adding gender as an additional fixed factor in all (M)ANOVAs, particularly paying attention to trajectory-by-gender interactions. Finally, as an alternate model analysis, analyses are repeated by adding depressive symptoms as a covariate in all (M)ANCOVAs. Effect sizes are represented using partial eta-squared (partial η_p^2) values. Values of .01 are considered small effects, values of .06 are considered medium effects, and values of .14 are considered large effects (Cohen 1988).

Results

Preliminary Analyses

Gender differences in loneliness across the four time points were examined using a Repeated Measures ANOVA. The effect of gender was significant ($F(1, 380) = 4.20, p < .05; \eta_p^2 = .01$), indicating that girls were slightly more lonely across the four time points than boys. In addition, an ANOVA indicated gender differences in the likelihood to approach social inclusion, with girls being slightly more inclined to accept invitations for social inclusion than boys (see Table 2). Further, a MANOVA with gender as fixed factor and with the different motives as dependent variables yielded a significant result ($\text{Wilks}' \lambda = .97; F(5, 701) = 3.77, p < .01; \eta_p^2 = .03$). Follow-up ANOVAs indicated that girls were slightly more likely to approach social inclusion

for autonomous reasons (i.e., intrinsic motivation and identified regulation) than boys. Moreover, a MANOVA indicated gender differences in emotion regulation following social exclusion ($\text{Wilks}' \lambda = .94; F(9, 694) = 5.05, p < .001; \eta_p^2 = .06$), and follow-up ANOVAs indicated that girls were more likely to use self-blame, rumination, and catastrophizing. Correlations between loneliness at T4 and all responses were calculated (see Table 2), and were generally in line with correlations obtained in the pilot study.

Effects of Loneliness Trajectory Membership on Inclination and Motivation to Approach Social Inclusion

First, an ANOVA with loneliness trajectories as fixed factor and willingness to accept invitations for social inclusion as dependent variable indicated differences between the five loneliness trajectories on the likelihood to accept invitations for social inclusion. As detailed in Table 3, adolescents in the chronically high trajectory were less willing to accept invitations for social inclusion as compared to adolescents from all other trajectories, except adolescents in the moderate increasing trajectory. Second, a MANOVA with loneliness trajectories as fixed factor and the five motives to accept invitations for social inclusion as dependent variables yielded a significant overall medium effect of trajectory ($\text{Wilks}' \lambda = .82; F(20, 2854) = 7.87, p < .001; \eta_p^2 = .05$). Follow-up ANOVAs with Tukey’s HSD comparisons indicated that the five loneliness trajectories significantly differed from one another on all motivations except for identified regulation. Specifically, chronically lonely adolescents had the lowest levels of intrinsic motivation and the highest levels of controlled motivation (i.e., both introjected and external regulation). Further, chronically lonely adolescents had significantly higher levels of amotivation than adolescents in any other trajectory.

Next, all results were repeated while adding gender as an additional fixed factor in all (M)ANOVAs. Trajectory-by-gender interactions were not significant in the 5 (trajectory) by 2 (gender) ANOVA examining the effects on likelihood to accept invitations for social inclusion ($F(4, 696) = 2.08, p = .08; \eta_p^2 = .01$), nor in the 5 (trajectory) by 2 (gender) MANOVA examining the effects on motivations for approaching social inclusion ($\text{Wilks}' \lambda = .97; F(20, 2299) = 1.22, p = .23; \eta_p^2 = .01$). This indicates that the effects of loneliness trajectories on willingness and motivation to attend social inclusion situations were similar for both boys and girls.

