Connectedness and Suicide Prevention in Adolescents: Pathways and Implications

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Adolescent suicide is a major public health concern. Stressing the need for public health–based solutions, the Centers for Disease Control and Prevention identified "connectedness" as one means of pursuing this agenda. To advance this effort in suicide prevention with adolescents, (1) consistencies and variation in the literature overtly linking connectedness to suicide thoughts and behaviors (STB) are reviewed, (2) three more specific mechanistic pathways are proposed whereby connectedness may influence STB, and (3) several implications related to use of connectedness as a public health framework for adolescent suicide prevention and intervention are outlined.

THE ISSUE: UNDERSTANDING AND INTERVENING IN ADOLESCENT SUICIDE

Adolescent suicide is a major public health concern (U.S. Department of Health and Human Services [USHHS], 2012). Currently the third leading cause of death for youth aged 1 to 19, accounting for 10% of all deaths in this age group (Centers for Disease Control and Prevention[CDC]/ NCHS, 2011), suicide rates increase ten-fold from preadolescence to early adulthood (Goldsmith & IOM, 2002). Up sharply from previous years, suicidal thoughts and behaviors (STB) are the third leading cause of death among those 10 to 14 years old and the second leading cause of death among 15 to 24 year olds (CDC/NCHS, 2011). In addition to the emotional and psychosocial morbidity, the high fiscal and societal costs associated with medical care, lost productivity, and secondary distress among family members and others render adolescent STB a significant public health problem.

To reduce the public impact of suicide, both the Surgeon General of the United States and the CDC have identified reducing suicide as an important public health priority. Stressing the need for public-health–based solutions emphasizing prevention, early intervention, and policy, both the 2001 and 2012 National Strategy for Suicide Prevention identified enhancing "connectedness" as one means through which this agenda should be pursued (USHHS, 2001; USHHS & National Action Alliance for Suicide Prevention, 2012). The CDC (2008) elaborated on this concept by stating "connectedness is a common thread that weaves

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together many of the influences of suicidal behavior and has direct relevance to prevention" (p. 3).

The CDC's focus on enhancing connectedness as a broad orienting framework for suicide prevention stems from a fundamental understanding about the importance of social connection in human well-being and has laid the groundwork for research, intervention, and policy efforts capable of accommodating a wide array of approaches. As others have noted (Barber & Schluterman, 2008), although such breadth is useful from a practical perspective, operationalizing and evaluating efforts falling under such a broad umbrella will require agreement about how to best define and measure connectedness and greater specificity about how connectedness protects against STB and promotes well-being throughout the life course.

To advance clarity of the connectedness concept in STB prevention targeting adolescents, we (1) review how "connectedness" is used in the literature in relationship to STB, with particular regard to its operationalization and influence on STB; (2) propose two broad domains (*subjective* and *structural*) and three specific pathways whereby connectedness may influence STB; and (3) outline the implications of these ideas for research and practice.

DEFINING CONNECTEDNESS

Conceptions of *connectedness* can be linked in the literature to at least nine distinct conceptual frameworks including, but not limited to, attachment theory (Bowlby, 1969), social support theory (Brown, Brady, Lent, Wolfert, & Hall, 1987), bio-ecological models of human development (Bronfenbrenner & Morris, 1998), resilience frameworks (Werner & Smith, 2001), stage-environment fit theories (Eccles et al., 1993), social development and learning theories (Bandura, 1997), and social capital theories (Coleman, 1988). The concept spans a broad number of disciplines and has been used to explain complex mechanisms governing the way social interaction, placement, and exchange influence individual level experience, perception, and behavior within or across contexts. "Connectedness" is often used interchangeably with closely related constructs such as "attachment," "bonding," "social integration," and "social support."

In their reviews of the connectedness construct, Barber and Schluterman (2008) and Townsend and McWhirter (2005) highlight the considerable variation in its operationalization across empirical studies. In general, they each find that definitions tend to reference the subjective and/or structural features of social affiliation. Within the subjective domain, scholars describe connectedness as a sense of interpersonal closeness with the broader social world or with individuals characterized by feelings such as caring, belonging, trust, value, and respect (Barber, Stolz, & Olsen, 2005; Lee & Robbins, 1995; Resnick, Harris, & Blum, 1993; Whitlock, 2006), or as the degree of satisfaction with an environment or relationship (Eisenberg, Neumark-Sztainer, & Perry, 2003). Within the structural domain, scholars focus on characteristics such as network density, strength of social ties, and sharing of resources between individuals and/or organizations and institutions (CDC, 2008; Timpone, 1998). Applications of connectedness specifically in relationship to STB tend to span both structural and subjective dimensions. For example, sociologist Emile Durkheim (1897) argued that suicide resulted from lack of social connection to others and low behavioral control. The interpersonal theory of suicide (Joiner, 2006) also refers to social connectedness as a core contributor to STB, but goes one step farther than Durkheim by codifying connectedness as an embodiment of both the structural idea of social integration and the subjective experience of belonging (Van Orden et al., 2010).

Notably lacking in these reviews, however, are more specific postulations about *how* connectedness might affect youth outcomes or, more specifically, how it

might confer protection for adolescent STB risk. Articulation of the specific pathways of influence is a logical means of exploring the utility of connectedness as a construct.

HOW CONNECTEDNESS IS CURRENTLY USED IN RELATION TO STB

In our review of the literature, we included studies that explicitly identified connectedness and some form of suicide-related thoughts or behaviors in adolescents (11–20 years of age) as a principle outcome measure. An initial search for peer-reviewed articles using the key words "connectedness" and "suicide" yielded 112 articles from PsychINFO and Web of Science databases. We selected the 18 that focused on adolescents, clearly identified connectedness as a construct of interest, and measured STB as an outcome. Results of this review are presented in Table 1. Studies are grouped according to the three proximal adolescent contexts: family, school, and peer groups.

As evident in Table 1, operationalized indicators of connectedness tended to be context specific, were often used analogously with other previously defined constructs (e.g., perceived social support; bonding), and varied widely in the properties measured. While none of the papers included a formal definition of connectedness, all operationalized it using subjective measures of affiliation. The term *connectedness* was most frequently operationally defined and assessed by subjective self-report measures of (1) perceived warmth, affection, attachment, and age-appropriate developmental support (such as autonomy and supervision); (2) perceived belonging or bonding within a collective, such as family, school or peer group; and (3) perceived availability of instrumental or affective resources or support.

