HHS Public Access

Author manuscript

J Youth Adolesc. Author manuscript; available in PMC 2020 August 01.

Published in final edited form as:

J Youth Adolesc. 2019 August ; 48(8): 1506–1518. doi:10.1007/s10964-019-01011-4.

Social Ties Cut Both Ways: Self-Harm and Adolescent Peer Networks

Molly Copeland[a,*], **Sonja E. Siennick**[b], **Mark E. Feinberg**[c], **James Moody**[a,d], and **Daniel T. Ragan**[e]

[a]Department of Sociology, Duke University, Durham, NC, 27708, USA

[b]College of Criminology and Criminal Justice, Florida State University, Tallahassee, FL, 32306, USA

[c]Edna Bennett Pierce Prevention Research Center, Pennsylvania State University, 310 BioBehavioral Health, University Park, PA, 16802, USA

[d]King Abdulaziz University, Jeddah Saudi Arabia

[e]Department of Sociology, University of New Mexico, Albuquerque, NM, 87131, USA

Abstract

Peers play an important role in adolescence, a time when self-harm arises as a major health risk, but little is known about the social networks of adolescents who cut. Peer network positions can affect mental distress related to cutting or provide direct social motivations for self-harm. This study uses PROSPER survey data from U.S. high school students (n = 11,160, 48% male, grades 11 and 12), finding that social networks predict self-cutting net of demographics and depressive symptoms. In final models, bridging peers predicts higher self-cutting, while claiming more friends predicts lower cutting for boys. The findings suggest that researchers and practitioners should consider peer networks both a beneficial resource and source of risk associated with cutting for teens and recognize the sociostructural contexts of self-harm for adolescents more broadly.

Keywords

self-harm; social networks; adolescence; peer networks

[*]Correspondence to: Molly Copeland, 417 Chapel Drive 276 Soc/Psych, Durham, NC 27708, (919) 660-5614, mc418@duke.edu.

Authors' Contributions: MC contributed to study design, conducted analyses, wrote the manuscript and contributed to revisions; JM generated the networks; SS, MF, and JM contributed to study design, interpretation, and revisions; DR participated in revisions of analyses and draft. All authors read and approved the final manuscript.

Data Sharing Declaration: Due to the sensitive nature of data collected, the dataset is not available for public use at this time.

Conflict of Interest: The authors declare that they have no conflict of interest.

Compliance with Ethical Standards

Ethical Approval: The procurement of the data required for this study was approved by the Iowa State University and Pennsylvania State University institutional review boards.

Informed Consent: All youth and families were informed about and consented to participate in the data collection for this project.

Introduction

Self-harm in adolescence presents a serious public health concern. Intentional, self-inflicted bodily injury, irrespective of suicidal intent, has risen in nonclinical adolescents in recent decades (Laukkanen et al. 2009). However, a paucity of community-based studies makes even rates of self-injury ambiguous, with recent estimates of lifetime prevalence of self-harm among teens ranging from 2% to 47% (Christoffersen et al. 2015). In addition to posing immediate risks of serious bodily injury, this understudied behavior is also associated with a range of negative health behaviors and outcomes, including increased depressive symptoms (Fortune and Hawton 2005), substance use (Tuisku et al. 2014), and suicide (Hawton et al. 2012). One self-harm behavior in particular, cutting, is the most common behavior reported by self-harming teens (Geulayov et al. 2018), with conservative estimates of lifetime prevalence of cutting in adolescent community samples around 12% (Laukkanen et al. 2009).

Self-cutting, like many other health behaviors in adolescence, has a distinctly social nature (Adler and Adler 2011). The importance of peers in adolescent development means that peer networks can shape teens' health behaviors (Umberson et al. 2010), including self-harm and cutting (Hawton et al., 2012). Theories such as the four-function model of self-harm (Nock 2010) describe internal motivations for self-harm, such as regulating negative affect. Given this function of self-harm, the stress or support of peer social life can indirectly relate to self-harm by deepening or alleviating mental distress underlying the behavior. However, this theoretical model suggests that self-harm can also relate to peers through explicitly social functions (Nock 2010). Prior work has found that adolescents self-harm to increase bonds with peers (Walsh 2006) or to signal group identity (Heilbron and Prinstein 2008), or because peers model self-ham as an attractive coping mechanism for the stresses of adolescence (Jarvi et al. 2013). Studies have found that adolescents who engage in cutting are more likely to have friends who cut, suggesting an association between peers and this method of self-injury (Hawton et al. 2010).

Yet, although peers clearly play a critical role in teen self-injury, social aspects of self-harm have been understudied (Bentley et al. 2014). Thus, little is known about the peer networks of adolescents who self-harm. A rich research tradition has shown that social networks significantly affect adolescent mental health and health behaviors, with studies finding that depressive symptoms are associated with under- (Ueno 2005) and over-integration in school peer networks (Falci and McNeely 2009). However, to the authors' knowledge, no studies have examined whether positions in peer networks predict self-harm. Furthermore, despite documented variation in self-cutting rates by gender (Bakken and Gunter 2012), little research has examined gendered aspects of cutting. Thus, it is unclear how any associations between peer networks and cutting vary by gender.

The current study bridges these gaps by testing whether peer network positions predict self-cutting and whether gender moderates these associations. Analyses draw on one of the only data sets (from the PROSPER project) to include information on both self-harm and sociocentric networks, which enables the application of network analytic techniques to the study of self-cutting. Overall, findings provide insight into the social contexts of adolescents

who engage in cutting and the gendered experience of network context and self-injurious behavior.

Self-harm in Adolescence

Self-harm, including cutting, presents a significant public health concern for teens. Adolescents show the highest rates of onset (Andrews et al. 2014) and overall self-harm (Nixon and Heath 2009), with cutting being the most common form of self-harm in nonclinical adolescent samples (Geulayov et al. 2018). Cutting also predicts greater repetition of self-harm and suicide attempts compared with other forms of self-injury (Hawton et al. 2010). The four-function model of self-harm suggests that cutting and other forms of self-harm serve internal functions of regulating emotions, as well as explicitly social functions, including motivations related to peers (Bentley et al. 2014).

Social functions of self-harm for teens are perhaps unsurprising given the social nature of many health behaviors in adolescence and the critical role peers play in adolescent development (Cotterell 2007). During adolescence, most teens socially detach from the family unit in favor of same-age peers as a source of norms and guidance for behavior, interactions, and identity (Douvan 1983). Adolescents are highly attuned to social status and their position among peers, with school settings providing an important social context (McFarland et al. 2014). Social networks indicate positions among peers, with a variety of social network structures and measures describing the positions of adolescents in their social worlds (Cotterell 2007). Given the importance of peers and teens' attunement to social positions, positions in social networks play a crucial role in adolescent mental health (Guan and Kamo 2016).

Peer Networks and Self-harm

One way that peer networks may relate to self-harm is indirectly via mental distress. Studies have found that greater depression, internalizing symptoms, and suicidality are associated with a range of social positions, including isolation (Kornienko et al. 2013), high popularity (Reynolds and Crea 2015), or being in imbalanced close friend groups in which some friends are not friends with one other (Bearman and Moody 2004). These positions can introduce stress that taxes mental health, or they may indicate a lack of psychological and social resources—such as social support from peers (Kornienko et al. 2013) or a sense of belonging or identity (Ueno 2005)—that results in greater mental distress. Other aspects of peer network positions are associated with lower mental distress, including popularity among other popular peers (Ueno 2005), naming more peers as friends (Guan and Kamo 2016), and being in tight-knit, high-density friend groups (Reynolds and Crea 2015). These positions may indicate increased social support (Kornienko et al. 2013) or psychological resources, such as higher self-esteem (Cheadle and Goosby 2012), that benefit mental well-being. Although this body of research has found robust relationships between social network positions and mental distress, the investigation has not yet been extended to self-harm behaviors, despite the theorized function of self-injury in regulating mental distress.