Effects of Loneliness Trajectory Membership on Emotion Regulation in Response to Social Exclusion

A MANOVA with loneliness trajectory as fixed factor and with the different cognitive emotion regulation strategies as

Table 3 Post-hoc comparisons for the five loneliness trajectory classes

	Without control for depressive symptoms					<i>F</i>	η_p^2	With control for depressive symptoms	
	Chronically high <i>M</i> (<i>SD</i>)	High decreasing <i>M</i> (<i>SD</i>)	Moderate increasing <i>M</i> (<i>SD</i>)	Moderate stable <i>M</i> (<i>SD</i>)	Low stable <i>M</i> (<i>SD</i>)			<i>F</i>	η_p^2
Social inclusion									
Would you go?	5.94 _a (1.07)	6.32 _{bc} (.67)	6.21 _{ab} (.71)	6.30 _{bc} (.71)	6.56 _c (.58)	10.96***	.06	6.44***	.04
Intrinsic motivation	5.87 _a (1.05)	6.41 _{bc} (.64)	6.15 _{ab} (.87)	6.34 _{bc} (.77)	6.57 _c (.61)	11.09***	.06	6.53***	.04
Identified regulation	5.66 (1.00)	5.65 (1.23)	5.66 (.99)	5.68 (1.09)	5.76 (1.25)	.25	.00	.20	.00
Introjected regulation	3.50 _b (1.34)	2.86 _{ab} (1.46)	3.48 _b (1.55)	2.80 _{ab} (1.38)	2.39 _a (1.36)	13.74***	.07	7.46***	.04
External regulation	3.78 _c (1.48)	2.45 _a (1.37)	3.34 _{bc} (1.41)	2.75 _{ab} (1.37)	2.24 _a (1.34)	17.69***	.09	10.69***	.06
Amotivation	3.11 _c (1.95)	1.80 _{ab} (1.10)	2.19 _b (1.15)	1.85 _{ab} (1.03)	1.40 _a (.71)	28.10***	.14	18.34***	.09
Social exclusion									
Acceptance	4.43 (1.34)	3.87 (1.38)	3.94 (1.34)	3.95 (1.47)	3.98 (1.57)	.57	.00	.56	.00
Focus on positive things	2.57 _a (1.45)	3.74 _b (1.61)	3.55 _b (1.37)	3.75 _b (1.54)	4.18 _b (1.63)	8.31***	.04	6.15***	.03
Focus on planning	3.19 (1.67)	3.33 (1.52)	3.45 (1.49)	3.33 (1.55)	3.19 (1.71)	.62	.00	.25	.00
Positive reappraisal	2.47 (1.70)	3.23 (1.56)	2.92 (1.47)	2.88 (1.47)	3.04 (1.72)	1.21	.01	1.32	.01
Putting into perspective	3.18 _a (1.53)	4.53 _b (1.56)	4.54 _b (1.44)	4.49 _b (1.53)	4.90 _b (1.65)	7.34***	.04	6.89***	.04
Rumination	5.32 _c (1.49)	3.44 _{ab} (1.77)	3.88 _b (1.59)	3.44 _{ab} (1.60)	2.76 _a (1.63)	20.97***	.11	14.29***	.07
Catastrophizing	4.44 _c (1.64)	2.44 _{ab} (1.24)	2.98 _b (1.50)	2.48 _{ab} (1.33)	1.96 _a (1.19)	28.24***	.14	20.34***	.10
Self-blaming	4.87 _c (1.67)	3.32 _b (1.70)	3.55 _b (1.62)	3.01 _{ab} (1.50)	2.35 _a (1.42)	26.40***	.13	17.23***	.09
Other-blaming	2.98 (1.39)	2.97 (1.31)	3.31 (1.27)	3.14 (1.25)	2.88 (1.37)	2.62	.01	2.70	.02

Means are significantly different from one another if they have different subscripts. A mean without a subscript is not significantly different from any other means

