



# Explicit Motives, Antecedents, and Consequences of Direct Self-Injurious Behaviors

## A Longitudinal Study in a Community Sample of Adolescents

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**Abstract.** *Background:* Self-injurious behaviors in adolescence are a serious public health concern. *Aims:* The current study aims to expand our understanding of motives for direct self-injurious behaviors (D-SIB). We examined the *explicit* motives but also the actual antecedents and consequences of D-SIB over time. *Method:* As part of the Saving and Empowering Young Lives in Europe (SEYLE) study, adolescents between the ages of 14 and 18 years from Israel completed self-report questionnaires at baseline, 3-month, and 12-month follow-ups. *Results:* Decreases in social support predicted later increases in D-SIB, an effect mediated by negative affect. Both peer and parental support also exerted quadratic effects on D-SIB. Thus, low as well as high support predicted subsequent D-SIB. In turn, D-SIB was followed by increased peer and parental support. *Limitations:* Our methodology relies on self-reports, affected by social desirability and recall biases. *Conclusion:* The findings support a causal path for the development of D-SIB: from interpersonal distress to emotional distress and then to D-SIB. They also point to interesting avenues regarding subgroupings of adolescents who self-injure depending on their motives. Finally, our results reveal that D-SIB, although of negative import, might paradoxically be effective in serving certain functions such as gaining support from parents and peers.

**Keywords:** direct self-injurious behaviors, adolescents, longitudinal changes, social support

Over the past several decades the question of why people behave in ways that are physically harmful (and consequently, mentally harmful) to themselves has received growing attention. Various terms have been used to describe and define such human self-injury, including: *deliberate self-harm* (DSH), *nonsuicidal self-injury* (NSSI), and *direct self-injurious behaviors* (D-SIB). There has been an on-going discussion on whether determination of a person's intent during self-injury can reliably be performed, especially within adolescent populations. Indeed, the association between suicidal behavior and NSSI is controversial and these may overlap (Hawton, Saunders, & O'Connor, 2012; Muehlenkamp, 2005), *D-SIB* is the term we use in the current study and is defined as intentional self-inflicted damage to the surface of an individual's body, which includes self-cutting, burning, biting, hitting,

and skin damage by other methods, regardless of the suicidal intent (Brunner et al., 2014). Overall lifetime prevalence of D-SIB in youths in Europe has been found to be 27.6%, while 19.7% report occasional D-SIB and 7.8% report repetitive D-SIB (Brunner et al., 2014). Self-Injury in adolescence predicts later repetitive self-harm, suicide attempts, and suicide in adulthood (Brausch & Gutierrez, 2010). Thus the systematic examination of the motives underlying these behaviors is needed. Several motivational models have recently been proposed (e.g., Klonsky & Glenn, 2009). Nock and Prinstein (2004) proposed a model based on the intersection of two dimensions, the internal versus interpersonal dimension and the positive and negative reinforcement dimension.

Internally directed motives include *emotion relief* (ER) – seen in behaviors enacted to reduce tension or other neg-

ative affective states (Chapman, Gratz, & Brown, 2006). They also include *feeling generation* (FG) – seen in behaviors enacted to produce a desirable psychological state. Specifically, self-injurers describe unreal or numb feelings relieved by D-SIB (Brown, Wilson, & Linehan, 2002). A third class of internally directed motives, *self-punishment* (SP), is seen in self-injury occurring out of self-devaluation, or a belief that one deserves punishment. Interpersonally directed motives include *interpersonal avoidance* (IA) – seen in behaviors enacted to create social distance. They also include *interpersonal communication* (IC) – seen in behaviors enacted to produce some desired response from others, be it attention, care, or help (Brown et al., 2002).

Most studies of motives for self-injury have been based on self-report. These studies of *explicit* motives, find strongest support for D-SIB as an emotional regulator (Laye-Gindhu & Schonert-Reichl, 2005; Nixon, Cloutier, & Aggarwal, 2002), followed by interpersonally directed motives, specifically IC (such as to feel close to someone, to get attention, to not feel like an outsider; Heath, Ross, Toste, Charlebois, & Nedecheva, 2009). However, to go beyond explicit reports of motives, other methods would be necessary. In the current study, we aimed to examine the *internal* and *interpersonal* antecedents and consequences of D-SIB; these allow us to infer about motives that were not explicitly endorsed.