Although most studies operationalized connectedness as a single index applied within one social context or across several contexts simultaneously, more recent studies

such as Kaminski et al. (2010) have captured a multilayered experience of connection across contexts and experiences. Overall, reviewed studies showed substantial consistency in measured associations between indicators of connectedness, regardless of how it is defined, and STB. The most frequently studied setting was the family, where indicators of adolescents' connectedness were associated with decreased suicide risk in three large longitudinal studies and all cross-sectional studies (see Table 1), although not without caveat. For example, an analysis of a 1-year follow-up of the National Longitudinal Study of Adolescent Health (Add Health) found that connectedness indicators were inversely associated with suicidal behavior among seventh to twelfth graders (Borowsky, Ireland, & Resnick, 2001), but in their study of former psychiatric patients, Czyz, Liu, and King (2012) found effects only for suicide ideation and not attempts. Moreover, Kidd et al. (2006) found that the relationship between STB and family connectedness was particularly pronounced for boys with positive school relations, poor peer relations, and suicide attempt history. Similarly, results were moderated by sex in two of the family connectedness studies reviewed but in ways that found family connectedness to be an STB protective factor for girls, but not for boys in high-risk communities (Logan, Crosby, & Hamburger, 2011) and with sexual abuse history (Pharris, Resnick, & Blum, 1997).

School was the next most common context in which the relationship between connectedness and STB was evaluated. Most studies found that school connectedness was associated with reduced STB, although results varied by measurement approach. Four studies, which used Add Health data, found that perceived closeness, caring, belonging, satisfaction, and safety in school and/or with teachers predicted lower likelihood of suicidal thoughts or behaviors (Kaminski et al., 2010; McNeely & Falci, 2004; Resnick et al., 1997, 1993; note that this last study was based on an Add Health precursor, the Minnesota Adolescent Health

TABLE 1
Review of Empirical Literature Linking Connectedness to Suicidal Thoughts and Behaviors (STB) Outcomes

Author(s)	Age (baseline)	Connectedness Operationalized as	STB Measure	Method	Main STB-related Result	Proposed Mechanisms
Family Connectedness Context						
Ackard, Neumark-Sztainer, Story, 7 Perry (2006)	7th–12th grade	Communication, caring, and valuing parents' opinion (from EAT survey)	Suicide attempts	Cross-sectional	Low family connectedness positively correlated with suicide attempts	
Borowsky, Resnick, Ireland, 7 Blum (1999)	7th–12 grade Native American youth	Perceived caring by parents and family, family understanding and attention, fun with family (Add Health)	Suicide attempts	Cross-sectional	Connectedness to family negatively correlated with suicide attempts	
Borowsky et al. (2001)	7–12th grade	Perceived parental closeness, caring, relationship satisfaction feeling loved and wanted by family (Add Health)	Suicide attempts	Longitudinal	Perceived parent and family connectedness is promotive against suicide attempts	

(continued)

TABLE 1
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Author(s)	Age (baseline)	Connectedness Operationalized as	STB Measure	Method	Main STB-related Result	Proposed Mechanisms
Czyz et al. (2012)	13–17 years inpatient suicidal adolescents	Changes in the extent family relationships are close, confiding, satisfying, and supportive (Perceived Emotional/Personal Support Scale; Slavin, 1991)	Suicide ideation (unrelenting or specific plan) and attempts	Longitudinal	Greater increases in connectedness with family 3 months after hospitalization predicts less severe suicidal ideation during a 1-year follow-up period only for adolescents without multiple attempt histories Family connectedness was not found significant for preventing suicide attempts	
Eisenberg & Resnick (2006)	9th and 12th grade gay, lesbian, and bisexual youth	Perceived communication, caring, enjoyment, and respect for privacy (scale created by authors)	Suicide ideation and attempts	Cross-sectional	Family connectedness is negatively correlated with suicide ideation and attempts	

TABLE 1
(*continued*)

Author(s)	Age (baseline)	Connectedness Operationalized as	STB Measure	Method	Main STB-related Result	Proposed Mechanisms
Eisenberg et al. (2007)	6th, 9th, and 12th grade youth with history of sexual abuse	Perceived communication, caring, enjoyment, and respect for privacy (scale created by authors)	Suicide ideation and attempts	Cross-sectional	Family connectedness is negatively correlated with suicide behaviors in youth with a history of childhood sexual abuse	
Hall-Lande et al. (2007)	7th–12 grade	Perceived caring and communication (4-item scale created by authors)	Suicide attempt and ideation	Cross-sectional	Family connectedness mediated the relationship between perceived social isolation and suicide attempts	Social isolation indicates lack of psychological support and sense of belonging with peers which reduces self-esteem and increases suicide risk
Kaminski et al. (2010)	7th–12th grade	Caring, advice giving, and help with practical problems from family members (Vaux Social Support Record)	Suicide: nonsuicidal self-harm, suicide ideation, suicide plans, and nonfatal suicidal behavior	Cross-sectional	Family connectedness negatively correlated with suicide ideation and behaviors	

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TABLE 1
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Author(s)	Age (baseline)	Connectedness Operationalized as	STB Measure	Method	Main STB-related Result	Proposed Mechanisms
Kidd et al. (2006)	7th–12th grade	Perceptions of parental care, support, and relationship quality (Add Health)	Suicide attempts	Longitudinal	Parental connectedness at time 1 predicted lower suicide attempt rates at time 2, particularly for boys with good school relations with poor peer relations and a suicide attempt history	
Logan et al. (2011)	7th and 9th grade in high-risk family and community settings	Perception of care behavior and supervision (adapted from an earlier study by Gorman-Smith et al., 1996)	Suicide ideation	Cross-sectional	Parental care and supervision negatively correlated with suicide ideation, particularly for females; having both parenting factors increased magnitude of effect for suicide ideation	

TABLE 1
(continued)

