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Attachment and non-suicidal self-injury among young adolescents:

The indirect role of behavioral problems

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Objective: Non-suicidal self-injury (NSSI) often occurs before age 15, yet the majority of research on risk factors for this dangerous behavior has focused on older samples.

Insecure attachment has been previously identified as a risk factor for both NSSI and behavioral problems, and behavioral problems appear to be particularly associated with NSSI among young populations. Redressing the lack of young adolescent NSSI research, the present study uses longitudinal data from a sample of young adolescents to test a model in which insecure attachment acts as a prospective risk factor for NSSI via emotional and behavioral problems.

Methods: Data on NSSI, child-mother attachment, and emotional and behavioral problems were collected from 559 (41.1% male) Flemish adolescents when they were 13 years old ($M = 12.71$, $SD = 0.32$), and again one year later. Insecure attachment was measured using maternal items on the Experiences in Close Relationships – Revised Child scale. Psychological adjustment was assessed with the Strengths and Difficulties Questionnaire.

Results: We found that anxious and avoidant attachment were indirectly associated with NSSI through behavioral problems but not through emotional problems.

Conclusions: Findings highlight the role of behavioral problems as a risk factor for NSSI in early adolescence, a rarely studied developmental period during which NSSI often first starts. Findings suggest that one possible pathway for the attachment-NSSI association

among young adolescents is through behavioral problems. Therapies that improve child-parent attachment may reduce NSSI among young adolescents both directly, and indirectly by improving behavioral problems.

Non-suicidal self-injury (NSSI), defined as “*the direct, deliberate destruction of one’s own body tissue in the absence of suicidal intent*” (Nock & Favazza, 2009, p. 9), is not only inherently dangerous but is also prospectively associated with a number of other negative outcomes, including higher risk of mental illness and suicide (Franklin et al., 2017; Wilkinson, Kelvin, Roberts, Dubicka, & Goodyer, 2011). Rates of NSSI peak during mid-adolescence at around 18% for lifetime prevalence in community samples (Muehlenkamp, Claes, Havertape, & Plener, 2012; Swannell, Martin, Page, Hasking, & St John, 2014), however, a significant proportion of young people report an onset before age 15 (Gandhi et al., 2016; Plener, Schumacher, Munz, & Groschwitz, 2015). Given that an earlier onset is related to more severe NSSI (Ammerman, Jacobucci, Kleiman, Uyeji, & McCloskey, 2017), identifying risk factors of NSSI during early adolescence will provide valuable insight into the etiology of NSSI in general. Yet there have been few longitudinal studies capable of identifying prospective risk factors for early onset NSSI (e.g., female gender, emotional and behavioral problems; see Hankin & Abela, 2011; Sourander et al., 2006; Tatnell, Hasking, Newman, Taffe, & Martin, 2016).

One risk factor that seems robustly related to NSSI among young adolescents is insecure child-parent attachment (Tatnell et al., 2016; Tatnell, Kelada, Hasking, & Martin, 2014; Yates, Tracy, & Luthar, 2008). However the pathways by which attachment is associated with NSSI at this young age are unclear. While previous

longitudinal work suggests that intrapersonal factors like psychological distress may mediate the association between insecure attachment and NSSI among young adolescents (Tatnell et al., 2014), cross-sectional evidence suggests that behavioral problems may be particularly salient to NSSI in this age group (Lundh, Karim, & Quillish, 2007). The fundamental concept of attachment centers on infants' perceptions of their parents' accessibility and responsiveness to their needs, demands, and communications such as crying (Bowlby, 1988). From these early interactions, children learn to regulate their behaviors and emotions (Cozolino, 2014; DeKlyen & Greenberg, 2008). As insecurely attached children's distress is repeatedly left unresolved or even aggravated by their attachment figures, development of their own abilities to regulate emotions may be impaired (Moretti & Peled, 2004). Poor emotional regulation has in turn been found to predict of NSSI (Claes, Houben, Vandereycken, Bijttebier, & Muehlenkamp, 2010; Klonsky, 2009), and people who engage in NSSI often have problems with both regulating emotional responses and tolerating intense emotions (Gratz & Roemer, 2008; Klonsky, 2007). For these people, intense emotions may override behavioural controls and NSSI may be an effective means of diminishing aversive symptoms by regulating these emotions.