## Internal Antecedents and Consequences of D-SIB

Internalizing problems such as depression *predict* later D-SIB (e.g., Haavisto et al., 2005; Sourander et al., 2006). However, very few studies have investigated the affective sequelae of D-SIB. In the short term, D-SIB may serve an emotion-regulating function, alleviating emotional distress (Klonsky, 2009), in the longer term, however, there may be a contrary effect. D-SIB may set the stage for depressive processes such as rumination, shame, guilt, and regret (Lundh, Wångby-Lundh, Paaske, Ingesson, & Bjärehed, 2011). Indeed, longitudinal evidence suggests that self-injurious behaviors serve as precursors to future psychopathology including depression and anxiety (Kohlboeck, Quadflieg, & Fichter, 2011; You, Leung, & Fu, 2012).

## Interpersonal Antecedents and Consequences of D-SIB

Individuals with repetitive D-SIB report significantly lower perceived social support from family (Muehlenkamp, Brausch, Quigley, & Whitlock, 2013) and peers (Heath

et al., 2009) while social support appears to be protective (Wichstrøm, 2009; You et al., 2012).

Self-harm behaviors are typically associated with poor social competence and loneliness; however, some adolescents who engaged in health risk behaviors perceive themselves as having higher social status and peer support (Prinstein & Cillessen, 2003). Thus, Prinstein, Choukas-Bradley, Helms, Brechwald, and Rancourt (2011) have documented nonlinear associations between social support and health risk behaviors, in which both high and low levels of popularity are predictive.

The possibility that, like health risk behaviors, D-SIB would be associated with higher social status or greater perceived support has yet to be examined. Moreover, to our knowledge, no study has examined the possibility of nonlinear associations between social support (from parents or from peers) and D-SIB. Such an association might suggest a different risk trajectory to self-harm behaviors, wherein popular and socially accepted adolescents engage in D-SIB for reasons that may differ from those of their lonely, nonpopular peers (Prinstein et al., 2011).

Few studies have investigated the interpersonal consequences of D-SIB. Thus adolescent self-injury might elicit a strong negative response from parents or friends, with deterioration of a relationship. Contrarily, they might elicit positive supportive responses from others, and even increase feeling of belongingness in certain social networks (Hilt, Nock, Lloyd-Richardson, & Prinstein, 2008) including anonymous internet communities (Johnson, Zastawny, & Kulpa, 2010; Whitlock, Powers, & Eckenrode, 2006).

In summary, the *internal* and *interpersonal* factors associated with D-SIB should not be considered in isolation (Saarni, Mumme, & Campos, 1998). Deficient social support may limit the adolescent's capacity for coping adaptively with intense emotional experiences (Nangle, Erdley, Newman, Mason, & Carpenter, 2003); and encourage use of D-SIB for emotion regulation (Adrian, Zeman, Erdley, Lisa, & Sim, 2011; Prinstein, Boergers, Spirito, Little, & Grapentine, 2000).

Less is known about both the internal and interpersonal consequences of D-SIB. Walker, Joiner, and Rudd (2001) found that suicide attempters were more depressed and had more suicidal ideation immediately following an attempt than were ideators. However, a month following the attempt the depression and ideation of attempters abated more than they did for ideators. Walker et al. interpreted the delayed relief as indicative of the effects of increased interpersonal support rather than of emotional catharsis. The latter, presumably, would have resulted in immediate symptom relief. Thus, they argue for a mediation model, in which increased social support mediates the association between suicide attempts and symptomatic relief following the attempt. Importantly, this interpretation was spec-

ulative, and was not tested with regard to suicide attempts and to other self-injurious behaviors.

## The Current Study

In this study we utilized a self-report questionnaire to learn about the stated (*explicit*) motives for D-SIB, and hypothesized ER motives to be the most frequently endorsed. Then, we monitored changes in affect, perceived social support (from parents and peers), and D-SIB in order to learn about the actual antecedents and consequences of D-SIB over time.

First, we modeled the (antecedent) associations between perceived peer and parental support and subsequent D-SIB, and explored the mediating role of negative affect (NA). We expected decreases in perceived social support from either source to predict increases in levels of D-SIB over time. Additionally, as nonlinear associations between social support and D-SIB have yet to be examined in the literature, we conducted exploratory analyses examining the quadratic associations between perceived social support (from either source) and D-SIB. Second, we modeled the (consequent) mediation model suggested by Walker et al. (2001). We expected increases in levels of D-SIB to predict increases in the levels of negative affect. Additionally, we expected increases in levels of D-SIB to predict increases in perceived social support. Thereafter, we examined the longitudinal association between engagement in D-SIB and later changes in NA, along with the exploratory hypotheses that social support mediates this association.