Beyond the internal functions of self-harm, the behavior is also associated with explicitly social motivations (Nock 2010). Teens report a direct role of peers in self-harm, including

discussing self-harm and its consequences with peers, learning of self-harm as a coping mechanism from peers, or even engaging in simultaneous self-injuring with friends (Walsh 2006). Research has also indicated other social motivations for self-harm and cutting, such as using self-harm as a shared secret to deepen bonds with friends (Walsh 2006) or to signal group identity (Young et al. 2006).

These social functions of self-harm suggest that friends' self-injury behavior is an important component for understanding the social network profiles of teens who self-harm. Peer network patterns may have very different associations with cutting if social ties connect adolescents to peers with different cutting behavior. Accordingly, prior work has found that self-injury by best friends and broader friend groups predicts adolescents' subsequent self-harm (You et al. 2013). However, most studies of the social role of peers in self-harm have used respondents' perceptions of peer relationships (Hamza and Willoughby 2014) or behavior (Claes et al. 2010), or have examined isolated dyadic friendships (Heilbron and Prinstein 2008). In this growing literature, the broader social network profile of teens who cut is unknown, despite the theorized social nature of the behavior.

Gender, Peers, and Self-harm

Understanding the social worlds of adolescents who self-harm also requires considering other socially salient features that might shape both network position and self-harm, such as gender. Rates of mental distress, patterns of self-harm, and characteristics of social relationships differ by gender in adolescence. Compared with teen boys, girls are more likely to cut (Bakken and Gunter 2012) and to report mental distress (La Greca and Harrison 2005). Girls more often interact with friends in dyads or small friend groups with high self-disclosure, whereas boys typically associate in larger groups focused around activities (Rose and Rudolph 2006), which can affect exposure or motivations to self-harm.

In addition to predicting gender differences in peer relationships and self-harm, developmental theories suggest ways that gender may also moderate the association between networks and cutting. Compared with boys, girls are often socialized to have greater sensitivity to others' emotions and emotional tension, to be more compliant and dependent on others, and to focus on caring for others (Zahn-Waxler et al. 2000). These tendencies can make girls more sensitive to the social stresses of adolescence, thus linking greater network integration to higher internalizing problems for teen girls. Prior work has found that girls are more attuned to and invested in peer friendships than boys (Rose et al. 2007). This focus on friendships can be a double-edged sword: although girls may reap greater benefits from supportive relationships with peers (Carboni and Gilman 2012), even high-quality friendships can have psychological costs. For example, close female friends engage in more co-rumination around negative emotions and experiences, which can link friendship to higher levels of internalizing symptoms for teen girls (Rose et al. 2007). This developmental trade-off model also suggests potential drawbacks to friendships for boys. For example, boys' interactions with friends may be less conducive to social support (Rose and Rudolph 2006), and boys may maintain status and popularity among peers by appearing "tough" in ways that deter support-seeking and accentuate mental distress (Kornienko and Santos 2014). Overall, this developmental model suggests that connections with peers generally

benefit adolescents' mental health but can also increase mental distress, and that the network dimensions spurring these benefits or detriments to mental health likely differ by gender. If different patterns of friendship lead to higher or lower levels of mental distress for girls relative to boys, network dimensions may also relate differently to cutting by gender, assuming that these processes extend to self-harm.

Research examining structural aspects of peer networks has found similar evidence that gender affects how peer networks matter for mental health. Some network features, such as cohesion and popularity, are associated with worse mental health for boys and better mental health for girls (Falci and McNeely 2009). Similarly, Carboni and Gilman (2012) found that occupying a brokerage or bridging position connecting others in the network is associated with increased stress and decreased life satisfaction for teen girls but not teen boys. Considering how gender might moderate relationships between social networks and self-harm is thus an important component of understanding the social networks of teens who cut.

Current Study

This study connects the body of research linking social networks and mental health to the growing literature theorizing the social nature of self-harm to examine if social network positions predict self-cutting. Some studies have examined peer networks in relation to self-harm, including simulating peer influence of self-harm (Giletta et al. 2013) and the effects of best friends and friend groups (You et al. 2013) and peer group norms (You et al. 2016). Yet, to the authors' knowledge, no research has used network analysis to examine multiple features of peer network positions comprehensively in relation to self-cutting. Thus, this study's hypotheses derive from the theorized social roles of self-harm, the mental health and networks literature, and the developmental trade-off model.

The first hypothesis is that given the theorized social functions of self-harm, features of social network positions will be associated with self-cutting net of depressive symptoms (Hypothesis 1). Competing hypotheses are based on the social network and adolescent mental health literature, which has found that mental distress is associated with both under- and over- integration in peer networks. For example, viewing oneself as not belonging in the school peer network (low sociality), lacking the benefit of far-reaching connections to others in the network (low closeness), being unpopular or having unpopular friends (low popularity and centrality), or lacking close relationships (low reciprocity) can indicate under-integration. Because, as prior literature has shown, these factors relate to detrimental mental health effects, low integration may also predict higher levels of self-cutting (Hypothesis 2A). However, adolescents can also be over-integrated among peers, with high reciprocity suggesting potential for co-rumination, high popularity or centrality creating stressful efforts to maintain status, and high bridging indicating identity strain or over-regulation across multiple groups. In this case, high integration would be predicted to be associated with higher self-cutting (Hypothesis 2B). Finally, because both self-cutting behavior and network characteristics vary with gender in adolescence, gender is expected to moderate associations between social network positions and self-cutting (Hypothesis 3). Expectations for each dimension or measure of network integration do not differ across these hypotheses, given that prior research and theory do not lead to strong differential predictions for each facet of

integration. By examining how social network positions predict self-cutting net of sociodemographic factors, friends' cutting, and depressive symptoms, and by considering how this relationship varies with gender, this study clarifies the social worlds of adolescents who self-cut, contributing to the growing literature theorizing social facets of self-harm.

Methods

Participants

Data for this study were collected as part of the PROSPER (PROmoting School-community-university Partnerships to Enhance Resilience) Project, a randomized controlled trial evaluating a partnership-based delivery system for evidence-based preventive interventions, and data here use social network measures developed as part of the PROSPER Peers Project (Spoth et al. 2004, 2013). This study utilizes data from the in-school survey portion of the larger PROSPER project. Surveyed school districts are located in rural and semi-rural Iowa and Pennsylvania. Sampled districts have enrollments between 1,500 and 5,200 and predominantly white student populations, with at least 15% of students in each school from low-income families. Pencil-and-paper surveys were administered to students during school starting in the fall of 6th grade in two cohorts of students in successive calendar years in 2002 and 2003. Subsequent surveys were administered every spring to grade 12. The current study examines only Waves 7 and 8 of the survey, for which variables of interest are available. These waves occurred in 2009 and 2010, when students were in 11th and 12th grade, respectively; the average response rate was 78%.