M mean, *SD* standard deviation

p* < .05; *p* < .01; ****p* < .001

dependent variables indicated significant differences between the five loneliness trajectories (Wilks' $\lambda = .79$; $F(36, 2655) = 4.91, p < .001; \eta_p^2 = .06$). Regarding the adaptive strategies, follow-up univariate analyses with Tukey's HSD post-hoc comparisons indicated that only focusing on positive things and putting things into perspective significantly differed between the trajectories. Specifically, chronically lonely adolescents were less likely than adolescents in any other trajectory to be able to focus on positive things or to put things into perspective, whereas adolescents in the other four trajectories did not differ from one another on both adaptive strategies. Regarding the maladaptive cognitive emotion regulation strategies, follow-up univariate analyses with Tukey's HSD post-hoc comparisons indicated that all maladaptive strategies, except other-blame, significantly differed between the five trajectories. Chronically lonely adolescents reported significantly higher levels of catastrophizing, self-blame, and rumination, compared to adolescents in any other trajectory.

Next, these results were repeated while adding gender as an additional fixed factor. Trajectory-by-gender interactions were not significant in the 5 (trajectory) by 2 (gender) MANOVA (Wilks' $\lambda = .95$; $F(36, 2572) = 1.10, p = .32; \eta_p^2 = .01$), suggesting that the effects of loneliness trajectories on emotion regulation strategies in social exclusion situations were similar for boys and girls.

Alternate Model Analysis

Given the potential confounding role of depressive symptoms, all results were repeated while adding depressive symptoms at T4 as a covariate. First, differences between the loneliness trajectories remained significant in the ANCOVA testing the effects of loneliness trajectory on the likelihood to accept invitations for social inclusion, as well as in the MANCOVA testing the effects of loneliness trajectory on motivations to approach social inclusion (Wilks' $\lambda = .87$; $F(20, 2356) = 4.98, p < .001; \eta_p^2 = .03$).

Follow-up ANCOVAs indicated that all results remained virtually identical, although effect sizes slightly decreased after taking depressive symptoms into account (see last two columns in Table 3). Second, the MANCOVA testing the effects of loneliness trajectory on emotion regulation strategies in social exclusion similarly indicated that the differences between the loneliness trajectories remained significant after controlling for depressive symptoms (Wilks' $\lambda = .83$; $F(36, 2644) = 3.87$, $p < .001$; $\eta_p^2 = .05$). Follow-up ANCOVAs indicated, again, that all results remained significant despite slight decreases in the effect sizes (see Table 3).

Discussion

Research increasingly shows that chronically lonely adolescents are hypersensitive to social exclusion and desensitized to social inclusion (Qualter et al. 2015), with attributions explaining at least partly this differential sensitivity to social events (Vanhalst et al. 2015). The main goal of this study was to contribute to this literature by investigating chronically lonely adolescents' motivational and regulatory reactions to social situations. The results of this study yield additional information about potential mechanisms involved in the maintenance of loneliness across time, although the design of the study did not allow us to infer directionality of effects. Specifically, we compared adolescents from five different loneliness trajectories (i.e., chronically high loneliness, high decreasing loneliness, moderate increasing loneliness, moderate stable loneliness, and low stable loneliness) in terms of responses to hypothetical vignettes of social inclusion and exclusion. Adolescents' willingness and quality of motivation to approach social inclusion situations were examined, together with their cognitive emotion regulation strategies to deal with social exclusion. In discussing the results of this study, we focused on the differences between chronically lonely adolescents and adolescents from the four other trajectories. Differences between the other four trajectories were also found, but not with the same consistency and intensity as the differences between the chronically lonely group and the four other groups.

Lower Inclination and Lower-Quality Motivation to Approach Social Inclusion

A first question that was addressed in this study was whether (chronic) loneliness is related to increased or decreased inclination to attend social situations. Loneliness was negatively correlated with adolescents' willingness to approach invitations for social inclusion, contradicting the common assumption that lonely adolescents would