## Method

### Procedure and Participants

This study is part of a multicountry health-promoting program for adolescents in European schools (Wasserman et al., 2010). The study compares the effects of three intervention strategies for suicide prevention. A baseline administration was followed by two follow-ups (at 3 and 12 months). This report is limited to the Israeli site.

The Israeli sample included 1,285 adolescents in Grades 9–11. We approached 32 schools and 12 participated in the study, with response rate of 37.5%. The schools were located all over Israel and were chosen randomly. These schools are characterized by a preponderance of male students, many of them with past failures in other educational settings.

At baseline, the adolescents were aged 14–17 years (mean age = 15.9;  $SD = .76$ ). Of these, 1,023 were boys (79.6%) and 233 were girls (18.1%). The ethnic breakdown of the sample was 57.4% Jewish, 33.8% Muslim Arab, 1.8% Druze, 2% Christian Arab, 1.5% Christian, and 3.5% missing values on ethnic background. Of the 1,285 study participants, a total of 1,037 pupils completed the first follow-up (81.4% retention rate). Of the 1,037 pupils who completed both the baseline and the first follow-up assessments, a total of 905 pupils completed the second follow-up (71.5% retention rate). An additional 140 pupils were excluded from analyses due to the missing data. This resulted in a total follow-up sample of 765 adolescents (59.5% of the baseline sample). In attrition analyses we found only one minor difference between participants who dropped out of the study and participants who completed all three assessments – those who dropped out of the study were more likely to be immigrants ( $\chi^2 = 6.12$ ,  $p < .013$ ) than those who completed the three assessments – which ruled out an alternative explanation for the pattern of longitudinal results.

Ethical approval was obtained from each of the local research ethics committees. We obtained informed consent from each participant and written consent from at least one parent, which was a prerequisite for participation.

## Measures

### Direct Self-Injurious Behaviors (D-SIB)

A modified version of the Deliberate Self-Harm Inventory (DSHI; Gratz, 2001) was used. The modification retained five self-injury items: cutting, self-burning, carving into the skin, preventing healing of wounds, and head banging. Items were followed by Likert scales for the frequency of each behavior ranging from 0 (*never*) to 3 (*five times or more*). Cronbach's  $\alpha$  coefficient was between 0.75 and 0.84.

### Explicit Motives

We developed a self-report questionnaire to assess the explicit motives of D-SIB. Items were taken from three leading questionnaires in the field: (1) The Functional Assessment of Self-Mutilation (FASM; Lloyd-Richardson, Perrine, Dierker, & Kelley, 2007); (2) The Inventory of Statements About Self-injury (ISAS; Klonsky & Glenn, 2009); and (3) The Drinking Motives Questionnaire (DMQ; Cooper, Russell, Skinner, & Windle, 1992). The questionnaire included 15 items representing the five main categories of motives suggested by Nock and Prinstein (2004) and by Turner, Chapman, and Layden (2012). The Cronbach  $\alpha$  coefficients for the scales were: ER = 0.77, FG = 0.72, IA = 0.53, IC = 0.81. The fifth scale, SP, was based on a single item.

## Depression

Beck Depression Inventory II (BDI; Beck, Steer, Ball, & Ranieri, 1996). One item, loss of libido, was omitted as it is considered to be an unsuitable question for an adolescent population, in some cultural settings (Byrne, Stewart, & Lee, 2004). The item on suicide ideation was presented but was not included in the total score so as to avoid a false correlation with suicidality measures. Cronbach  $\alpha$  ranged between 0.88 and 0.89.

## Anxiety

The Zung Self-Rating Anxiety Scale (SAS; Zung, 1971) The SAS is composed of 20 items scored on a 4-point Likert scale, ranging from 1 (*little or none of the time*) to 4 (*most of the time*). Cronbach  $\alpha$  ranged between 0.71 and 0.81.

## Peer Support

A composite score derived from 10 items assessing feelings of social isolation, loneliness, inclusion, and connectedness to a peer group was used to measure this construct. Four items were drawn from the peer problems subscale of the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) rated on a 3-point scale with two of the items reverse-keyed (“I have at least one good friend”; “Other people my age generally like me”). Another six items designed to assess peer relations were selected from the Global School-based Student Health Survey (GSHS; World Health Organization, 2010; e.g., “How often have you felt lonely/feel you belong to a group?”). Three of these items were rated on a 3-point scale, and three others on a 4-point scale including two reversed items. Cronbach  $\alpha$  ranged between 0.69 and 0.73.