Author(s)	Age (baseline)	Connectedness Operationalized as	STB Measure	Method	Main STB-related Result	Proposed Mechanisms
Matlin et al. (2011)	9th–12th grade, African American youth	Perceptions of family support (modified Perception of Support Inventory; Rosen, 1981)	Suicidality: suicide ideation and attempts	Cross-sectional	Family connectedness negatively correlated with suicidal thoughts and positively correlated with reasons for living among adolescents with high levels of depression; no results reported on relationship between connectedness and STB	
Neumark-Sztainer et al. (1997)	6th, 9th, and 12th, grade	How much family cares about, respects privacy of, and understands adolescent, and extent of fun with family (Minnesota Student Survey)	Thought about or attempted suicide	Cross-sectional	Family connectedness is negatively correlated with suicide risk, although more weakly than other tested predictors, self-esteem, and well-being	

TABLE 1
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Author(s)	Age (baseline)	Connectedness Operationalized as	STB Measure	Method	Main STB-related Result	Proposed Mechanisms
Pharris, Resnick, & Blum (1997)	7th–12th grade sexually abused American Indian adolescents	Perceived family attention and caring (modified Add Health Survey)	Suicide attempt and ideation	Cross-sectional	Family connectedness negatively correlated with suicidal thoughts and behaviors in sexually abused girls, but not boys	
Resnick et al. (1993)	7th–12th grade	Sense of belonging and closeness to family (Add Health)	Suicide ideation and attempts	Cross-sectional	Family connectedness negatively correlated with suicidal thoughts and behaviors	
Resnick et al. (1997)	7th–12th grade	Enjoy and feel close to, and cared for, loved, and wanted by family members (Add Health)	Suicidal thoughts and behaviors	Cross-sectional	Family connectedness is negatively correlated with suicidal thoughts and behaviors	
School Connectedness Context						
Hall-Lande et al. (2007)	7th–12 grade	Degree to which respondent likes going to school (single-item scale created by authors)	Suicide attempt and ideation	Cross-sectional	School connectedness mediated the relationship between social isolation and suicide attempts for boys, but not girls	

TABLE 1
(*continued*)

Author(s)	Age (baseline)	Connectedness Operationalized as	STB Measure	Method	Main STB-related Result	Proposed Mechanisms
Kaminski et al. (2010)	7th–12th grade	Feel close to people at school, part of school, and happy at school (Add Health)	Suicide ideation, suicide plans (and nonsuicidal self-injury)	Cross-sectional	School connectedness is negatively correlated with suicidal behaviors and suicide ideation	
Kidd et al. (2006)	7th–12th grade	Feel connected with school (i.e., teacher caring, feeling close to people at school) (Add Health)	Suicide attempts	Longitudinal	No main effects for school or peer relations on suicide attempts; 3-way interaction effect (parents X peer X school) for boys with a suicide attempt history and poor peer relations, but not for girls or boys with no attempt history	
Logan (2009)	7th and 9th grade youth with abuse history	Feeling a part of school, close to people at school, and happy to be at school	Suicide ideation	Cross-sectional	Connectedness to school negatively correlated with suicidal thoughts	

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TABLE 1
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Author(s)	Age (baseline)	Connectedness Operationalized as	STB Measure	Method	Main STB-related Result	Proposed Mechanisms
Logan et al. (2011)	7th and 9th grade in high-risk family and community settings	Feel close to people, feel happy, and belong at school (Add Health)	Suicide ideation	Cross-sectional	School connectedness negatively correlates with suicide ideation	Praise and attention generates a sense of belonging, which leads to increased engagement in school and motivation to do well and reduces STB risk; role of social belonging in risk varies based on norms of peer referent groups
McNeely ^Falci (2004)	7th–12th grade	Social belonging and teacher support (Add Health scale)	Suicide: changes in suicidality (thoughts or attempts)	Longitudinal	Teacher support protects against suicide attempts for those students who do not report experiencing suicidal thoughts at wave 1; social belonging does not protect against STB	
Neumark-Sztainer et al. (1997)	6th, 9th, and 12th grade	How much adolescent likes school (Add Health)	Thought about or attempted suicide	Cross-sectional	School connectedness negatively correlated with suicidal thoughts and behaviors	
Resnick et al. (1993)	7th–12th grade	School enjoyment and sense of belonging (Add Health)	Suicide ideation and attempts	Cross-sectional	School connectedness negatively correlated with suicidal thoughts and behaviors	

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TABLE 1
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Author(s)	Age (baseline)	Connectedness Operationalized as	STB Measure	Method	Main STB-related Result	Proposed Mechanisms
Resnick et al. (1997)	7th–12th grade	Fair treatment by teachers, feel close to people at school, sense of belonging (Add Health)	Suicidal thoughts and behaviors	Cross-sectional	Connectedness to school negatively correlated with suicidal thoughts and behaviors	
Young et al. (2011)	Ages 11, 15, and 19	Perceptions of the school environment, teacher–pupil relationships, pupil involvement, and school engagement	Suicide ideation and attempt	Longitudinal	With the exception of age 11, school engagement, measures of (poor) school connectedness were associated with increased odds of suicide ideation and attempt; the majority of theses association were significant, with the remainder marginally significant	
Peer Connectedness Context						
Czyz et al. (2012)	13–17 years inpatient suicidal adolescents	Change in the extent peer relationships are close, confiding, satisfying, and supportive (Perceived Emotional/Personal Support Scale; Slavin, 1991)	Suicide ideation (unrelenting or specific plan) and attempts	Longitudinal	Peer connectedness predicts lower suicide ideation in females 3 months after hospitalization but predicts more severe ideation at 12 months	An initial gain in connectedness after a hospitalization with peers may turn to feelings of rejection or loss when the initial gain in closeness and support decreases over time