gratefully take opportunities for social contact when such opportunities occur (e.g., Gardner et al. 2005). Moreover, we found that chronically lonely adolescents were significantly less inclined to accept invitations for social inclusion than adolescents from all other loneliness trajectories, except adolescents with a moderate increasing loneliness trend. Chronically lonely adolescents' decreased eagerness to accept invitations is in line with lonely people's tendency to withdraw from social situations in order to reflect on the causes of social threat (Qualter et al. 2015) and to avoid further social rejection (Lucas et al. 2010). Nevertheless, although results of this study are in line with these theoretical models, we want to be careful in drawing strong conclusions. Specifically, a closer inspection of the mean scores in response to the question "Would you go?" indicated that all means were situated on the high end of the 7-point scale, even for chronically lonely adolescents (i.e., mean scores varying between 5.94 for chronically lonely adolescents and 6.56 for adolescents in the low stable group). Despite the obtained significant results, we cannot conclude that chronically lonely adolescents would decline invitations for social inclusion. Rather, these results indicate that chronically lonely adolescents are relatively less inclined to accept such invitations, which is a small but important nuance.

In addition to examining the degree to which lonely adolescents are inclined to attend social events (i.e., the quantity of their motivation), this study examined the quality of adolescents' motivations to attend such events, using self-determination theory as a guiding framework. Cross-sectional analyses indicated that loneliness was associated negatively with intrinsic motivation (i.e., attending the event because of the inherent pleasure), and positively associated with introjected and external regulation (i.e., feelings of internal and external pressure), and with amotivation (i.e., not seeing any merit in the social activity). These results are in line with previous cross-sectional research indicating that adolescents with higher levels of loneliness had lower levels self-determined friendship motivations (Richard and Schneider 2005). Longitudinal analyses further indicated that chronically lonely adolescents had the lowest scores on intrinsic motivation, and the highest scores on introjected regulation, external regulation, and amotivation—with the latter being significantly higher than any other trajectory. Unexpectedly, no differences were found between the loneliness trajectories in terms of identified motivation. Apparently, chronically lonely adolescents may see the value and personal importance of social contact, yet do not anticipate that social contact will be enjoyable. Note that, although girls were more likely to approach social inclusion with autonomous motives (in line with previous research; Richard and Schneider 2005; Soenens and Vansteenkiste 2005), the

effects of the duration of loneliness on motivations to approach social inclusion were found for both boys and girls.

The overall pattern of findings clearly shows that chronic loneliness is related to decreased eagerness and to low-quality motivation for social contact. Thus, to the extent that chronically lonely adolescents are attempting to engage in social contact, their motivation to do so appeared to be of lower quality. Therefore, their attempts to obtain rewarding social experiences are unlikely to actually succeed (Deci and Ryan 2000, 2014; La Guardia and Patrick 2008), and their loneliness is unlikely to be reduced. Together, adolescents lowered inclination and lower-quality motivation for social contact could both function as potential maintaining mechanisms of chronic loneliness, and we suggest future longitudinal research to further examine the direction of effects.

Research building on different theoretical frameworks has indeed suggested that various motives and goals underlying social behavior are relevant to the quality of social functioning (e.g., Gable 2006; La Guardia and Patrick 2008; Lavigne et al. 2011; Parkhurst and Asher 1985). For example, the distinction between a promotion-focused vs. prevention-focused interaction style could be particularly interesting to interpret the findings from the present study (Lucas et al. 2010). A promotion-focused interaction style involves eagerness to engage in social contact and social behavior aimed at striving for positive outcomes and avoiding missed opportunities. A prevention-focused interaction style, by contrast, involves cautious social behavior aimed at avoiding negative outcomes, even at the risk of missing social opportunities. The results of this study are in line with the notion that chronically lonely individuals adopt a prevention-focused interaction style (Lucas et al. 2010), given their decreased willingness and low-quality motivation to attend social situations. Not surprisingly, research indicated that such a prevention-focused mind-set results in poor social outcomes (Gable 2006; Stangier et al. 2006). Thus, the self-defeating prevention-focused mind-set that characterizes chronically lonely people is likely to lead to negative social outcomes and to even more loneliness.

