Suicidal Disclosures among Friends: Using Social Network Data to Understand Suicide Contagion

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Abstract

A robust literature suggests that suicide is socially contagious; however, we know little about how and why suicide spreads. Using network data from the National Longitudinal Study of Adolescent to Adult Health, we examine the effects of alter's (1) disclosed and (2) undisclosed suicide attempts, (3) suicide ideation, and (4) emotional distress on ego's mental health one year later to gain insights into the emotional and cultural mechanisms that underlie suicide contagion. We find that when egos know about alter's suicide attempt, they report significantly higher levels of emotional distress and are more likely to report suicidality, net of extensive controls; however, alter's undisclosed suicide attempts and ideation have no significant effect on ego's mental health. Finally, we find evidence that emotional distress is contagious in adolescence, though it does not seem to promote suicidality. We discuss the implications of our findings for suicide contagion specifically and sociology more generally.

Keywords

adolescence, emotional contagion, gender, mental health, social networks, suicide contagion

Over the past four decades, the sociological study of suicide has become increasingly interested in the potential for suicides to spread between individuals, or what is often referred to as *suicide contagion* or *suicide suggestion* (Phillips 1974; Stack 1987; Wasserman 1984). Consistent evidence, for example, has revealed that when people, particularly youth, experience the suicide death or attempt of a role model, they are at increased risk of suicidality themselves (Abrutyn and Mueller 2014a; Baller and Richardson 2009; Bearman and Moody 2004; Farberow et al. 1987; Mueller, Abrutyn, and Stockton forthcoming; Niederkrotenthaler et al. 2012; Thorlindsson and Bjarnason 1998). Despite the mounting evidence that suicide contagion matters, the sociology of suicide has remained largely focused on Durkheim's admittedly important thesis that social integration and moral regulation are the primary social forces that condition suicidality (for a review, see Wray, Colen, and Pescosolido 2011). In part, this is because we know very little about

why it is that friends tend to have similar levels of suicidality and if this similarity is in fact indicative of social contagion, *how* contagion occurs.

Indeed, we argue that research must now turn from documenting suicide contagion toward identifying the mechanisms behind the spread of suicidality through social relationships. What circumstances transform the generalized *idea* of suicide into a meaningful cultural script that individuals may deploy for coping with their own distress? To investigate this question, we examine whether knowing about a friend's suicide attempt changes the likelihood that suicide contagion occurs. Additionally, we

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analyze whether friends' emotional distress and sui-cide ideation, absent concrete actions (e.g., suicide attempts), promotes suicide contagion. Our research is guided by social learning theories (Akers and Jensen 2006; Bandura 1977; Sutherland, Cressey, and Luckenbill 1992) and symbolic interactionism (Stryker 1980), in addition to research on emotional contagion between significant others (Hatfield, Cacioppo, and Rapson 1994).

To assess the social mechanisms behind suicide contagion, we employ social network data from the National Longitudinal Study of Adolescent to Adult Health (Add Health). These data offer a unique opportunity to examine both respondents' (egos') reports of their friends' (alters') suicidality in addition to friends' self-reports of suicidality.[1] Specifically, we examine the differential effects of alter's (1) disclosed suicide attempts, (2) undis-closed suicide attempts, (3) suicide death, (4) sui-cide ideation, and (5) emotional distress at Wave I on ego's mental health at Wave II to gain insights into the mechanisms that may underlie suicide con-tagion. To ensure observed associations between ego and alter's mental health are not spurious, we use longitudinal data to examine whether these mechanisms are robust to controls for (1) ego's mental health (at Wave I), (2) factors associated with friendship formation, and (3) risk and protec-tive factors for suicidality. Additionally, this study contributes to recent calls within sociology to develop a more complex and elaborate understand-ing of how social forces shape suicide (Wray et al. 2011), thereby deepening sociology's contribution to understanding and preventing suicide.