Among young adolescents, insecure attachment is associated not only with NSSI, but also with emotional problems such as symptoms of depression and anxiety (Irons & Gilbert, 2005; Muris, Meesters, van Melick, & Zwambag, 2001; Papini & Roggman, 1992), and behavioral problems (Fearon, Bakermans-Kranenburg, van IJzendoorn, Lapsley, & Roisman, 2010), such as trouble following rules, or getting in fights with others. In turn, both emotional and behavioral problems are prospective risk factors for

NSSI among young adolescents (Sourander et al., 2006; Tatnell et al., 2016). Thus, both emotional and behavioral problems may represent pathways through which insecure attachment increases the risk for early onset NSSI (Gandhi et al., 2016; Hallab & Covic, 2010; Kimball & Diddams, 2007). However, no longitudinal study has considered the indirect role of both emotional and behavioral problems together in the attachment-NSSI association among young adolescents. Addressing this significant gap in the literature could elucidate intermediary processes through which insecure attachment is associated with NSSI, providing meaningful information to help guide appropriate intervention initiatives in early adolescence.

In this brief report, we test a hypothesized model in which insecure child-parent attachment acts as a prospective risk factor for NSSI among young adolescents via emotional and behavioral problems.

Method

Participants and procedure

Participants were drawn from the JOnG! project, a prospective cohort study of Flemish adolescents. A full description of the procedure and participants has been reported elsewhere (Baetens et al., 2014). The study procedures were approved by the Ethics Committee of all universities cooperating in the JOnG! project. For the current study purposes, we focused on the age 13 ($m = 12.71$, $SD = 0.32$) and age 14 child-report questionnaires, here after referred to as wave 1 and wave 2. The sample included all 827 individuals that provided valid child-reports at wave 1 (57.2% female). Of these, 559 cases (67.6% of the sample) also provided data at wave 2 (58.9% male). None of the

study variables were related to attrition (all $p > .15$), and Little's MCAR test ($\chi^2(6) = 6.67, p = .353$) was not significant, suggesting that unit-missingness did not impact findings. Expectation maximization was used to account for less than 5% item-missingness, a maximum likelihood based approach that estimates values based on all study variables, and is preferable to conventional methods (e.g., list-wise deletion) of handling item-missingness (Schafer & Graham, 2002).

Measures

Engagement in NSSI at wave 1 and wave 2 was determined by an affirmative response to the item "*Since the previous questionnaire, have you intentionally harmed yourself - e.g. cutting, burning or scratching - without wanting to kill yourself?*" Using a single-item measure of NSSI is common in NSSI research and has been shown to render consistent estimates of prevalence (Muehlenkamp et al., 2012).

Children's perceptions of attachment were measured at wave 1 using the *Experiences in Close Relationships – Revised Child* (ECR-RC) version (Brenning, Soenens, Braet, & Bosmans, 2011), a child-appropriate adaptation of the Experiences in Close Relationships Scale-Revised (Fraley, Waller, & Brennan, 2000). The ECR-RC is a child self-report questionnaire comprising 36 items across two subscales: avoidant attachment (avoidance of intimacy and reliance on others; i.e. "*I don't like telling my mother how I feel deep down inside*") and anxious attachment (fear of abandonment and rejection, i.e. "*I'm afraid my mother will stop loving me*"). These subscales showed high internal validity in this sample: avoidant $\alpha = .93$ and anxious $\alpha = .88$. Only items about the child-mother relationship were used in the present study as very few fathers

participated in the JOnG! project. Although the measure used was child-report, we chose to focus on the child-mother relationship given the preponderant participation of mothers.

Emotional and behavioral problems at wave 1 were measured using the *Strengths and Difficulties Questionnaire* (SDQ) (Goodman, 2001). The SDQ is a reliable and valid screener of psychological difficulties across different domains (Muris, Meesters, & van den Berg, 2003; Van Roy, Veenstra, & Clench-Aas, 2008). For the current study purposes, the child self-report five-item Emotional Symptoms subscale (“*I am often impatient, down or in tears*” or “*I worry a lot*”) was used to measure emotional problems, and the five-item ‘Conduct problems’ subscale operationalized behavioral problems (“*I often have angry outbursts*” or “*I do what I am told*”).