Maladaptive Cognitive Emotion Regulation Strategies

Previous work indicated negative correlations between loneliness and adaptive emotion regulation strategies, and positive correlations between loneliness and maladaptive emotion regulation strategies (Heinrich and Gullone 2006), which was confirmed in the present study. This study was the first, however, to examine the role of adolescents' history of loneliness in this regard. Regarding adaptive emotion regulation strategies, the results indicated that

chronically lonely adolescents were significantly less able to put things into perspective and to focus on positive aspects than adolescents from any other trajectory. With respect to maladaptive emotion regulation strategies, chronically lonely adolescents were more likely than adolescents from any other trajectory to catastrophize and ruminate about the event and to blame themselves for what happened. Note that these findings apply to both boys and girls, despite the fact that girls were generally more likely to use maladaptive coping strategies (i.e., self-blame, rumination, and catastrophizing). These gender differences are in line with previous research on coping and emotion regulation (Rose and Rudolph 2006; Seiffge-Krenke 2011).

Together, the results suggest that chronically lonely adolescents' cognitive emotion regulation strategies could function as maintaining factors of chronic loneliness. Future longitudinal work is advised to further examine this hypothesis. Previous work already indicated that chronically lonely adolescents experience increased negative emotions (e.g., sadness, disappointment, insecurity, anger, and jealousy) in response to social exclusion (Vanhalst et al. 2015¹). The results of this study add to this finding by showing that chronically lonely adolescents are also less likely to adequately regulate these negative emotions when confronted with social exclusion. Being unable to adequately regulate emotions when confronted with social exclusion, in turn, can lead to enduring stress and psychopathology (Aldao et al. 2009; Gross 1999), suggesting the possibility of a negative vicious cycle.

Clinical Implications

The findings from this study highlight the potential importance of altering chronically lonely adolescents' social motivation and emotion-regulation strategies in clinical interventions, particularly because lower quality motivation and maladaptive emotion regulation strategies have also been associated with psychopathology (e.g., Aldao et al. 2009; Ryan et al. 2016). First, to alter emotion regulation strategies, many effective prevention and intervention programs exist that aim at reducing internalizing problems (e.g., Topper et al. 2016). Second, to alter social motivation, Lucas et al. (2010) demonstrated in a series of experiments that the prevention-focused mindset that characterizes lonely individuals and that leads them to display a cautious and vigilant interaction style (e.g., a lower inclination and motivation to accept invitations for social inclusion) can be reduced by subtle primes of a promotion-focused mindset. Indeed, the difference between lonely and non-lonely individuals on the tendency for social avoidance disappeared when a promotion-focused mind-set was primed. Moreover, altering social motivation could be incorporated in existing loneliness interventions focusing on modifying

social cognitions (e.g., via cognitive behavioral therapy). Specifically, a meta-analysis indicated that such interventions were more effective in reducing loneliness than interventions focusing on improving social skills, enhancing social support, or increasing opportunities for social contact (Masi et al. 2011).

Limitations and Directions for Future Research

The theoretical model guiding this study suggested that the duration and the chronic nature of adolescents' personal history of loneliness is a key factor in distinguishing adaptive from maladaptive outcomes related to experiencing loneliness. Although this study provided evidence for maladaptive reactions to social inclusion and exclusion in chronically lonely adolescents, the design of the study did not allow us to examine potential adaptive reactions to social inclusion and exclusion in adolescents who are lonely only very temporarily. To address this issue, future research could make use of shorter intervals between measurement waves or even a diary design, in order to better identify temporarily lonely individuals. Moreover, such an approach could allow researchers to compare adolescents with similar current state levels of loneliness but with a different loneliness history, which could not be done in the current study given that the different loneliness trajectories also had different loneliness levels at T4. In addition, we suggest future work to examine alternative factors that distinguish adaptive from maladaptive outcomes related to experiencing loneliness, in addition to the duration of loneliness. Specifically, theories stressing the adaptive function of loneliness not only tend to focus on temporary loneliness, but also on within-person changes in loneliness. That is, when a person feels more lonely than usual, this experience can signal a deficit in social interactions and can elicit a restorative attempt to seek social contact. By contrast, theories stressing the maladaptive function of loneliness not only tend to focus on enduring or chronic loneliness, but also on between-person changes in loneliness. Specifically, individuals who display more loneliness relative to others are at greater risk for maladjustment. We suggest future research to further examine this alternative explanation of previous contradicting theoretical and empirical work.