BACKGROUND

The Logic of Suicide Contagion

Gabriel Tarde (1903) was one of the first to note that all manners of behavior and attitudes can spread through social relationships. His argument was deeply social psychological—namely, that humans possess the unique ability to symbolically interact and thus to influence each other using all sorts of justifications (Katz 2006; Kral 1994). Though Tarde was not interested specifically in suicide, his name is associated with studies of suicide suggestion or con-tagion (Phillips 1974). Despite the homage that stud-ies of suicide contagion often pay to Tarde, his theoretical insights are usually not seriously engaged (Abrutyn and Mueller 2014b). Instead, most studies adopt Tarde's basic general insight: that exposure to someone else's suicide, particularly if the person is a significant other, leads to a greater likelihood of

suicidality in the person exposed. And this literature is robust. For example, audiences exposed to media reports of suicides evince temporary increases in suicide rates (Gould 2001; Gould et al. 2014; Niederkrotenthaler et al. 2009, 2010; Pirkis and Blood 2001; Stack 2000a, 2003, 2005). Further, hav-ing a friend or family member attempt or complete suicide is strongly associated with the probability that an exposed child (Niederkrotenthaler et al. 2012) or adolescent (Abrutyn and Mueller 2014a; Bjarnason 1994; Thorlindsson and Bjarnason 1998) will seriously contemplate attempting suicide them-selves. Some research has found that role models' suicide attempts also increase the probability that a teenager actually attempts suicide (Bearman and Moody 2004), even among youth with no docu-mented history of suicidal thoughts or attempts (Abrutyn and Mueller 2014a). Yet, despite this robust literature, few studies have examined *why* or *how* suicide contagion occurs. This is unfortunate, as understanding contagion will greatly improve our ability to intervene effectively when suicide clusters occur. In the following sections, we review the typi-cal explanations for suicide contagion, and we explain how we will leverage our network data to evaluate which mechanisms are most plausible.

A Cultural Explanation for Suicide Contagion

Many suicide researchers have gravitated toward theoretical explanations for suicide contagion—like social learning theory (Akers and Jensen 2006; Bandura 1977; Stack 1990; Sutherland et al. 1992)—that treat the spread of suicidality as analo-gous to the spread of juvenile delinquency or crimi-nal behavior (e.g., Baller and Richardson 2009). While social learning theory can offer some insights into why suicides may spread, we argue that elaborating it using cultural sociology can deepen its predictive power.

Social learning theory generally assumes that behaviors are learned through "operant condition-ing" or through social interactions that reinforce behaviors as either desirable or undesirable (Akers and Jennings 2009). Practical information that enables individuals to execute behaviors (e.g., learn how to commit crimes or, perhaps, how to complete suicide) is also a part of social learning. Sutherland et al.'s (1992) work modifies these assumptions slightly by arguing that learning deviant or negative behaviors is most likely to occur within a small group of intimates, in which so-called deviant behavior is considered normal. Hence, social

learning predicts that role models who possess status characteristics that are salient to an individual will be more influential, an assumption borne out by some research on suicide contagion (Stack 2000b). Adapting this perspective to the case of suicide, social learning theory suggests that the more exposure an individual has to a behavior, such as suicide attempts or completions, via their social relationships, the more acceptable and feasible that behavior may become and the more the natural barriers humans have against self-harm may erode (Joiner 2005), especially when those modeling the behavior are intimate others (Sutherland et al. 1992).