Modeling strategy

Structural equation modeling was conducted with Mplus v7.4, using robust full maximum likelihood estimation to deal with unit-missingness (Muthén & Muthén, 2012). The Root Mean Square Error of Approximation (RMSEA) and Standardized Root Mean Square Residual (SRMR) was used to assess the model fit. Values close to 0.08 and 0.05 indicate acceptable and good fit, respectively (Brown, 2015). Using a logistic link function, we fitted an unrestricted structural equation model that included both direct and indirect effects, via emotional and behavioral problems, between avoidant and anxious attachment at wave 1 and NSSI at wave 2. The unrestricted model controlled for the effects of NSSI at wave 1. To arrive at the most parsimonious model underlying our data, effects were constrained to 0 in a restricted model when coefficients failed to reach borderline significance ($p > .08$), and the lower Bayesian Information Criterion (BIC) of the restricted model indicated it fit the data better (Schwarz, 1978).

Results

At wave 1, 827 participants reported on NSSI behavior, of which 23 (2.8%) reported having engaged in NSSI in the past year. At wave 2, 559 participants reported on NSSI behavior, of which 26 (4.7%) reported having engaged in NSSI in the past year. Girls were more likely than boys to report past year NSSI at both time points (wave 1: 1.7% versus 3.6%; wave 2: 2.2% versus 6.4%) but this difference only reached statistical significance for wave 2 ($\chi^2(559) = 5.41, p = .020$). Gender was controlled for as a covariate in subsequent analyses.

The measurement model fit the data well: RMSEA = 0.051, 90% CI = 0.049-0.053, $p = .220$; SRMR = 0.065. The unrestricted full structural equation model (BIC = 108503.8), which freely estimated all coefficients (including indirect effects) indicated that there was no direct effect of higher anxious ($\beta = 0.13, SE = 0.46, p = .770$) or avoidant attachment ($\beta = -0.23, SE = 0.19, p = .221$) on NSSI at wave 2. Further, there was also no direct association between emotional problems and NSSI at wave 2 ($\beta = -0.64, SE = 1.55, p = .681$). These effects were removed in the restricted model (Figure 1), which yielded superior model fit (BIC = 108470.8). As can be seen in Figure 1, NSSI at wave 1 and female gender predicted NSSI at wave 2. Higher anxious (indirect effect: $\beta = 0.28, SE = 0.13, p = .031$) and avoidant attachment (indirect effect: $\beta = 0.13, SE = 0.07, p = .045$) were indirectly associated with wave 2 NSSI via behavioral problems.

Figure 1 here

Discussion

We found that insecure maternal attachment was indirectly associated with NSSI in young adolescents through behavioral problems. These findings are in keeping with the idea that insecure attachment plays an important role in young adolescent NSSI (Sourander et al., 2006), and that effective behavioral control often fails to develop in the context of insecure attachment (DeKlyen & Greenberg, 2008). Moreover, our data indicate that insecure attachment may be indirectly related to NSSI through this association with behavioral problems, and that behavioral problems are a major risk factor for NSSI, particularly in young populations. This new finding implies that therapies that strengthen child-parent attachment may be effective in ameliorating these behavioral problems as children learn better communication skills and parents learn to respond more effectively to their children's actions and needs (Moretti, Holland, & Peterson, 1994). In turn, improvements in attachment security may also reduce risk of NSSI among young adolescents both directly, and indirectly as a result of contingent reductions in behavioral problems. The efficacy of such approaches in preventing NSSI among young adolescents is an important area for future research.