## Parental Support

This measure included six items taken from the GSHS (e.g., How often ... “Parents understand your problems and worries”; “Pay attention to your opinion”; “Help you make decisions”). Items were rated on 3- or 5-point Likert scales. Cronbach  $\alpha$  ranged between 0.81 and 0.85.

## Data Preparation

### Negative Affect (NA)

Since depression and anxiety were strongly correlated ( $R = .41-.65$ ) and for clarity of interpretation, we combined the scores for a general negative affect (NA) factor. BDI and SAS scores were standardized, and their average was calculated. Combining depression and anxiety into one cluster is consistent with previous studies showing the strong observed comorbidity and importance of a broad internalizing or distress factor linking diverse emotional disorders (Simms, Prisciandaro, Krueger, & Goldberg, 2012).

Although there are differences between these disorders, it was reported that there are similarities that support the feasibility of an emotional meta-structure for DSM-V and ICD-11, with negative affectivity as the defining feature (Goldberg, Krueger, Andrews, & Hobbs, 2009). Cronbach’s  $\alpha$  coefficient for internal consistency of the 39 items of both BDI and SAS in our sample was 0.90–0.91

## Missing Data

To deal with missing values, several steps were performed. First, pupils who did not participate in all three assessments were excluded ( $n = 100$ ). Second, scores were calculated when at least 66% of the items composing each scale were endorsed. Third, in each assessment, participants that had more than 33% missing (scale) scores were excluded ( $n = 40$ ). These steps resulted in a total follow-up sample of 765 pupils with sufficient data. Then, the single imputation method (i.e., EM) was performed using the MVA (missing value analysis) module in SPSS 18 (Rubin, 1976).

## Data Analysis

To examine the differences in frequencies between the five classes of explicit motives for D-SIB a repeated measures ANOVA, followed by series of post hoc  $t$  tests for paired samples were conducted. In order to examine the longitudinal antecedents and consequences of D-SIB we tested two mediational models following Baron and Kenny’s (1986) guidelines. These were carried out using hierarchical multiple regressions. The Sobel significance test (Sobel, 1987) was used to examine the strength of the mediation. For the prospective analyses, the regression models were performed so that Time 1 factors were controlled by entering them into the model first. In the following steps, Time 2/3 variables were entered into the regression, so that these steps’ unique contribution to the explained variance reflects the effect of change over time in the predicting factors. As strong correlations exist between the variables entered into the regression, all the variables were mean centered in order to avoid multicollinearity that could bias our results. Moreover, we controlled for three demographic characteristics – gender, ethnicity, and economic difficulties. All analyses were performed using SPSS 18.

## Results

### Preliminary Analyses

In all, 32.5% ( $n = 249$ ) of the pupils reported a history of D-SIB, and 5.4% ( $n = 41$ ) received medical treatment

following self-injury. High rates of psychopathology symptoms were reported; 17.5% ( $n = 134$ ) of the pupils were above cut-off for depression, and 28.1% ( $n = 215$ ) for anxiety. Prevalence of psychopathology symptoms are presented according to validated cut-off points (Wasserman et al., 2010).

### Explicit Motives for D-SIB

Differences between the five categories of motives for D-SIB ( $F_{4,123} = 2.32, p < .05$ ) were found. However, no significant differences were found in the post hoc analyses. The pattern of distribution shows that FG ( $M = 0.64,$

$SD = 0.76$ ) and IC ( $M = 0.64, SD = 0.82$ ) were more frequently endorsed as motives for D-SIB, whereas ER ( $M = 0.52, SD = 0.70$ ), SP ( $M = 0.50, SD = 0.77$ ) and IA ( $M = 0.55, SD = 0.77$ ) were less frequently endorsed.

### Antecedents of D-SIB

Table 1 presents the results of the hierarchical multiple linear regression model, predicting D-SIB with peer and parental support through the mediating effect of NA. Though peer and parental support are discussed separately, all variables were entered in the same regression model.