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TABLE 1
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Author(s)	Age (baseline)	Connectedness Operationalized as	STB Measure	Method	Main STB-related Result	Proposed Mechanisms
Kaminski et al. (2010)	7th–12th grade	Perceived caring, provision of practical advice, and help with problems from peers (Vaux Social Support Record)	Suicide: nonsuicidal self-harm, suicide ideation, suicide plans, and nonfatal suicidal behavior	Cross-sectional	Peer connectedness positively correlated with suicidal thoughts and behaviors	
Matlin et al. (2011)	9th–12th grade, African American youth	Perceptions of peer support (modified Perception of Support Inventory; Rosen, 1981)	Suicide ideation and attempts, and reasons for living	Cross-sectional	Peer connectedness positively correlated with reasons for living, but strongest effect for students with low levels of depression; no results reported on relationship between connectedness and STB	
Community Connectedness Context						
Borowsky et al. (1999)	7th–12th grade Native American youth	Perceived caring by adults, school people, church, tribal elders (Add Health)	Suicide attempts	Cross-sectional	Connectedness to adults outside of family negatively correlated with suicide attempts	

(continued)

TABLE 1
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Author(s)	Age (baseline)	Connectedness Operationalized as	STB Measure	Method	Main STB-related Result	Proposed Mechanisms
Matlin et al. (2011)	9th–12th grade, African American youth	Social Cohesion subscale of the Collective Efficacy Scale (Sampson, Raudenbaush, & Earls, 1997)	Suicide ideation and attempts, and reasons for living	Cross-sectional	Community connectedness showed trend toward being positively correlated (but was nonsignificant) with reasons for living, but strongest effect for students with high levels of depression; no results reported on relationship between connectedness and STB	

Database); however, two others did not (Bearman & Moody, 2004; Kidd et al., 2006; note that Bearman & Moody used Add Health measures but did not label this "connectedness"; they are thus not included in Table 1). This disparity in findings may result from the fact that both the Kidd and Bearman and Moody studies include multiple contexts in final models and that the lack of direct effects for school connectedness on STB in these studies may be due to interactions between contexts that are often unmeasured in connectedness studies. School connectedness studies employing similar indicators related to feeling close to people, belonging, feeling happy at school, and engagement with teachers and peers all reveal inverse relationships to STB (Logan, 2009; Neumark-Sztainer, Story, French, & Resnick, 1997; Resnick et al., 1993; Young, Sweeting, & Ellaway, 2011). Similarly, teacher caring and STB were positively correlated in two studies (Eisenberg, Ackard, & Resnick, 2007; Eisenberg & Resnick, 2006) for populations of sexually abused and sexual minority youth. As in the family setting findings, there is evidence that sex moderates the relationship between connectedness and STB in school setting as well; however, as with family, not in entirely consistent ways. One study found school connectedness protective for girls only (Hall-Lande, Eisenberg, Christenson, & Neumark-Sztainer, 2007), while another found an interaction effect with school connectedness and other variables for boys only (Kidd et al., 2006). In contrast to family and school domains, studies examining peer connectedness and STB were more rare and showed larger discrepancies in the connectedness–STB relationship. Although two studies found that peer support reduced risk of STB (Czyz et al., 2012; Matlin, Molock, & Tebes, 2011), a third study found that it increased risk of STB (Kaminski et al., 2010). Such findings are consistent with research showing that associations between peer relationships and well-being vary by the nature of peer interactions and social structure. On the one hand, social isolation

from peer groups is associated with higher risk of suicidal thoughts and behavior (Bearman & Moody, 2004; Prinstein, Boerges, Spirito, Little, & Grapentine, 2000), and suicidal youth report higher levels of social isolation (Kaminski & Fang, 2009). On the other hand, overreliance on peers for support increases risk of externalizing problems and conflict and can also heighten emotional distress (Donald, Dower, Correa-Velez, & Jones, 2006). Similarly, other studies have shown that having a friend make a suicide attempt increases risk of STB (Bearman & Moody, 2004) and that adolescents are uniquely vulnerable to contagion effects following the suicide death of someone they know (Insel & Gould, 2008). In sum, findings in this area suggest that while *disconnection from* peers may heighten risk of STB, *connection to* peers may also heighten risk of STB when peer group norms are maladaptive or unconventionally supportive of STB.

Studies of youth connectedness to community and STB are rare. Most often operationalized as sense of connection to and trust with adults outside the family system, these studies typically show mildly statistically significant or trending toward significant effects of community connectedness on STB. For example, in a study operationalizing community connectedness as perceived caring by adults, school people, church, and tribal elders, community connectedness was negatively correlated with STB among Native American youth (Borowsky, Resnick, Ireland, & Blum, 1999). These findings are consistent with a similar study of the effects of community connectedness (operationalized as sense of belonging in community) on STB among Native American adults where community connectedness showed a weak but significant effect on suicide ideation and no significant effect on suicide attempt (Hill, 2009). Similarly, in a study of African American youth that operationalized connectedness as sense of social cohesion in neighborhoods, community connectedness trended toward being positively correlated (but was nonsignificant) with the

reasons for living STB measure (Matlin et al., 2011).

WHAT ARE THE MECHANISMS BY WHICH CONNECTEDNESS INFLUENCES STB?

The quantity and quality of social ties have been linked with suicide for over a century, since Durkheim (1897) first posited that a weakening of the bonds that normally integrate individuals into the collective (i.e., "anomie") is among the chief causes of suicide. Although unity across contemporary conceptualizations of connectedness is largely lacking, there is broad agreement that connectedness is derived from interpersonal affiliation with individuals and institutions which enhance well-being through emotional and instrumental support derived from one or more interlocking social systems (e.g., families, schools, peer groups, communities). Beyond this, few studies have explained the specific mechanisms or pathways through which connectedness modifies risk of suicide or other mental health problem outcomes, as is evident in Table 1. As a means of postulating more specific pathways of potential empirical value, we examined overlap between the theoretical models in which connectedness is grounded (identified above) alongside models of the factors that lead to suicide. One of the most well-developed suicide models, Joiner's (2006) interpersonal theory of suicide (ITS), proposes that suicide arises from perceptions of thwarted belongingness (also referred to a social isolation; what the authors see as one facet of the higher order construct of social connectedness) coupled with perceived burdensomeness and capacity for lethality. Both belongingness and burdensomeness are based on perceptions of social affiliation and exchange. Both have an *intrapersonal* dimension (individual thoughts and emotions that affect perception and interpretation of social interactions) as well as an *interpersonal* dimension (presence of and exchange with individuals and systems outside of oneself;