We also found that emotional problems were not associated with NSSI. While this finding is at odds with the large body of research demonstrating that emotional problems are central to NSSI among older adolescents (Nixon, Cloutier, & Jansson, 2008; Selby, Bender, Gordon, Nock, & Joiner, 2012), it is nevertheless in keeping with an emerging body of prior NSSI research on young adolescents indicating behavioral problems may be more salient to NSSI than emotional problems in this younger age group (Lundh et al.,

2007; Lundh, Wångby-Lundh, Paaske, Ingesson, & Bjärehed, 2011; Sourander et al., 2006). While it is possible that NSSI may be one manifestation of the behavioral problems associated with insecure attachment, in the present study behavioral problems were prospectively associated with NSSI, reducing the probability of confounding and reverse causation. These findings suggest that NSSI among young adolescents may be more closely associated with behavioral difficulties than among older adolescents. Our findings underscore the need for a cohort study of the time-variant effect of emotional and behavioral problems on NSSI.

Limitations and future research directions

Several limitations and future research directions deserve attention. First, although the present sample was larger than most previous longitudinal studies of NSSI with this young age group, the typically low rates of past year NSSI (23 participants at T1 and 26 at T2) precluded more complex model testing (i.e., moderated mediation model); more work is thus warranted. Relatedly, it is important to note that if non-significant direct effects were included, there was no association between attachment and NSSI, highlighting the importance of investigating hypothesized indirect effects even in the absence of a total effect (Hayes, 2009). Therefore, replication of the present finding represents an important goal for future research. Third, because attachment and adjustment (emotional/behavioral symptoms) were measured at the same time point, research with three waves is needed to confirm the temporality of the associations between attachment and behavioral problems. While poor adjustment may be a result of insecure attachment, it is also possible that insecure attachment is at least partially a consequence of the difficulty of parenting poorly adjusted children (Johnston & Mash,

2001) A final limitation is that 32% of the sample did not provide follow-up data, however analysis suggests that baseline variables did not predict attrition and as such results are likely to be generalizable across the initial sample.

Despite these shortcomings, and awaiting future research on this important topic, our data suggest that one possible pathway for the attachment-NSSI association may be through behavioral difficulties, implicating both attachment and behavioral difficulties as possible targets for NSSI treatment and intervention among young adolescents.

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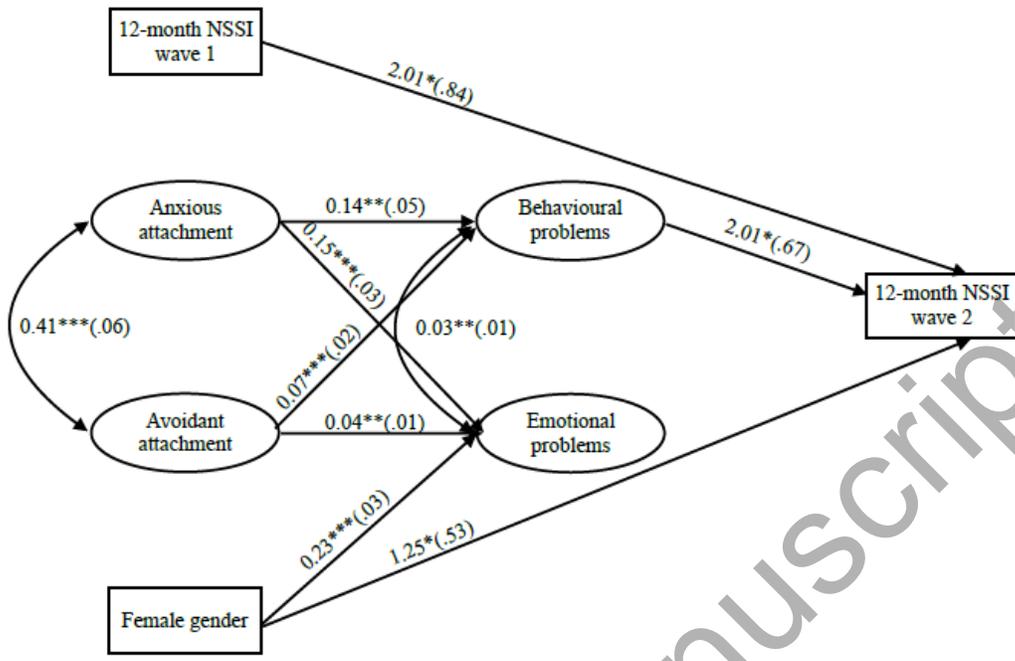
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