Social network data come from the friendship nomination portion of the survey, where students can list the names of up to two best friends and five close friends in their grade and school. Friendship nominations are then matched across surveys to construct sociocentric networks of friendship patterns for each grade and school in each year of the survey. This design allows examination of network-wide structural features. It also enables examining friends' self-reported behaviors rather than teens' perceptions of their friends' behavior, which is often subject to false consensus bias (Prinstein and Wang 2005). The full sample completing the social network survey contains 15,524 person-wave observations—8,273 at Wave 7 and 7,251 at Wave 8—representing 9,724 unique respondents. Any students who were present for the administration of a given wave of the survey were included, resulting in final counts of 5,800 respondents in both waves, 2,473 of whom were only in Wave 7 and 1,451 of whom were only in Wave 8.

Measures

Self-cutting.—The dependent variable *self-cutting* comes from the survey question, "During the past 12 months, how many times have you tried cutting yourself?" Response options were "Never," "Once," "Twice," "Three or four times," and "Five or more times." Given the low incidence of cutting overall and the serious nature of any cutting behavior, this is dichotomized as any or no self-cutting, following prior work (You et al. 2013). Rates of self-cutting and other variables in the analytic sample are shown in Table 1.

Social network position.—Given this study's aim of examining the relationship between self-harm and peer networks broadly, analyses include a range of social network variables that represent different facets of a teen's position in his/her peer network. *Popularity* is measured with in-degree, or how many friendship nominations a respondent receives; *sociality* is measured by out-degree, or how many friendship nominations a respondent sends. *Closeness* conceptually represents how easily an adolescent can access others (or information, norms, etc.) across the network, and it is measured by how many steps an individual would need to take to reach others in the network. This measure corresponds to the inverse of the geodesic distance to other nodes (Wasserman & Faust, 1994). *Bridging* is measured by betweenness centrality, with high values indicating teens that connect peers in the network. Formally, this measure is the normalized number of paths where a node is on the geodesic path between two other actors (Wasserman & and Faust 1994), shown here as the square-root transformation. *Centrality*, measured by Bonacich centrality, provides a far-reaching measure of overall popularity by taking into account the popularity of one's friends. This measure captures status with reference to the entire network. High values indicate that a teen is popular among peers who are also popular across the network. Measuring centrality thus distinguishes popular youth who have elevated levels of network connections among highly connected friends (high centrality) from youth who are popular among peers who are relatively lacking in connections (low centrality). *Reciprocity* indicates the closeness of teens' friendships measured by the proportion of individuals' ties in which both parties nominated each other as friends. These measures indicate distinct aspects of youths' social positions among peers, such as bridging different groups of peers, being popular among other popular youth, or being on the fringe of a social network.

Sociodemographic variables.—Control variables include *depressive symptoms* (1 = depressed, 0 = nondepressed), assessed by a dichotomous question drawn from the CDC Youth Risk Behavior Survey: "In the past 12 months: Did you ever feel so sad or hopeless almost every day for two weeks or more in a row that you stopped doing some usual activities?" Because teens who cut may be more likely to have friends who also cut, models control for *friends' self-cutting*; this variable is measured as the average value for the outcome cutting variable among the individual's friends (through sent or received ties).

Demographic controls include binary indicators for *male* (1 = male, 0 = female); *white* (1 = white, 0 = nonwhite); and *low socioeconomic status* (SES) (1 = low SES, 0 = moderate/high SES), as measured by eligibility for free/reduced-price school lunch based on family income below 150% of the federal poverty line. Because adolescents' parental relationships could shape both motivations to self-cut and social connections with peers, analyses include controls for *family relations*, a measure of family dynamics drawn from a scale of parental attachment and supervision items (α = .95; shown in Appendix A). A measure controlling for another aspect of adolescents' social context is *school adjustment*, which measures teens' adjustment and bonding to their school (α =.77), drawn from items shown in Appendix A. These measures enable examination of how social network positions relate to self-cutting net of other characteristics of adolescents' social contexts.

Other control measures mitigate effects of survey design on the analyses. Models include a control variable for the *wave* of the survey, given that self-cutting rates may have changed

over time. Also included is *wave count*, a count of the number of times each individual contributes to the survey, to account for differential attrition in the sample. *Treatment* is a dummy variable indicating whether adolescents attend a school that was in the treatment condition of the broader PROSPER intervention, which targeted teen resilience against substance use. Because the friendship nomination section of the survey limited respondents to naming a maximum of seven friends, models include a dummy variable, *max out-degree*, to indicate adolescents who named seven peers as friends and may have wanted to name more friends but were unable to do so. *Out-of-grade friends* is a count of how many friends an adolescent has outside of his/her grade or school, drawn from two multiple choice questions following the friendship nomination section of the survey asking how many friends respondents have outside of their grade/school. This variable indicates the extent to which teens may be spending their social energy outside of the school peer network boundary captured in the survey.

Plan of Analysis

Analyses use logistic regression to predict the binary outcome of self-cutting. Because teens are nested within schools that potentially have contextual effects, analyses pool both waves of data and use random effects to account for clustering at the individual and school-level. This study examines whether adolescents' social positions are associated with self-cutting, and thus analyses employ a random-effects framework to estimate between-person (rather than within-person) effects. Analyses exclude students from the first cohort who repeated a grade during the period captured in the sample ($n = 24$) because they were recruited into the second cohort, resulting in two entries for the same grade. Given the robustness of social network measures to missingness (Smith et al. 2017) and lack of validated imputation methods for sociocentric variables, cases with missing data are listwise deleted. This exclusion results in a loss of 28% of cases from the initial sample size, for an analytic sample of $n = 11{,}160$. Analyses are conducted in Stata 15.

The association between self-cutting and each network measure is first presented individually, net of controls, to show baseline associations between cutting and each facet of adolescents' positions among peers (Models 1–6). These models include a measure of depressive symptoms to further examine the relationship between each network position and self-cutting beyond indirect associations with mental distress. Measures are then analyzed in an omnibus model with all network variables and controls included to better capture the simultaneity of network features. The first of these models excludes depressive symptoms (Model 7); the next model adjusts for depressive symptoms (Model 8) to test whether depressive symptoms account for any observed relationship between network measures and self-cutting, a pattern consistent with mediation. The final model includes interactions between gender and network variables (Model 9) to test gender moderation.

Results

Table 2 shows results of models with individual network measures and controls to examine associations of each aspect of network integration among peers and self-cutting.

Significant control variables indicate that in all models, cutting is associated with being female, lower socioeconomic status, and worse parental relationships. Having more out-of-grade friends is positively associated with cutting, and self-reported school adjustment is negatively associated with cutting, suggesting that integration into the school environment is an important component in teen self-cutting. As expected given the internal and social functions of self-harm, self-cutting is also positively associated with depressive symptoms and with having friends who report cutting. In these (and subsequent) models, school-level parameters are nonsignificant, suggesting that after controls and network features are accounted for, there are no longer significant school-level differences in relationships between networks and cutting. This pattern suggests that the associations between positions in the network structure and teens' self-cutting do not significantly vary from school to school.

Of the network measures included in Models 1–6, two are significantly associated with cutting: sociality and centrality. Higher sociality (nominating more friends) and centrality (being popular among other popular youth) predict lower cutting, consistent with Hypothesis 2A. The association between cutting and these features of social positions net of depressive symptoms indicates the social nature of self-harm. This finding suggests peer networks predict cutting after accounting for depressive symptoms that could spur internal motivations to self-injure, consistent with Hypothesis 1.