these exchanges help to create and reinforce intrapersonal cognition and affect). Although social isolation (a core component of thwarted belonging) contains clear structural overtones in this model, the authors postulate that the subjective experience of isolation is the core mechanism by which social (dis) connectedness influences STB. More specifically and germane to our postulation, Van Orden et al. (2010) argue that the need for social belonging is a reflection of two primary human needs first articulated by Baumeister and Leary (1995): the need for regular, affectively positive experience with known others coupled with stable perception that one is engaged in a social network of others characterized by reciprocal care and concern. In contrast, the more recent connectedness–STB model outlined by the CDC (2008) emphasizes the structural dimension of social exchange by postulating that the social systems in which young people are embedded confer protection and opportunities in ways that are often invisible to individuals and hence less subjectively experienced (although they quietly shape the subjective experience). They do this through supplying individuals in the external environment who may assist in identifying and intervening when someone is observed to be at risk of STB and by coordinated services aimed at reducing environmental risk factors and enhancing environmental protective factors (CDC, 2008). In sum, our review suggests three broad pathways by which connectedness may protect against STB: (1) intrapersonal responses and processes, (2) collective responsibility and action, and (3) positive norms and expectations. We believe that each of these areas is useful in explicating empirically testable hypotheses and for guiding intervention and prevention efforts (Figure. 1).

Intrapersonal responses and processes

The ITS (Joiner, 2006; Van Orden et al., 2010) holds that both thwarted belongingness and burdensomeness arise from distorted self-narratives reinforced by
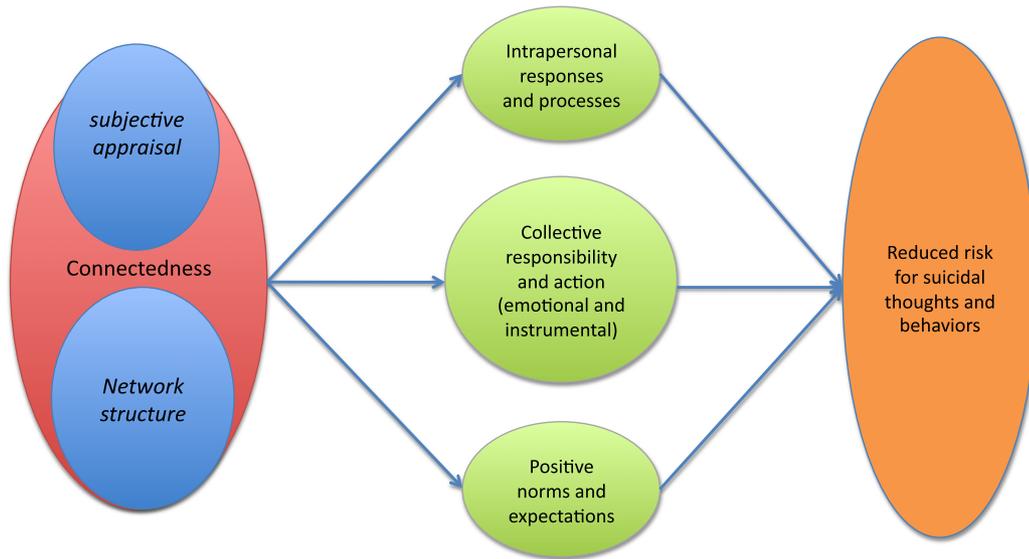
Figure 1. Proposed mechanism domains through which connectedness confers protection against STB in adolescents.

perceptions of social interaction (Van Orden et al., 2010). In other words, in order for suicide to be considered or acted on, one must believe (cognition) and feel (affect) that one is not wanted and is, moreover, a burden on salient others in one's social network. Embedded in this theory is the assumption that both cognitions (e.g., thoughts, memories, judgments) and affective experiences (e.g., emotions, feelings) are associated with social exchange and experiences. It also suggests that these cognitive and affective benefits may be accrued through perceiving that one is of use to key referent groups (e.g., not a burden) and through perceiving existential value and meaning in being part of a group. These assumptions are consonant with an emerging body of evidence which suggests that the subjective experience of connectedness to others may literally shape (Perry, 2002) or contribute to the physiological systems that govern positive emotion and stress response (Eisenberger & Cole, 2012; Livingstone & Srivastava, 2012). We thus hypothesize that simply *feeling* connected to one or more communities may reduce adolescent STB risk through the neurophysio-

logical benefits to cognition (e.g., believing one is of value and cared for) and emotion regulation that result from social affiliation and attachment. In this sense, we argue that the experience of affiliation and the positive emotions it engenders has distinctive protective value for STB over and above the "absence of pathology" and independent of other structural factors, such as network density or quality.

As social connectedness is related to how other people are represented within oneself, the experience of connectedness ultimately stems from one's subjective perception of interpersonal closeness and value (Lee & Robbins, 1995). Consonant with this, studies examining the effects of varying categories of social support (typically social size and density, enacted and perceived support) consistently find that perceived support is a more powerful indicator of well-being than other categories such as number of social ties (Taylor & Lynch, 2004). These findings hold for youth as well, particularly as they age (Chu, Saucier, & Hafner, 2010). This suggests that the experience of the external social world, *as represented by subjective thoughts and emotions*,

directly mediates an individual's perceived level of connectedness and influences uptake of assistance offered in times of distress or imbalance.

Why is this? An increasingly sophisticated body of science suggests a dynamic interplay between perceptions of social experiences, neurobiology, and emotion (Eisenberger & Cole, 2012; Gilbert, 2012; Steinberg, 2010). Humans possess a complex array of neural circuitry to support social affiliation and communication (Eisenberger & Cole, 2012; Perry, 2002). This circuitry exists to code meaning of social exchange and to promote affiliations that enhance survival and well-being (Perry, 2002). The perception of emotion is one of the ways that the brain signals the body to seek affiliations deemed useful (Eisenberger & Cole, 2012). For example, the feel good chemicals, norepinephrine and serotonin, are produced in the body through positive affiliation with others, are perceived as "positive emotion," and play a central role in the ability to successfully regulate emotion in challenging contexts (Insel & Winslow, 1998). Moreover, the subjective experience of positive emotion leads to positive mental states and better physical health (Gilbert, 2012) and improves sociability and cognition, specifically creativity and problem-solving (Fredrickson, 2001; Fredrickson & Joiner, 2002).