**Table 1.** Antecedents of D-SIB: hierarchical multiple linear regression predicting D-SIB (in T2) with peer and parental support (in T2) mediated by NA (in T2)<sup>a</sup>

	Criterion	Step	Predictor	B (SE)	$\beta$	$R^2$	$\Delta R^2$	F change
Step I	IV <sub>1</sub> – DV (c) PES– D–SIB	–	PES	–.41 (.14)	–.14**	.25	.01	3.20*
		–	PES <sup>2</sup>	.41 (.15)	.11**			
	IV <sub>2</sub> – DV (c) PAS– D–SIB	–	PAS	–.13 (.09)	–.06			
		–	PAS <sup>2</sup>	.15 (.09)	.06*			
Step II	IV <sub>1</sub> – M (a) PES– NA	–	PES	–.61 (.07)	–.35***	.45	.11	39.35***
		–	PES <sup>2</sup>	.12 (.07)	.05			
	IV <sub>2</sub> – M (a) PAS– NA	–	PAS	–.21 (.04)	–.17***			
		–	PAS <sup>2</sup>	–.05 (.04)	–.03			
Step III	M – DV (b) NA– D–SIB	–	NA	.73 (.06)	.43***	.33	.12	138.9***
Step IV	M – DV with IV (b') NA– D–SIB	1	NA	.69 (.07)	.40***	.34	.01	3.75**
		2	PES	.01 (.14)	.00			
	2	PES <sup>2</sup>	.33 (.14)	.08*				
	2	PAS	–.00 (.09)	–.00				
	IV <sub>2</sub> – DV with M (c') PAS– D–SIB	2	PAS <sup>2</sup>	.19 (.08)	.07*			

Note. <sup>a</sup>The following variables were controlled for in the analysis: gender, ethnicity, and economic difficulties, D-SIB (in T1), peer and parental support (in T1) NA (in T1). IV = independent variable. DV = dependent variable. M = mediator. PES = perceived peer support. PAS = perceived parental support. NA = negative affect.

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

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### Peer Support

Results indicated a negative linear association as well as a positive quadratic association between perceived peer support and D-SIB. In addition, a negative linear association was found between peer support and NA. A positive linear association was found between NA and D-SIB adjusting for the effects of perceived social support (both linear and quadratic). Finally, the linear association between perceived peer support and D-SIB was reduced to non-significance when NA was adjusted for. The Sobel significance test (Sobel, 1987) supported full mediation for the linear effect (Sobel statistic =  $-6.53$ ,  $SE = .06$ ,  $p < .001$ ). The quadratic association between perceived peer support and D-SIB was only minimally reduced when NA was adjusted for, and the corresponding Sobel test was not significant (Sobel statistic =  $1.70$ ,  $SE = .04$ ,  $p = .09$ ). Thus, the quadratic association between perceived peer support and D-SIB is not mediated by NA.

### Parental Support

Results indicated a positive quadratic association between perceived parental support and D-SIB. In addition, a negative linear association was found between perceived parental support and NA mentioned before, and a positive linear association was found between NA and D-SIB with the effects of perceived social support (both linear and quadratic) adjusted for. The quadratic association between perceived parental support and D-SIB was only minimally reduced when NA was adjusted for and the corresponding Sobel test was not significant (Sobel statistic =  $-1.24$ ,  $SE = .03$ ,  $p = .21$ ). Thus, the quadratic association between perceived parental support and D-SIB is not mediated by NA.

### Consequences of D-SIB

Table 2 presents the results of the hierarchical multiple linear regressions, predicting NA with D-SIB, through the mediating effect of perceived social support.

**Table 2.** Consequences of D-SIB: hierarchical multiple linear regression predicting NA (in T3) with D-SIB (in T2) as mediated by peer and parental support (in T3)<sup>a</sup>

	Criterion	Step	B (SE)	$\beta$	$R^2$	$\Delta R^2$	F change
Step I	IV - DV (c)	-	.01	.01	.43	.00	.06
	D-SIB-NA		(.02)				
Step II	IV - M1 (a)	-	.02	.07*	.41	.01	4.80*
	D-SIB-PES		(.01)				
	IV - M2 (a)	-	.03	.07*	.44	.01	5.30*
	D-SIB-PAS		(.01)				
Step III	M1 - DV (b)	-	-.51	-.30***	.51	.08	66.37***
	PES-NA		(.06)				
	M2 - DV (b)	-	-.20	-.17***			
	PAS-NA		(.04)				
Step IV	M1 - DV with IV (b') PES-NA	1	-.51	-.30***	.52	.00	3.00
	M2 - DV with IV (b') PAS-NA	1	-.21	-.17***			
	IV - DV with M1,2 (c') D-SIB-NA	2	.03	.05			
Interaction	IV*M1-DV	3	-.10	-.09***	.54	.02	12.69***
	D-SIB*PES-NA		(.03)				
	IV*M2-DV	3	.05	.08**			
	D-SIB*PAS-NA		(.02)				