Although each network measure indicates a conceptually distinct facet of adolescents' social positions, teens do not experience their social positions among peers one separate component at a time. Instead, multiple features of positions experienced simultaneously might relate to self-cutting differently. To capture this more holistic view of social positions in relation to cutting, Models 7–9 in Table 3 include all the peer network measures.

Comparing results across Model 7 and 8 suggests that depressive symptoms do not account for the relationships between network position and self-cutting observed here: sociality and bridging are significant in models with and without depressive symptoms included. That is, associations between network position and self-cutting are not fully attenuated by including depressive symptoms. Because depressive symptoms are significantly associated with self-cutting and substantially improve model fit, as indicated by a lower information criteria value for Model 8 compared with Model 7, models that include depressive symptoms provide a better estimate of the relationship between network positions and self-cutting.

In Model 8, sociality maintains a negative association with cutting (supporting Hypotheses 1 and 2A), but centrality is no longer significantly associated with cutting when other aspects of network positions are included in the same model. Additionally, bridging is positively associated with cutting: net of the other network features, being in a position connecting others is associated with higher self-cutting, consistent with Hypothesis 2B.

Because both sociality and cutting are gendered in adolescence, network measures are interacted with gender in Model 9. Here, the interaction between gender and bridging is not statistically significant, indicating that the effect of bridging on self-cutting does not differ by gender, contrary to expectations of Hypothesis 3. For sociality, however, the gender

interaction is significant (supporting Hypothesis 3), indicating that the association between claiming more friends and lower self-cutting observed in previous models is driven primarily by the boys in the sample. The nonsignificant main effect here indicates that sociality does not significantly predict self-cutting for girls. Figure 1 illustrates this interaction, showing the predicted probability of self-cutting on sociality for boys and girls. The figure shows that boys typically have lower rates of cutting than girls and that boys see a greater reduction in predicted cutting associated with increased sociality.

For example, holding all else at the mean in Model 9, a teenage boy who sends seven friendship nominations (the maximum number allowed on the survey) sees a reduction in the predicted probability of self-cutting of about .06 compared with a boy who sends zero nominations. For girls, the respective reduction in predicted cutting is about .03. Although these changes in probability seem small, consider that the difference in predicted cutting between youth who indicate depressive symptoms and those who indicate no depressive symptoms is .14, holding all other variables at their means. By comparison, for boys, social engagement toward school friends is associated with nearly half as large an impact on predicted cutting as that of depressive symptoms.

Robustness checks (available in the supplemental appendix) indicate that the results are not sensitive to alternative specifications of variables. Curvilinear (quadratic) versions of the network positions tested in the omnibus model are nonsignificant, and their inclusion leads to worse model fit. Models with a binary indicator of any exposure to friends' self-cutting, models with a nontransformed bridging variable, and models excluding centrality, out-of-grade friends, or friends' self-cutting all show the same patterns of results as the models shown here. Additionally, adding control variables sequentially in stepwise regression does not alter the patterns of results.

Discussion

Adolescent self-harm is a pressing public health concern. Theories of self-injury suggest that self-harm serves internal motives of regulating emotional distress as well as explicitly social functions. In adolescence, social positions among peers also take on heightened importance. Although numerous studies have established the relationship between peer social networks and mental distress, the growing self-harm literature has not yet described the social network profiles of adolescents who self-harm. This study examines associations between one form of self-harm and social network measures to provide the first steps toward delineating network profiles of self-harming teens. Overall, analyses using data from the PROSPER study show that sending more friendship nominations (sociality) is associated with lower cutting for boys, and bridging others in the network is positively associated with cutting for both genders, net of depressive symptoms, friends' self-cutting, and sociodemographic characteristics (consistent with Hypothesis 1).

The results indicate that variation in the association between network positions and self-cutting is primarily between individuals rather than school settings: parameters accounting for differences across schools were small and nonsignificant in all models, suggesting that the associations between network positions and self-cutting are consistent across the schools

in this sample. Additionally, although depressive symptoms are significantly associated with self-cutting, they do not attenuate the relationship between network positions and self-cutting. Network measures that predict self-cutting do so even when depressive symptoms are included in the model, thus finding no support for a mediation effect of depressive symptoms. This finding suggests that network positions relate to social functions of self-cutting beyond an indirect relationship via depressive symptoms, aligning with theories of the social nature of the behavior (Bentley et al. 2014).

Results regarding network positions indicate that sociality and centrality are associated with lower cutting, and gender interactions indicate that sociality is particularly protective for boys. These findings suggest that more integrative positions, such as being popular among other popular youth, may have psychosocial benefits or reduce the salience of self-harm as a tool for social gains (consistent with Hypothesis 2A). However, the relationship between centrality and self-cutting becomes nonsignificant when modeled in conjunction with other network measures, revealing that centrality does not have unique effects beyond those of other facets of individuals' network positions, such as sociality. The relationship between sociality and self-cutting remains significant in omnibus models, indicating that boys who spend their social energy among school peers and who see themselves as connected in the school network may encounter less internal or social motivation to cut. Alternatively, isolated boys who do not see themselves as belonging among school peers or who have only minimal connection to their network may face greater risks of self-harm. These results are consistent with research finding that sociality in particular is associated with lower mental distress (Guan and Kamo 2016). Results here extend this pattern to cutting and show gender moderation in the benefits of sociality. More generally, this finding aligns with psychological theories predicting that gender differences in friendships, socialization, and peer interaction lead to different effects of peer contexts on mental health and behavior (Kornienko and Santos 2014). It thus extends this developmental trade-off theory (Rose and Rudolph 2006) to specific aspects of network positions, such as sociality, and to a specific type of self-harm, self-cutting (consistent with Hypothesis 3).

As the trade-off model would predict, however, network connections are not always beneficial. Bridging is associated with higher levels of cutting (consistent with Hypothesis 2B), suggesting that adolescents may be particularly subject to stress or other social costs associated with connecting others in the network. Higher bridging values may indicate that youth do not feel wholly integrated into one peer group or another. Teens who hold bridging positions may be more likely to use self-harm to deepen bonds or signal group membership than teens who are in more fully embedded positions with more clear integration into a particular group. This finding problematizes prior work that viewed high bridging as a positive, beneficial position conveying status and social gate-keeping among peers (Faris and Felmlee 2011). Rather, the positive relationship between bridging and self-cutting found here aligns with prior work finding that being in bridging positions might not be as uniformly beneficial as previously assumed (Carboni and Gilman 2012). This study extends such work finding bridging positions can tax adolecents' mental health to both genders). To the extent that bridging suggests a precarious or less clearly cohesive position among peers, this result is also broadly consistent with other research finding that occupying a structurally noncohesive (Falci and McNeely 2009) or imbalanced (Bearman and Moody 2004) position

is associated with mental distress. Additionally, this positive relationship between bridging and cutting demonstrates how network features capturing broader patterns of ties across the entire social network relate to self-cutting, which is missed if only self-reports of close friendships or friendship dyads are considered.