For adolescents, the neurological pathways between external experiences of interpersonal exchange and the production of reward chemicals are particularly pronounced and enhance the salience of emotion in cognition and behavioral outputs (Chein, Albert, O'Brien, Uckert, & Steinberg, 2011; Steinberg, 2010). Adolescents exhibit high physiological and neurological sensitivity to external emotional cues (particularly social rejection and acceptance; Steinberg, 2010) and tend to feel all emotions, and particularly negative emotions, more acutely than children or adults (Gilbert, 2012). For depressed adolescents, the experience of positive emotion is even more blunted than in normative adolescent populations and is likely to reinforce negative attributions (e.g., the deduction that one is not wanted or does not belong; Chorpita & Daleiden, 2002). A prolonged sense of negative emotion states and social disconnection (which are mutually reinforcing) contribute to neurophysiological imbalances linked to many of the known precursors to suicide, such as depression, substance use, and persistent feelings of hopelessness (Eisenberger & Cole, 2012). Experiencing positive emotions broadens attention, positive cognition, self-regulation, and social affiliation desires and capacities which, in turn, enhance sense of well-being and reduce suicide risk.

Collective Responsibility and Action

The intrapersonal processes discussed above are produced only in relationship to social systems, particularly those which advance a sense of developmentally appropriate (e.g., not over burdening) utility to others. Being embedded in a variety of interconnected social systems (e.g., family, school) accrues benefits for members through monitoring and sharing of resources (Bovier, Chamot, & Perneger, 2004). One such system-level effect is the enhanced likelihood that psychological distress and suicide will be disclosed or detected by others and addressed in a way that reduces the potential for lethal outcomes. The potential for collective action is greater when individuals are engaged in meaningful relationships and collective action, and responsibility will be enhanced by increased network density and diversity.

As a case in point, several sources of data suggest that schools with strong social networks linking adults with adolescents are likely to provide more avenues for help-seeking and help-giving interactions than those without such networks (Pisani, Schmeelk-Cone, et al., 2012). Moreover, the protective value of such networks is likely to be augmented by the inclusion of competent adults who can detect and respond to distress (Wyman et al., 2008).

Thus, we posit that connectedness to adults and systems in which youth–adult relationships occur (such as schools) confers protection by (1) heightening opportunities for soliciting and activating assistance; (2) enhancing the likelihood that negative affect and behavior, including signs of distress or more direct warning signs for suicidal behavior, will be noticed and proactively addressed; and (3) providing a sense of utility, meaning, and purpose.

Reciprocal communication pathways between youth and adults are particularly important for adolescents, who, unlike young children, exercise greater agency in seeking help and greater autonomy in accepting or rejecting help, whether from informal sources (e.g., family, teachers) or formal sources (e.g., medical and mental health professionals). Studies within the mental health services literature show that strong ties with adults in key social settings enhance adolescent willingness to seek help for emotional problems, in general, and for suicide concerns, in particular (Pisani, Schmeelk-Cone, et al., 2012). Establishing personal relationships with adults is critical because the pathway to most forms of help for adolescents begins with existing relationships to adults (Boldero & Fallon, 1995; Costello, Angold, March, & Fairbank, 1998; Rickwood, Deane, & Wilson, 2007) and because adolescents prefer to discuss emotional problems with familiar persons and are more likely to seek professional help from sources within familiar settings (Costello et al., 1998; Logan & King, 2001).

Adolescents who are more socially integrated into systems, such as school and clubs, and who also feel that they belong are more likely to perceive social support as available and adults as capable of helping suicidal youth, both of which predict adolescents' help-seeking behavior and intentions (Pisani, Schmeelk-Cone, et al., 2012; Pisani, Wyman, et al., 2012). Similarly, expectations of strong social support, the ability to approach adults with problems, and closeness with adults were all

associated with greater intentions to seek and accept help for suicide ideation in college-age students (Yakunina, Rogers, Waehler, & Werth, 2010). In a study following a suicide education program, high school students reported that the inability to approach and discuss problems with adults and a lack of closeness with adults would be key barriers for seeking help for oneself or a friend at school (Cigularov, Chen, Thurber, & Stallones, 2008). Thus, beyond the mere opportunity for supportive relationships, a high degree of social integration may expand the base of social resources available to individuals in a time of crisis.

Greater perceived engagement and structural integration at school and in other settings, particularly where competent and caring adults are available, provide more opportunities for suicide risk indicators to be recognized by others as "problems" needing attention (Costello, Swendsen, Rose, & Dierker, 2008). Since parents are the primary facilitators of professional services and assistance (Logan & King, 2001), their awareness of and willingness to define a problem as such are critical. Linkages between social systems are also important because, for example, parents are often alerted to an adolescent period of difficulty through concerns raised by school personnel (Costello et al., 2008). As a result, adolescents who experience low connectedness across multiple social contexts (e.g., schools, families, peers, community) are less likely than their better-connected peers to be noticed and responded to in times of distress.

Finally, being part of a community of others enhances motivation to be of value and of use to others, an experience that serves as an important source of perceived meaning and purpose (Townsend & McWhirter, 2005). Although children and adolescents are typically regarded as the recipients of care, being a part of a community allows for the giving of care and support which may have underrecognized value in protecting against STB (Joiner, 2006). Knowing that one is liked and cared for is important, but connectedness implies reci-

procal exchange: the receiving *and* giving of care, respect, trust, and support (Whitlock, 2006). As suicide is highly associated with depressive, ruminative cognitions that produce a low sense of belonging and/or social value (Durkheim, 1897; Joiner et al., 2005), opportunities for meaningful contribution and recognition lower suicide risk and enhance sense of purpose and meaning, particularly if they engender regular opportunities for experiencing positive emotion (Fredrickson & Joiner, 2002; Livingstone & Srivastava, 2012). This assumption has been validated in samples of adults where providing emotional and instrumental support to others confers even stronger protective and promotive benefits than receiving support in a variety of suicide-linked areas, such as coping, purpose in life, depression, and anxiety (Brown, Nesse, Vinokur, & Smith, 2003; Schwartz & Sendor, 1999). In studies of youth, frequent positive emotions during school were associated with higher levels of student engagement and negative emotions with lower levels of engagement (Reschly, Huebner, Appleton, & Antaramian, 2008). The same study showed that positive but not negative emotions were associated with adaptive coping and, through this, to student engagement. Studies of effects of adolescent giving show similar benefits to givers (e.g., adolescents are more likely to benefit than children) (Dillon & Wink, 2007).