Note. <sup>a</sup>The following variables were controlled for in the analysis: gender, ethnicity, and economic difficulties, D-SIB (in T1), peer and parental support (in T2) NA (in T2). IV = independent variable. DV = dependent variable. M = mediator. PES = perceived peer support. PAS = perceived parental support. NA = negative affect.

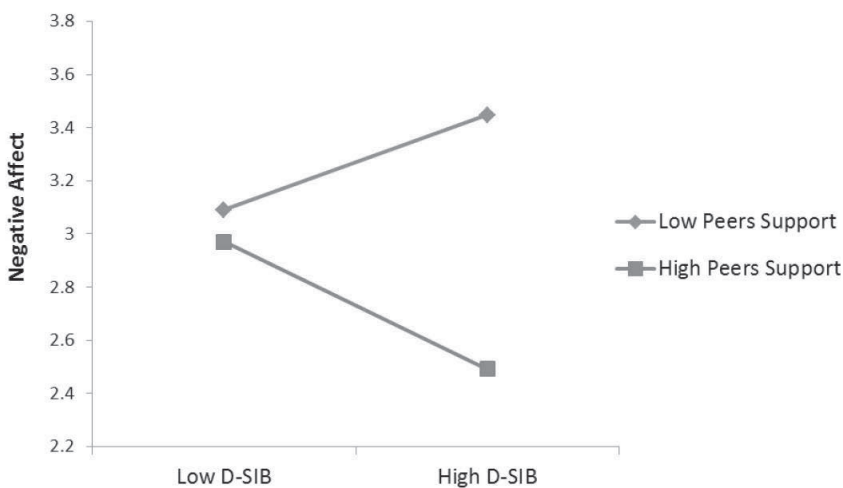
\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

### Peer Support

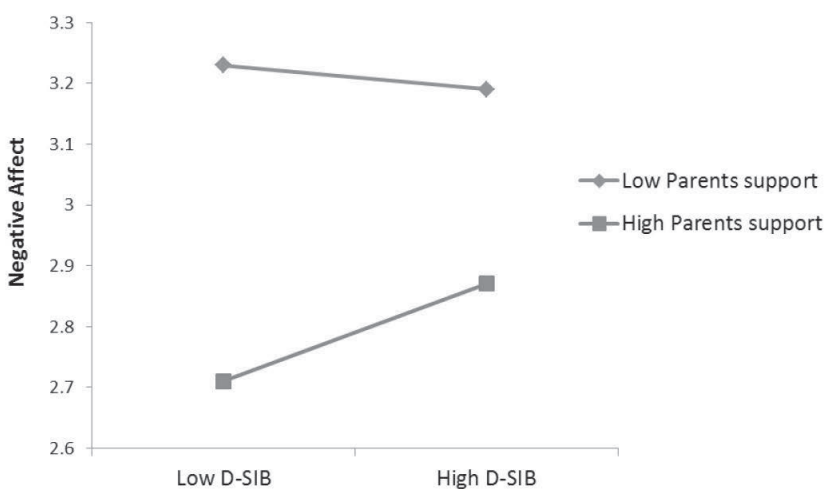
Results indicated no association between D-SIB and later NA. However, a positive association was found between D-SIB and later perceived peer support. A negative association was found between perceived peer support and NA, with the effects of early D-SIB adjusted for in the equation. Following Baron and Kenny’s (1986) guidelines, mediation was not found since the association between D-SIB and later NA was not significant. However, most contemporary analysts believe that this criterion is not necessarily required in establishing mediation. Specifically, there is often a suppression effect, or what MacKinnon, Fairchild, and Fritz (2006) described as *inconsistent mediation*. In these cases, the direct and indirect paths sum up to a non-significant total effect despite the fact that both are significant. Therefore, although a direct effect was not found between the predictor (i.e., change in the frequency of D-SIB from T1 to T2) and the outcome (i.e., change in the levels of NA from T2 to T3), we conducted additional analyses to examine a possible moderating effect of perceived social

support on this association. An interaction effect of D-SIB and perceived peer support was entered in the last step of the regression, and was found to be significant. The probing of the interaction revealed different patterns of associations between early increases in D-SIB and later changes in NA depending on levels of peer support (see Figure 1) and on the levels of parental support (see Figure 2).