Overall, this study contributes to the study of peer networks and self-harm in adolescence by suggesting several ways that future research should consider peer networks as sources of both benefits and risks to health. Although social integration among peers, particularly self-perceived integration for boys, supports mental health and predicts lower self-harm, researchers should not assume that integration is uniformly beneficial for health. Other features of network positions, such as bridging peers in the network, can be sources of stress or social strain that can spur self-harm. Future research should investigate the mechanisms by which bridging positions relate to higher self-harm to further develop the theoretical motivations for risks associated with these positions. Researchers should also consider the role of gender in social network processes related to mental health, given that these findings support theories that point to differential social experiences of peer relationships by gender and distinct associations between network position and self-harm for adolescent boys and girls. Further, this study suggests that the meaningful social functions of self-harm occur for individuals based on their position among peers rather than the idiosyncratic traits of a given school. Using sociocentric network data to better capture the multilayered, complex nature of adolescent social life among school peers also indicates the importance of social structure to adolescent health, beyond isolated dyads, ego networks, or perceptions of relationships.

No single study can sufficiently guide comprehensive recommendations for practice, but contingent on subsequent research, this study suggests several points related to mental health and school-based practice to which professionals should be sensitive. Clinicians and practitioners concerned with self-cutting among youth should consider self-cutting to be a partly social phenomenon, not limited to severely depressive adolescents or exclusively private or clinical spheres. Practitioners may benefit from regarding peer networks as both a potentially detrimental and a potentially protective resource, beyond assuming that simply having friends uniformly supports mental health and self-harm prevention for all youth. The latter view may not capture the complexities of teen social life that can shape motivations to self-harm. Parents, teachers, and other professionals who can observe peer dynamics should also consider that youth who socially bridge others in the network face greater risks for self-cutting, as do boys who do not associate with school peers or do not see themselves as part of the school social environment. Moreover, this analysis of sociocentric networks and the significance of network-spanning measures such as bridging suggest that school-based self-harm interventions may benefit in the long term from taking peer network positions into account. Network information may be utilized both to identify at-risk students and to aid in prevention and intervention efforts, given that leveraging network structure has been shown to significantly improve exposure to intervention in efforts targeting mental well-being (Pickering et al. 2018). This study also suggests the benefits of considering potential variance in the relationship between peer networks and self-harm by gender; professionals can best address how connections with peers shape self-harm by differentiating expectations by gender, rather than adopting one-size-fits-all practices or programs. Again, however,

given the nascence of this literature examining social networks and self-harm, these suggestions should not be considered strict guidelines for practice or intervention.

Three limitations to this study are worth noting. First, the data used here examine two years in late adolescence, but earlier ages generally show higher prevalence of cutting and other forms of self-harm. Second, the data are restricted to only one, typically gendered method of self-harm and one measure of depressive symptoms. Future research should examine other forms of self-harm and more comprehensive measures of mental distress that may indicate alternative dimensions of distress linking networks and self-cutting. Finally, the data set used here includes only youth in rural Iowa and Pennsylvania, and the results could differ for adolescents in other settings. Future work should examine these patterns with more representative samples in longitudinal data to address further questions of causality.

Conclusion

Self-harm is theorized to have distinctly social functions, but despite the rich literature demonstrating the relationship between peer networks and mental distress in adolescence, the social networks of teens who self-harm remain unclear. This study contributes to understanding the social contexts of self-harm in adolescence by taking the first steps toward clarifying the social network positions of teens who engage in a common self-harm behavior, self-cutting. Results indicate that dimensions of integration into peer networks predict self-cutting in two ways: bridging others in the network is associated with higher self-cutting, and sociality (or nominating peers as friends) is associated with lower self-cutting, especially for boys. These findings highlight the important role of social network integration for adolescents' mental health and support developmental theories outlining gender differences in the nature and implications of peer friendships. This work contributes to the study of adolescent social well-being and mental health by describing the peer network profiles of self-cutting teens and the ways in which integration into networks can present both benefits and risks to mental health differentially by gender. This study suggests that future research seeking to understand functions and patterns of self-harm should consider the social structures of the peer context. Future work should examine self-harm contagion and the mechanisms relating peers to self-harm, differentiated by gender and network patterns. Policymakers and professionals working with adolescents should consider how dimensions of peer relationships, particularly bridging others or not viewing any peers as friends, can indicate adolescents who may be particularly at risk for self-harm.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

The authors thank the members of working groups at Duke and PSU for their helpful comments and acknowledge the contributions of study participants, families, and the PROSPER staff to making this project possible.

Funding: This research is supported by grants from the W. T. Grant Foundation (8316) and National Institute on Drug Abuse (R01 DA018225) to D. Wayne Osgood. The analyses used data from PROSPER, a project directed by R. L. Spoth, funded by the National Institute on Drug Abuse (R01 DA013709) and co-funded by the National Institute on Alcohol Abuse and Alcoholism.

Appendix A

Family relations scale:

The scale was constructed by taking the mean of each of the standardized measures, using the grand composite of the four affective quality subscales with one-fourth weight.

To assess *affective quality*, respondents were asked, “During the past month, how often did…”:

- Your MOM let you know she really cares about you?
- Your MOM act loving and affectionate toward you?
- Your MOM let you know that she appreciates you, your ideas, or the things you do?
- YOU let your mom know you really care about her?
- YOU act loving and affectionate toward your mom?
- YOU let your mom know what you appreciate her, her ideas, or the things she does?
- Your DAD let you know he really cares about you?
- Your DAD act loving and affectionate toward you?
- Your DAD let you know that he appreciates you, your ideas, or the things you do?
- YOU let your dad know you really care about him?
- YOU act loving and affectionate toward your dad?
- YOU let your dad know what you appreciate him, his ideas, or the things he does?

Response options to these questions were 1 = Always or almost always, 2 = Often, 3 = About half the time, 4 = Not very often, or 5 = Never or almost never.

To assess *activities with child*, respondents were asked, “During the past month, how often did…”:

- You work on homework or a school project together with your Mom or Dad?
- You do something active together with your Mom or Dad?
- You talk about what’s going on at school with your Mom or Dad?
- You work on something together around the house with your Mom or Dad?
- You discuss what you want to do in the future with your Mom or Dad?
- You do some other fun activity that you both enjoy with your Mom or Dad?

Response options to these questions were 1 = Everyday, 2 = A few times a week, 3 = About once a week, 4 = Two or three times during the past month, 5 = Once during the past month, or 6 = Not during the past month.

To assess *inductive reasoning*, respondents were asked, “During the past month, how often did…”:

- My parents give me reasons for their decisions.
- My parents ask me what I think before making a decision that affects me.
- When I don’t understand why my parents make a rule for me, they explain the reason.

Response options to these questions were 1=Always, 2=Almost always, 3=Almost half the time, 4=Almost never, 5=Never

School adjustment scale:

Items are rated 1–5, with 1 = Never true, 2 = Seldom true, 3 = Sometimes true, 4 = Usually true, and 5 = Always true. (R) indicates that an item is reverse-coded. Items include:

- I like school a lot.
- I try hard at school.
- Grades are very important to me.
- School bores me. (R)
- I don’t feel like I really belong at school. (R)
- I feel very close to at least one of my teachers.
- I get along well with my teachers.
- I feel that teachers are picking on me. (R)

Biography

Molly Copeland is a PhD candidate at Duke University. Her major research interests include social networks, adolescent mental health, and social determinants of health.

Sonja E. Siennick is an associate professor at Florida State University’s College of Criminology & Criminal Justice. She studies criminal offending and mental health problems in the contexts of the life course and kinship and friendship relations.