Positive norms and expectations

As some researchers have noted (Kirby, 2001), the influence of connectedness may be positive or negative depending on the norms and values of the individuals, groups, or systems to which one is attached. This is one of the reasons that structural and subjective connectedness to peer groups with antisocial or negative thinking norms may actually heighten risk of suicide (Bearman & Moody, 2004; Insel & Gould, 2008). Norms influence a wide range of youth health behaviors including risky behaviors, such as substance abuse and

delinquency, and also prosocial behaviors (Gilbert, 2012; Steinberg, 2010). Norms encompass perceptions of how typical a given behavior is within a group (i.e., descriptive norms) as well as the consequences of engaging, or not engaging, in that behavior (i.e., injunctive norms). Both dimensions influence decision making and behavior (Rimal & Real, 2003). Norms most likely to reduce the likelihood of STB include those that support healthy coping and help-seeking behaviors and those that influence how members perceive suicidal thinking and behavior (i.e., STB is normative, abnormal, requires intervention; Pisani, Schmeelk-Cone, et al., 2012).

The transmission of norms through affiliation groups links both the subjective and structural dimensions of connectedness. For example, the subjective dimension of connectedness may influence how adolescents place value on norms, as suggested by a large body of research showing that adolescents' norms and behaviors are strongly influenced by friends and by those to whom they aspire to be more closely affiliated (Valente, 2010). Some of this influence on adolescents and young adults can be tied to heightened physiological and neurological sensitivity to external emotional cues (e.g., social rejection and acceptance) coupled with the fact that the presence of peers augments adolescent risk-taking and sensation-seeking (Steinberg, 2010). Thus, subjective perceptions of valuing influence are how norms are cocreated and disseminated. The structural dimension is evident in the ways in which norms are disseminated through network ties and are influenced by network proximity to other social groups. Norms and practices spread readily through denser social networks and are reinforced when these networks are only loosely connected to other networks, peers, or adults, or when they are tightly connected to social networks with similar norms (Valente, 2010). At-risk adolescents who are isolated or who affiliate primarily with peers who share their behavioral and attitudinal tendencies typically possess fewer opportunities to ben-

efit from exposure to healthy social norms and attitudes, particularly if their social group is not affiliated with other networks or with adults.

Group norms and attitudes that support help-seeking within one's referent group have been linked in numerous studies to greater willingness to seek help for emotional problems, including suicidal concerns (Pisani, Schmeelk-Cone, et al., 2012; Rickwood et al., 2007). These findings hold true for adolescents as well where studies show that perceptions of peer support for help-seeking are associated with greater likelihood of disclosing recent suicidal behavior to an adult (Pisani, Wyman, et al., 2012) and greater intention to seek help for distress (Schmeelk-Cone, Pisani, Petrova, & Wyman, 2012). Similarly influential may be group perceptions about suicidal thoughts and behaviors and, in particular, the responsibility of members for responding. The extent to which symptoms become defined as problems needing intervention is a process that occurs within social networks, including families and peer groups, which have their own norms and expectations about behavior (Pescosolido, 1992).

SUMMARY AND IMPLICATIONS

Application of the connectedness construct across contexts in research examining associations with STB largely shows consistent results, whether operationalized as a single index or as a collection of indices, and point to several conclusions. First, few existing definitions of connectedness reflect both the subjective and structural dimensions of connectedness. For this reason, we offer the following definition of *connectedness*: the degree to which an individual (or group) possesses a subjective sense of emotional interrelatedness (belonging, caring, value, and trust) and a willingness to share with and seek resources from the individuals and communities in which he/she is socially or geographically embedded. This definition reflects both salient dimen-

sions (subjective and structural) emergent in the literature reviewed and encapsulates several of the primary constructs used to measure connectedness. Second, the results of our review underscore the complexity of structural and interpersonal affiliation over time and place. For example, research suggests that peer connectedness confers protection against STB in many conditions but can be a risk factor if a friend makes a suicide attempt or holds STB promotive attitudes. Lastly, our results strongly underscore the beneficial effects in reducing risk of STB from adolescents' ties to adults, particularly family members, who are perceived as supportive and engaged. More specific implications for practice and research are offered below.

Implications for Practice

On the basis of the literature reviewed here, we would expect that connectedness-focused interventions, regardless of the ecological level in which they are targeted, will exert influence on individual STB outcomes. However, variation in the effect of connectedness on STB by demographic factors such as sex and across context suggests that connectedness-based intervention efforts may benefit from early and ongoing evaluative attention to the ways and variations in which the intervention is leveraging effect and the way in which it differentially impacts boys and girls. Lastly, the pattern of empirical findings to date suggests that the location of context (proximal versus distal) matters. Family, for example, consistently emerged as the most potent connectedness context followed by schools, peers, and then communities. There does exist some research, however, to suggest that number of contexts to which one feels connected may matter even more than the specific context in which connectedness occurs (Borowsky et al., 1999; Kaminski et al., 2010), so efforts to enhance positive affiliation in multiple contexts, even if more distal contexts are targeted, may be as or more effec-

tive than focusing exclusively on one. This is a particularly important implication in communities where family contexts are less available and mutable targets of change than other contexts.

Beyond this, review of studies to date suggests that connectedness affects STB through one or more of the following routes: (1) expanding intergenerational social networks; (2) heightening opportunities for soliciting and activating assistance from others or systems (e.g., schools, families, or other social systems); (3) enhancing the likelihood that worrisome affect and behavior, including early signs of distress or more direct warning signs for suicidal behavior, will be noticed and proactively addressed by proximal systems (parents, peers, schools); (4) increasing exposure to positive coping and help-seeking norms; (5) increasing positive emotion and, as a consequence, cognitive flexibility and emotion regulation capacity; and (6) enhancing opportunities for experiencing belonging and utility in a community of others. Interventions intended to be as multilayered as the construct will include as many of these mechanisms as possible and, ideally, will cross context. However, smaller projects intended to isolate effects of one or more of these leverage points in one context will be of value in elucidating the contribution.