Among participants with low peer support, early increases in D-SIB levels (from T1 to T2) predicted later increases in NA (from T2 to T3). By contrast, among participants with high peer support, early increases in D-SIB predicted later decreases in NA. Among participants with low parental support, changes in D-SIB (from T1 to T2) did not predict changes in NA (from T2 to T3). By contrast, among participants with high parental support, higher levels of D-SIB predicted later increases in NA.



**Figure 1.** Interaction effect of D-SIB (T2) and peer support (T3) on NA (T3);  $\beta$  of interaction term =  $-.09^{***}$ .



**Figure 2.** Interaction effect of D-SIB (T2) and parental support (T3) on negative affect (T3);  $\beta$  of interaction term =  $.08^{**}$ .

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## Discussion

The aim of the study was to look at motives for D-SIB. We went beyond explicit retrospective reports about the reasons for self-injury, and used a prospective design that enabled a temporal examination of the antecedents and consequences. The main findings in this large-scale study are discussed here.

### Antecedents of D-SIB

The most intriguing finding of our study was that social support for peers and parents predicted D-SIB in a non-linear pattern. Thus, both high and low levels of support predicted high levels of D-SIB. As far as we know, this is the first study showing this quadratic relationship between support from peers and parents and D-SIB, although there are studies showing quadratic effects of interpersonal support on several other (non-D-SIB) health risk behaviors (e.g., Prinstein et al., 2011).

The quadratic effect found for peer support may appear counterintuitive; however, given the fact that D-SIB is common in certain social networks, it is possible that these behaviors are actually rewarded (O'Connor, Armitage, & Gray, 2006). This is an important paradigm shift: from seeing self-harm behavior predominantly as a consequence of poor social competence, to considering it also as a possible correlate of social success (Allen, Porter, McFarland, Marsh, & McElhaney, 2005). Such a finding may have significant implications for the differential prevention of D-SIB resulting from different motives. Thus, where D-SIB is associated with NA and low social support, interventions should be targeted at alleviating dysphoria and increasing support. However, where D-SIB is motivated by increasing social support and is not mediated by NA, the interventions should be directed at improving interpersonal problem solving by substituting more effective strategies for improving social efficacy.

The quadratic effect found for parental support may require a different interpretation. The absence of parental support might lead the adolescent to engage in D-SIB as a way to signal distress and to gain attention (Gratz, 2006). At the other extreme, excessive parental involvement and an overprotecting parenting style lead the adolescent to engage in D-SIB (Bureau et al., 2010; Gratz, 2006; Yamaguchi et al., 2000), possibly enhancing separation and independence.

In addition to the quadratic effect, a *negative linear effect* of peer support on D-SIB was found, which was fully mediated by NA. This finding accords with our hypothesis and with conventional wisdom that emotional difficulties predict D-SIB and mediate the influence of interpersonal

problems (e.g., Adrian et al., 2011). Indeed, it supports a causal path for the development of self-harm behaviors among adolescents: from interpersonal distress to emotional distress and then to self-harm.

### Consequences of D-SIB

Yet another innovative result of the study was that adolescents reporting D-SIB experienced a significant increase in the quality of relationships with their peers and parents. The current study is the first to show this interesting pattern regarding the relationships of adolescents with their peers, but is in accordance with Hilt et al. (2008), who found this pattern concerning the quality of adolescents' relationships with their fathers. One possible explanation for this surprising finding of improved peer relations could be that adolescents involved in risky behaviors may feel supported by their peers if those peers are themselves involved in the same risk behaviors. Alternatively, adolescents may use D-SIB to communicate distress and recruit attention and support from their surroundings (parents and peers), and may find this strategy helpful in the short term. Once again this stresses the importance of a differential approach to therapy.

Alternatively, adolescents may use D-SIB to communicate distress and recruit attention and support from their surroundings (parents and peers) and may (on average) find this strategy successful. The first explanation may be limited to the effects of D-SIB on peer relations whereas the second may apply more broadly. Whatever the explanation, these findings support a social positive reinforcement function for D-SIB, and may have important implications for understanding the role of interpersonal changes in the development and the maintenance of D-SIB over time.