Mark E. Feinberg is a research professor at The Pennsylvania State University. His research focuses on family relationships and family and community prevention.

James Moody is a professor at Duke University and King Abdulaziz University. His current research focuses on dynamic social network methods and social cohesion and diffusion.

Daniel T. Ragan is an assistant professor in the Department of Sociology at the University of New Mexico. His current research focuses on adolescent delinquency and drug use, crime over the life course, and social networks.

References

Adler PA, & Adler P (2011). The Tender Cut. New York: NYU Press.

Andrews T, Martin G, Hasking P, & Page A (2014). Predictors of onset for non-suicidal self-injury within a school-based sample of adolescents. Prevention Science: The Official Journal of the Society for Prevention Research, 15(6), 850–859. 10.1007/s11121-013-0412-8 [PubMed: 23812886]

Bakken NW, & Gunter WD (2012). Self-cutting and suicidal ideation among adolescents: Gender differences in the causes and correlates of self-injury. Deviant Behavior, 33(5), 339–356. 10.1080/01639625.2011.584054

Bearman PS, & Moody J (2004). Suicide and friendships among American adolescents. American Journal of Public Health, 94(1), 89–95. [PubMed: 14713704]

Bentley KH, Nock MK, & Barlow DH (2014). The four-function model of nonsuicidal self-injury: Key directions for future research. Clinical Psychological Science, 2(5), 638–656. 10.1177/2167702613514563

Carboni I, & Gilman R (2012). Brokers at risk: Gender differences in the effects of structural position on social stress and life satisfaction. Group Dynamics, 16(3), 218–230. 10.1037/a0028753

Cheadle JE, & Goosby BJ (2012). The small-school friendship dynamics of adolescent depressive symptoms. Society and Mental Health, 2(2), 99–119. 10.1177/2156869312445211 [PubMed: 23599906]

Christoffersen MN, Mohl B, DePanfilis D, & Vammen KS (2015). Non-suicidal self-injury - Does social support make a difference? An epidemiological investigation of a Danish national sample. Child Abuse and Neglect, 44, 106–116. 10.1016/j.chiabu.2014.10.023 [PubMed: 25435107]

Claes L, Houben A, Vandereycken W, Bijttebier P, & Muehlenkamp J (2010). Brief report: The association between non-suicidal self-injury, self-concept and acquaintance with self-injurious peers in a sample of adolescents. Journal of Adolescence, 33(5), 775–778. 10.1016/j.adolescence.2009.10.012 [PubMed: 19910041]

Cotterell J (2007). Social Networks in Youth & Adolescence. New York, NY: Routledge.

Douvan E (1983). Commentary: Theoretical perspectives on peer sssociation In Epstein JL & Karweit N (Eds.), Friends in School: Patterns of Selection and Influence in Secondary Schools (pp. 63–69). New York: Academic Press.

Falci C, & McNeely C (2009). Too many friends: Social integration, network cohesion and adolescent depressive symptoms. Social Forces, 87(4), 2031–2062.

Faris R, & Felmlee D (2011). Status struggles: Network centrality and gender segregation in same- and cross-gender aggression. American Sociological Review, 76(1), 48–73. 10.1177/0003122410396196

Fortune SA, & Hawton K (2005). Deliberate self-harm in children and adolescents: a research update. Current Opinion in Psychiatry, 18, 401–406. 10.1097/01.yco.0000172059.55778.c9 [PubMed: 16639133]

Geulayov G, Casey D, McDonald KC, Foster P, Pritchard K, Wells C, … Hawton K (2018). Incidence of suicide, hospital-presenting non-fatal self-harm, and community-occurring non-fatal self-harm in adolescents in England (the iceberg model of self-harm): a retrospective study. The Lancet Psychiatry, 5(2), 167–174. 10.1016/S2215-0366(17)30478-9 [PubMed: 29246453]

Giletta M, Burk WJ, Scholte RHJ, Engels RCME, & Prinstein MJ (2013). Direct and indirect peer socialization of adolescent nonsuicidal self-injury. Journal of Research on Adolescence, 23(3), 450–463. 10.1111/jora.12036 [PubMed: 26412955]

Guan W, & Kamo Y (2016). Contextualizing depressive contagion: A multilevel network approach. Society and Mental Health, 6(2), 129–145. 10.1177/2156869315619657

Hamza CA, & Willoughby T (2014). A longitudinal person-centered examination of nonsuicidal self-injury among university students. Journal of Youth and Adolescence, 43(4), 671–685. 10.1007/s10964-013-9991-8 [PubMed: 23933867]

Hawton K, Bergen H, Kapur N, Cooper J, Steeg S, Ness J, & Waters K (2012). Repetition of self-harm and suicide following self-harm in children and adolescents: Findings from the Multicentre Study of Self-harm in England. Journal of Child Psychology and Psychiatry and Allied Disciplines, 53(12), 1212–1219. 10.1111/j.1469-7610.2012.02559.x

Hawton K, Harriss L, & Rodham K (2010). How adolescents who cut themselves differ from those who take overdoses. European Child and Adolescent Psychiatry, 19(6), 513–523. 10.1007/s00787-009-0065-0 [PubMed: 19784715]

Heilbron N, & Prinstein MJ (2008). Peer influence and adolescent nonsuicidal self-injury: A theoretical review of mechanisms and moderators. Applied and Preventive Psychology, 12(4), 169–177. 10.1016/j.appsy.2008.05.004

Jarvi S, Jackson B, Swenson L, & Crawford H (2013). The impact of social contagion on non-suicidal self-injury: A Review of the literature. Archives of Suicide Research, 17(1), 1–19. 10.1080/13811118.2013.748404 [PubMed: 23387399]

Kornienko O, Clemans KH, Out D, & Granger DA (2013). Friendship network position and salivary cortisol levels. Social Neuroscience, 8(4), 385–396. 10.1080/17470919.2013.795500 [PubMed: 23682997]

Kornienko O, & Santos CE (2014). The effects of friendship network popularity on depressive symptoms during early adolescence: Moderation by fear of negative evaluation and gender. Journal of Youth and Adolescence, 43(4), 541–553. 10.1007/s10964-013-9979-4 [PubMed: 23832253]

La Greca AM, & Harrison HM (2005). Adolescent peer relations, friendships, and romantic relationships: Do they predict social anxiety and eepression. Journal of Clinical Child and Adolescent Psychology, 34(1), 49–61. 10.1207/s15374424jccp3401 [PubMed: 15677280]

Laukkanen E, Rissanen ML, Honkalampi K, Kylmä J, Tolmunen T, & Hintikka J (2009). The prevalence of self-cutting and other self-harm among 13- to 18-year-old Finnish adolescents. Social Psychiatry and Psychiatric Epidemiology, 44(1), 23–28. 10.1007/s00127-008-0398-x [PubMed: 18604615]

McFarland DA, Moody J, Diehl D, Smith JA, & Thomas RJ (2014). Network ecology and adolescent social structure. American Sociological Review, 79(6), 1088–1121. 10.1177/0003122414554001 [PubMed: 25535409]

Nixon MK, & Heath NL (2009). Introduction to self-Injury in adolescence. In Self-Injury in Youth: The Essential Guide to Assessment and Intervention (pp. 1–6).