Research Implications

Variation in the way connectedness is defined and operationalized in relation to STB has resulted in a diverse array of constructs, studies, and levels of analyses, few of which allow for satisfying systematic comparison. Although it may be untenable to design studies reflective of all the elements of connectedness, we join Barber and Schluterman (2008) in encouraging researchers to be explicit and precise in locating the dimensions and domains of connectedness they wish to pursue within the broader framework outlined here.

Our review also points to several limitations of current research and areas for future investigation. First, because virtually all studies to date have tested only main effects, there are a number of important unanswered questions related to the relationship between connectedness and STB depending on factors such as peer group norms. For example, studies examining interactions and processes across levels comprising connectedness are needed to ascertain how the benefits of connectedness to peer groups on emotional well-being may be offset by norms that may promote maladaptive strategies. Also of value would be studies that examine salient dimensions of connectedness (subjective and structural) within and across contexts with an eye to contextual and demographic mediators, moderators, interactions, and group-level variations building off nascent work in this area (Kaminski et al., 2010; Kidd et al., 2006). For example, variation in the way connectedness affects male and female STB risk contains important implications for intervention. Findings to date suggest that there may be important variations in the effects of connectedness on STB depending on the context with more proximal contexts (e.g., families and schools) exerting more influence than more distal contexts (e.g., communities). However, lack of uniformity in researching the connectedness–STB link within and across contexts (particularly community contexts) prohibits sound understanding of direct and indirect effects. Further complexity in measuring connectedness is introduced by the fact that perceived connectedness to individuals may be governed by different factors than perceived connectedness to larger systems (e.g., families, school, communities) and that perceived connectedness to systems may reflect a heterogeneous set of experiences with sets of individuals (e.g., school connectedness may reflect experiences with peers and individual adults). Particularly in light of the CDC focus on understanding and promoting connectedness across key socializing contexts, clearly specified research on direct, indirect, and interaction effects across context is merited.

Although we have proffered several pathways to explain the protective effects of connectedness, better understanding of the mechanisms linking connectedness and STB is a primary research need. There are myriad possible designs and research aims that may contribute to advancing this area of knowledge. As a starting point, we offer the following four broad hypotheses as outstanding candidates for the first wave of more refined testing of the connectedness construct:

- The subjective experience of belonging and utility (e.g., feeling useful and valued in at least one proximal context) will enhance positive emotions and cognitions pertaining to self and other interrelatedness and will result in fewer or less severe suicide risk behaviors;
- Increasing the density of social ties in secondary schools, particularly for isolated adolescents, will lead to increased exposure to normative social influences that promote more positive help-seeking and coping norms;
- Direct experiences cooperating with adults toward shared goals may help to foster more favorable attitudes about adult help and result in increased adolescent help-seeking for oneself and one's peers; and
- The benefit of connectedness to peers is mediated or moderated by norms pertaining to, and peer experiences with, STB. This interaction is influenced by the strength of connectedness across contextual domain (e.g., family, school, peer, community).

Using experimental designs to increase the causal inferences that can be made about connectedness should be another high priority. As evident in Table 1, all connectedness-focused studies to date are cross-sectional or longitudinal observational studies. We identified no experimentally designed studies that had the specific intention of assessing the effectiveness of connectedness-based interventions in reducing STB. As studies of interventions are the most effective way to understand mechanisms, research is needed to examine changes from interventions using rigorous mediation models that examine proximal changes in mechanisms and longer term risk factors and STB. Similarly, despite the call for understanding how its more structural elements affect STB risk in adolescents, no connectedness–STB study in adolescence reviewed here used network-related or -level indicators to measure connectedness. Much needed are studies that operationalize the more structural elements of this construct and that assess the ways in which placement within social systems affects access to and uptake of social resources.

One example of an experimental test of a connectedness-based intervention is the current ongoing randomized controlled trial of the Sources of Strength program, a universal suicide prevention program in secondary schools (Wyman et al., 2010). A previous test of this intervention using a randomized controlled trial design found that after 4 months of messaging activities conducted by diverse peer leaders trained in the Sources of Strength curriculum, school-wide help-seeking acceptance and norms for coping with suicide concerns were increased. A current, ongoing, federally funded trial is employing social network analyses to determine whether peer leader messaging increases the density of positive affiliation ties across adolescents and increases positive ties to adults, particularly among isolated students, and whether those network changes increase help-seeking for suicide concerns, more positive coping practices and, ultimately, decrease STB. Similarly, the Caring Letters Project (Motto & Bostrom, 2001) is a suicide intervention for adults grounded in similar connectedness-based principles; the idea that extending caring letters to individuals at heightened risk of suicide may enhance feelings of connectedness and belonging. Studies

to date support suggested efficacy (Motto & Bostrom, 2001) and feasibility (Luxton, Kinn, June, Pierre, Reger, & Gahm, 2012) of this approach in adults and have promise for youth. Randomized control trials of interventions such as Sources of Strength and the Caring Letters Project are poised to significantly advance understanding of effects and mechanisms at work in the relationship between connectedness-based constructs and STB (Wyman et al., 2010). Such studies designed to enhance connectedness as a means of leveraging its influence offer valuable opportunities for understanding basic mechanisms and effects in the relationship between connectedness and STB.

In closing, the connectedness construct possesses practical and intuitive appeal and continues to be quite widely used as a research construct, despite empirical limitations. In light of this, we suggest that researchers acknowledge connectedness as a broad meta-concept and that they locate their studies within this overarching framework and, most importantly, that they use these efforts to better articulate and elucidate the specific mechanisms by which connectedness leverages influence on STB. We further suggest that this research be concentrated within one or more of the two connectedness areas most commonly assumed to leverage influence: (1) positive subjective cognitive and emotional experiences and appraisals of relationships with adults, peers, and social systems (e.g., schools) and (2) structural interrelatedness between networks in which youth are embedded. Such research should be structured to shed light on interaction, mediation, and moderation effects, ideally using study designs that permit temporal, indirect, and interaction effects testing.

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