Second, despite the longitudinal design of the study, we cannot draw conclusions about the directionality of effects, given that responses to social inclusion and exclusion were only measured at the final measurement wave. Indeed, it can be expected that loneliness and adolescents' motivational and regulatory processes are reciprocally related. That is, the duration of loneliness may affect cognitive and behavioral responses to social inclusion and exclusion, but the opposite direction might also apply, with certain responses to social situations (e.g., adaptive emotion regulation

strategies to deal with exclusion and autonomous motives to approach inclusion) possibly reducing loneliness and with other responses (e.g., maladaptive emotion regulation strategies to deal with exclusion and controlled motives to approach inclusion) possibly increasing or prolonging feelings of loneliness. In other words, we expect a self-reinforcing loneliness loop (Cacioppo and Hawkley 2009) to occur in chronically lonely adolescents, such that feelings of loneliness on the one hand and cognitive and behavioral responses to social situations on the other hand exacerbate one another. Future research should further examine this hypothesis.

Third, the vignette methodology employed in this study has a number of advantages (e.g., a standardized and harmless experimental manipulation of social exclusion and inclusion), but also has its disadvantages (e.g., potentially lower ecological validity). Future research, therefore, is advised to replicate our study using actual rather than hypothetical social experiences. Studying responses to actual social inclusion and exclusion situations has the advantage of studying actual behavior rather than behavioral intentions.

Fourth, in line with previous studies (e.g., Ladd and Ettekal 2013; Schinka et al. 2013; Vanhalst et al. 2013), only a small subgroup of adolescents was found to be chronically lonely. Therefore, in order to increase power to detect desired effect sizes and to strengthen our conclusions, future research could deal with this issue by replicating this study either in a larger community sample or in a clinical sample, where (chronic) feelings of loneliness are more common. For example, patients diagnosed with depression (e.g., Hagerty and Williams 1999), social anxiety (e.g., Flensburg-Madsen et al. 2012) or autism spectrum disorders (Lasgaard et al. 2010) are known to be particularly vulnerable for experiencing loneliness.

Conclusion

The present study contributes to our understanding of chronic loneliness in adolescence, by providing insights into motivational and emotion-regulatory dynamics. Rather than eagerly accepting opportunities for social inclusion, chronically lonely adolescents were more hesitant to accept invitations for social inclusion and they approached such situations with maladaptive motivation. Moreover, rather than dealing adequately with social exclusion, chronically lonely adolescents used more maladaptive and less adaptive cognitive emotion regulation strategies. Together, these findings tentatively suggest that chronically lonely adolescents' behavioral intentions, motives, and emotion regulation strategies minimize their opportunities to benefit from social inclusion and maximize the adverse

consequences of social exclusion—which likely contributes to the maintenance of loneliness across time.

Author Contributions J.V. conceived and designed the study, collected the data, performed statistical analysis, interpreted the data, and took the lead in writing up the manuscript. K.L. participated in the conception and design of the study, participated in data analyses and interpretation, and critically revised the manuscript. S.V. participated in the conception and design of the study, participated in interpretation of data, and critically revised the manuscript. B.S. participated in the conception and design of the study, participated in the interpretation of data and in writing as well as critically revising the manuscript. All authors read and approved the final manuscript.

Compliance with Ethical Standards

Conflicts of Interest The authors declare that they have no competing interests.

Ethical Standards All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

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