Nock MK (2010). Self-injury. Annual Review of Clinical Psychology, 6, 339–363. 10.1146/annurev.clinpsy.121208.131258

Pickering TA, Wyman PA, Schmeelk-Cone K, Hartley C, Valente TW, Pisani AR, … LoMurray M (2018). Diffusion of a peer-led suicide preventive intervention through school-based student peer and adult networks. Frontiers in Psychiatry, 9(11), 1–16. 10.3389/fpsyt.2018.00598 [PubMed: 29410632]

Prinstein MJ, & Wang SS (2005). False consensus and adolescent peer contagion: Examining discrepancies between perceptions and actual reported levels of friends' deviant and health risk behaviors. Journal of Abnormal Child Psychology, 33(3), 293–306. 10.1007/s10802-005-3566-4 [PubMed: 15957558]

Reynolds AD, & Crea TM (2015). Peer influence processes for youth delinquency and depression. Journal of Adolescence, 43, 83–95. 10.1016/j.adolescence.2015.05.013 [PubMed: 26066630]

Rose AJ, Carlson W, & Waller EM (2007). Prospective associations of co-rumination with friendship and emotional adjustment: Considering the socioemotional trade-offs of co-rumination. Developmental Psychology, 43(4), 1019–1031. 10.1037/0012-1649.43.4.1019 [PubMed: 17605532]

Rose AJ, & Rudolph KD (2006). A review of sex differences in peer relationship processes: Potential trade-offs for the emotional and behavioral development of girls and boys. Psychological Bulletin, 132(1), 98–131. 10.1037/0033-2909.132.1.98 [PubMed: 16435959]

Smith JA, Moody J, & Morgan JH (2017). Network sampling coverage II: The effect of non-random missing data on network measurement. Social Networks, 48, 78–99. 10.1016/j.socnet.2016.04.005 [PubMed: 27867254]

Tuisku V, Kiviruusu O, Pelkonen M, Karlsson L, Strandholm T, & Marttunen M (2014). Depressed adolescents as young adults - Predictors of suicide attempt and non-suicidal self-injury during an 8-year follow-up. Journal of Affective Disorders, 152–154(1), 313–319. 10.1016/j.jad.2013.09.031

Ueno K (2005). The effects of friendship networks on adolescent depressive symptoms. Social Science Research, 34(3), 484–510. 10.1016/j.ssresearch.2004.03.002

Umberson D, Crosnoe R, & Reczek C (2010). Social relationships and health behavior across life course. Annual Review of Sociology, 36, 139–157. 10.1146/annurev-soc-070308-120011.Social

Walsh BW (2006). Treating Self Injury: A Practical Guide. New York: The Guilford Press.

Wasserman SS, & Faust K (1994). Social Network Analysis: Methods and Applications (Vol. 8). Cambridge, UK: Cambridge University Press.

You J, Lin MP, Fu K, & Leung F (2013). The best friend and friendship group influence on adolescent nonsuicidal self-injury. Journal of Abnormal Child Psychology, 41(6), 993–1004. 10.1007/s10802-013-9734-z [PubMed: 23474798]

You J, Zheng C, Lin MP, & Leung F (2016). Peer group impulsivity moderated the individual-level relationship between depressive symptoms and adolescent nonsuicidal self-injury. Journal of Adolescence, 47, 90–99. 10.1016/j.adolescence.2015.12.008 [PubMed: 26775191]

Young R, Sweeting H, & West P (2006). Prevalence of deliberate self harm and attempted suicide within contemporary Goth youth subculture: longitudinal cohort study. BMJ, 332, 1058–1061. 10.1136/bmj.38790.495544.7C [PubMed: 16613936]

Zahn-Waxler C, Klimes-Dougan B, & Slattery MJ (2000). Internalizing problems of childhood and adolescence: Prospects, pitfalls, and progress in understanding the development of anxiety and depression. Development and Psychopathology, 12, 443–466. Retrieved from http://journals.cambridge.org/abstract_S0954579400003102 [PubMed: 11014747]

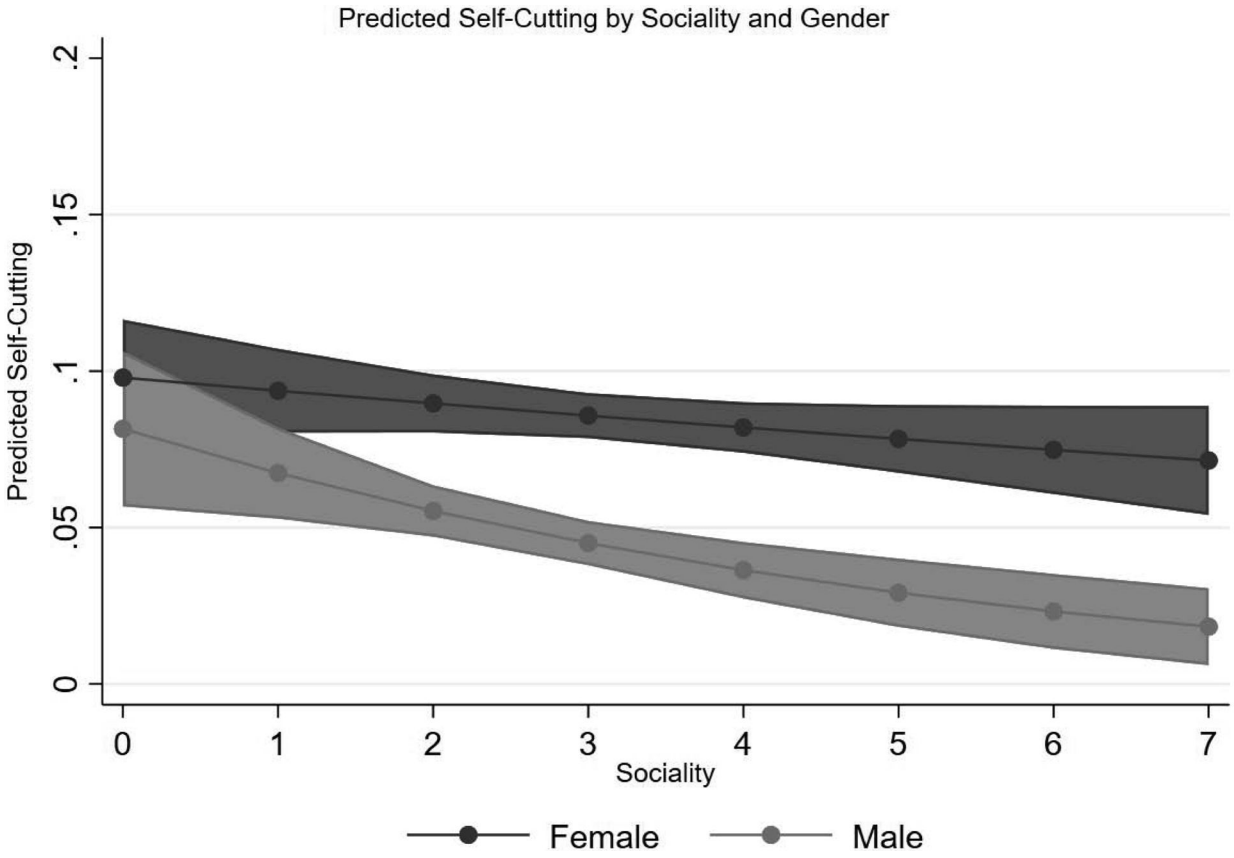

Fig. 1.
Predicted Self-Cutting by Sociality and Gender

Table 1.