We then tested whether interpersonal support moderated the association between D-SIB and subsequent changes in NA; indeed, both peer and parental support did evince such moderation.

Among adolescents with low peer support, higher levels of D-SIB predicted later increases in NA. By contrast, among adolescents with high peer support, higher levels of D-SIB predicted later decreases in NA. These findings, alongside the quadratic association found between peer support and D-SIB, reinforce the possibility that D-SIB behaviors may need to be categorized into (at least) two subtypes. One subtype may characterize adolescents with low peer support who will tend to experience high levels of NA. Following D-SIB, they tend to feel even more depressed and anxious. Another subtype may characterize adolescents with high peer support. Following D-SIB, these adolescents tend to experience increased social support and decreases in NA.



The possibility that this second subtype of D-SIB exists is reminiscent of earlier theoretical work positing a communicative function for self-harm (Farberow & Shneidman, 1961). This work supports the notion that suicide attempters and self-injurers, specifically adolescents, might view self-aggression as an acceptable way of communicating with others in certain specified social networks (Platt, 1985). Among adolescents with low parental support, D-SIB levels did not predict subsequent changes in NA. By contrast, among those with high parental support, higher D-SIB levels predicted later increases in NA. For the first (low parental involvement) group, D-SIB may be used in an (unsuccessful) attempt to gain attention or support. Tragically, even these extreme acts of self-injury fail to achieve the desired outcome. Thus, these adolescents remain highly distressed. For the second (high parental involvement) group, D-SIB may be used to express independence and demand autonomy from overprotective parents. In these cases, D-SIB may trigger conflict and disturbance in the parent-adolescent relationship. This, in turn, may cause the observed increases in distress levels, and specifically in NA.

Although this was not the main focus of the current study, the findings point to some interesting avenues for future research regarding subgrouping of self-injurers. Previous studies have suggested that some self-injurers may exhibit different psychiatric problems than others (Klonsky & Olino, 2008). Indeed, a study of adolescent inpatients found considerable diagnostic heterogeneity, with 12% not meeting criteria for any mental disorder (Nock, Joiner, Gordon, Lloyd-Richardson, & Prinstein, 2006). Given the heterogeneity of D-SIB phenomena, it may be useful to try and identify different subgroups of self-injurers and to explore the characteristics of each of these subgroups.

## Explicit Motives

Contrary to our initial hypothesis, the adolescent self-reports endorsed both internal and interpersonal motives for D-SIB with similar frequency. This was also contrary to Brausch and Gutierrez (2010), who found internal motives to be predominant. Interestingly, positive reinforcement motives were more frequently endorsed than negative reinforcement motives. We may need to consider that among adolescents, motives linked to *approach* strategies as more imminent risk markers for D-SIB than motives linked to *avoidance* strategies (Carver & Harmon-Jones, 2009).

## Limitations

A few limitations of the study should be considered. First, the overrepresentation of males and of adolescents of Arab ethnicity compared with the general Israeli population limits the ability to generalize from this sample to the population at large. Nevertheless, since both males and ethnic minorities are often underrepresented in suicide and self-injury research but are at higher relative risk (e.g., Hawton, 2000) this study does provide important data.

Our methodology relies solely on self-reports, which are affected by social desirability and recall biases. However, we did examine changes over time in measures that were not explicitly tied with self-harm. This enabled us to go beyond the stated reported motives for D-SIB and to learn about the actual antecedents and consequences of these behaviors over time. Future studies may benefit from the use of observational methods and of parent or peer reports, which would circumvent this problem.

## Implications

This study offers new insights into adolescents' motives for engaging in D-SIB. Our explicit results point to the dominance of positive reinforcement motives, both internal and interpersonal, for engaging in D-SIB. This finding highlights the need to go beyond the widely accepted tension-reduction theories for understanding D-SIB among adolescents.

Our results point to two possible subcategorizations of D-SIB and of the adolescents who engage in them, depending on characteristics of peers and parental support and of NA over time. The categorization of different types of self-injurious behaviors and of self-injurers might contribute to the development of more specific and therefore effective prevention programs and interventions for D-SIB.

Finally, our results highlight the importance of deficits in interpersonal support as a predictor of NA and, eventually, of self-injurious behaviors. Importantly, support from both parents and peers seemed to improve following engagement in D-SIB. Prevention and intervention efforts may benefit from helping adolescents to improve their relationships with parents and peers, thus reducing the need for drastic measures such as D-SIB.

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