Descriptive statistics for PROSPER Peers sample (Waves 7–8)

	Mean/Proportion	SD	Min.	Max.
Self-cutting	.07	.26	0	1
Network Variables				
Popularity	2.78	2.17	0	15
Sociality	2.95	1.98	0	7
Closeness	.22	.08	0	.44
Bridging	.12	.10	0	.62
Centrality	0.79	.10	0	4.5
Reciprocity	.45	.38	0	1
Control Variables				
Depressive Symptoms	.16	.37	0	1
Friends' Self-cutting	.07	.17	0	1
Male	.44	.50	0	1
White	.86	.34	0	1
Low SES	.19	.39	0	1
Family Relations	−.16	.41	−1.40	.83
School Adjustment	3.67	.67	1	5
Out-of-Grade Friends	10.08	6.29	0	20
Max Out-Degree	.05	.21	0	1
Treatment	.49	.50	0	1
Wave Count	1.78	.42	1	2
Observations	11,160			
Respondents	7,600			

Table 2.

Multilevel logistic regression of self-cutting in PROSPER Peers.

	M1	(SE)	M2	(SE)	M3	(SE)	M4	(SE)	M5	(SE)	M6	(SE)
Male	−0.970***	(0.11)	−1.014***	(0.11)	−0.959***	(0.11)	−0.969***	(0.11)	−0.956***	(0.11)	−0.982***	(0.13)
White	−0.273	(0.16)	−0.223	(0.17)	−0.244	(0.17)	−0.281	(0.16)	−0.247	(0.16)	−0.276	(0.16)
Low-SES	0.599***	(0.14)	0.570***	(0.14)	0.582***	(0.13)	0.610***	(0.13)	0.558***	(0.14)	0.605***	(0.14)
Family Relations	−1.039***	(0.16)	−1.026***	(0.16)	−1.038***	(0.16)	−1.044***	(0.16)	−1.016***	(0.15)	−1.042***	(0.16)
School Adjustment	−0.912***	(0.13)	−0.870***	(0.13)	−0.901***	(0.13)	−0.917***	(0.13)	−0.887***	(0.13)	−0.913***	(0.13)
Depressive Symptoms	2.646***	(0.16)	2.630***	(0.16)	2.639***	(0.16)	2.646***	(0.16)	2.633***	(0.16)	2.646***	(0.16)
Friend Self-cutting	1.417***	(0.36)	1.372***	(0.35)	1.386***	(0.36)	1.435***	(0.36)	1.341***	(0.34)	1.426***	(0.36)
Popularity	−0.022	(0.03)										
Sociality			−0.160***	(0.04)								
Closeness					−1.639	(0.89)						
Bridging							0.185	(0.54)				
Centrality									−0.366**	(0.12)		
Reciprocity											−0.102	(0.18)
Out-of-grade Friends	0.047***	(0.01)	0.050***	(0.01)	0.048***	(0.01)	0.047***	(0.01)	0.048***	(0.01)	0.047***	(0.01)
Treatment	−0.042	(0.14)	−0.009	(0.14)	−0.026	(0.14)	−0.045	(0.14)	−0.049	(0.14)	−0.043	(0.14)
Wave	−0.208*	(0.10)	−0.259*	(0.10)	−0.252*	(0.10)	−0.198*	(0.10)	−0.227*	(0.10)	−0.201*	(0.10)
Wave Count	−0.165	(0.15)	−0.108	(0.15)	−0.145	(0.14)	−0.175	(0.15)	−0.139	(0.14)	−0.168	(0.15)
Max Out-Degree	0.133	(0.46)	0.748	(0.50)	0.212	(0.47)	0.078	(0.45)	0.430	(0.48)	0.094	(0.44)
Intercept	−1.733***	(0.44)	−1.656***	(0.45)	−1.539**	(0.47)	−1.774***	(0.45)	−1.679***	(0.44)	−1.730***	(0.44)
Random-Effects Parameters												
School Level	0.019	(0.03)	0.019	(0.03)	0.020	(0.03)	0.019	(0.03)	0.022	(0.03)	0.019	(0.03)
Individual Level	4.937***	(0.72)	4.937***	(0.75)	4.944***	(0.74)	4.936***	(0.72)	4.930***	(0.74)	4.934***	(0.72)
Observations	11,160		11,160		11,160		11,160		11,160		11,160	
Respondents	7,600		7,600		7,600		7,600		7,600		7,600	
AIC	4,503.0		4,484.0		4,499.9		4,503.4		4,493.9		4,503.1	
BIC	4,620.1		4,601.1		4,617.0		4,620.5		4,611.0		4,620.2	

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

Table 3.

Multilevel logistic regression of self-cutting in PROSPER Peers

	M7	(SE)	M8	(SE)	M9	(SE)
Male	−1.543***	(0.16)	−0.996***	(0.13)	−0.086	(0.49)
White	−0.263	(0.19)	−0.212	(0.17)	−0.212	(0.16)
Low SES	0.649***	(0.16)	0.549**	(0.14)	0.567***	(0.14)
Family Relations	−1.504***	(0.18)	−1.017***	(0.16)	−1.023***	(0.15)
School Adjustment	−1.234***	(0.16)	−0.862***	(0.13)	−0.868***	(0.13)
Depressive Symptoms			2.609***	(0.16)	2.639***	(0.16)
Friends' Self-cutting	1.588***	(0.39)	1.341***	(0.34)	1.378***	(0.34)
Popularity	0.079	(0.07)	0.047	(0.06)	0.023	(0.07)
Sociality	−0.188**	(0.06)	−0.167**	(0.05)	−0.087	(0.06)
Closeness	−1.831	(1.28)	−1.063	(1.11)	−0.178	(1.84)
Bridging	2.931***	(0.80)	2.316**	(0.79)	2.571*	(1.09)
Centrality	−0.416	(0.29)	−0.268	(0.25)	−0.374	(0.29)
Reciprocity	−0.070	(0.22)	0.030	(0.22)	0.072	(0.22)
Male × Popularity					−0.016	(0.11)
Male × Sociality					−0.269*	(0.11)
Male × Closeness					−2.510	(3.10)
Male × Bridging					−0.358	(1.54)
Male × Centrality					0.516	(0.53)
Male × Reciprocity					−0.059	(0.51)
Out-of-Grade Friends	0.063***	(0.01)	0.049***	(0.01)	0.049***	(0.01)
Treatment	0.055	(0.15)	−0.000	(0.14)	−0.001	(0.14)
Wave	−0.370**	(0.11)	−0.290**	(0.11)	−0.296**	(0.11)
Wave Count	−0.244	(0.15)	−0.106	(0.15)	−0.110	(0.15)
Max Out-Degree	0.915	(0.53)	0.830	(0.50)	0.784	(0.52)
Intercept	0.248	(0.55)	−1.597***	(0.47)	−1.966***	(0.53)
Random-Effects Parameters						
School Level	0.007	(0.04)	0.019	(0.03)	0.021	(0.03)
Individual Level	7.790***	(1.70)	4.881***	(0.71)	5.024***	(0.78)
Observations	11,160		11,160		11,160	
Respondents	7,600		7,600		7,600	
AIC	4,910.6		4,483.6		4,479.6	
BIC	5,057.0		4,637.4		4,670.0	

* $p < .05$,

** $p < .01$,

*** $p < .001$