While the motivations identified by social learning theory undoubtedly play some role in suicide contagion, important insights from cultural sociology and symbolic interactionism drawn, in part, from Tarde's (1903) work can provide a fuller picture of how contagion may operate. From a cultural perspective, individuals are seen as embedded in contexts where certain emotion rules, behavioral patterns, and cognitive frames are normative (Hochschild 1979). This shared culture is collectively derived and full of symbols that individuals use to make sense of their everyday life and their place in society (McCall and Simmons 1978). Within this framework, we can think of suicide as a symbolic act that individuals may use to express their extreme distress, hopelessness, or anomie to themselves and others (Goffman 1959). That is, the more frequent the exposure to suicide deaths or attempts, the more powerful a suicide "script" or "narrative" may become for guiding an individual's understanding of his or her life circumstances and emotions and the options he or she may choose for coping. Thus, exposure to the suicide attempts of friends—who are a particularly powerful significant others for adolescents (Giordano 2003)—may transform the distant idea of suicide—as something that other people do—into something that people like them use to cope with distress, sorrow, or alienation. As such, in the wake of alter's suicide attempt, suicide can become a "cultural script" for coping with distress that egos may choose to deploy.

In terms of relating this discussion of social learning and symbolic interactionism to our analyses, we argue that evidence for this cultural mechanism will appear if either alters' disclosed suicide attempts or alters' death by suicide at Wave I is significantly associated with egos' suicidality at Wave II. Suicide cannot be socially learned or become a cultural script if youth are not aware of their friend's attempt or death. Further, we expect that exposure to suicide attempts will be more relevant to cultural scripts than exposure to alters' suicide ideation or negative emotions, as behavior reduces the distance between ideas and action. Research, for example, has found that adolescents' sexual behaviors are more strongly linked to their peers' actual sexual behaviors than peers' attitudes about sex (van de Bongardt et al. forthcoming). Thus, we suspect (and test) whether knowing a friend has attempted suicide makes the behavior more real and plausible than exposure to a friend with suicidal thoughts or high emotional distress levels. This gives rise to our first hypothesis:

> *Hypothesis 1:* If a cultural mechanism underlies the suicide contagion process, alters' disclosed suicide attempts or suicide death at Wave I should be significantly related to ego's suicidality at Wave II.

Emotional Contagion

Though cultural mechanisms undoubtedly contribute to suicide contagion, socioemotional mechanisms likely also play a role in the contagion process as emotions are implicated both as a primary factor in suicide death and in coping with the suicide attempt or death of a significant other (Abrutyn and Mueller 2014c; Joiner 2005; Pitman et al. 2014; Shneidman 1993). Though an emotional mechanism is rarely emphasized in the suicide contagion literature, it is present in the broader social psychological literature and in Tarde's (1903:194–213) original thesis (see also, Abrutyn and Mueller 2014b). In Tarde's work, he noted that emotions help explain the contagion of ideas and subsequently, behavior: "the intensity of everybody's desire increases in proportion to its spread, through the *effect of mutual reaction*" (p. 196, italics added). The potential for emotional contagion may be particularly salient in the case of significant others like friends, as humans are especially likely to be oriented toward their significant other's emotions (Kimura, Daibo, and Yogo 2008). Our ability to empathize with significant others makes us especially prone to mimicking or adopting intimate other's behavior (Hatfield, Rapson, and Le 2009) and/or to confusing the other's emotions with our own (Aron and McLaughlin-Volpe 2001), especially those intimate others who we deem high in status (Larson and Almeida 1999; Summers-Effler 2004). Additionally, a significant body of research has found that humans are wired to pay close attention to faces and emotions (Damasio 1994; Ekman 1982), suggesting that emotional flows between individuals may be sufficient to

shape well-being even absent explicit knowledge about the behaviors of significant others. The recent controversial "Facebook Experiment" takes this argument one step further, demonstrating that emotional contagion can occur between friends even absent face-to-face contact and nonverbal cues such as facial expressions (Kramer, Guillory, and Hancock 2014).

This literature on emotional contagion suggests that having an emotionally distressed alter may affect ego's mental health, as she either adopts her friend's troubles as her own or feels her own negative emotions in reaction to or in empathy with her friend's spoken or unspoken emotional state (Aron and McLaughlin-Volpe 2001). This may be particularly salient in adolescence when youth are especially attuned to their friendships (Crosnoe 2000; Giordano 2003). With our study, we use three separate items to measure potential sources of emotional contagion: alters' undisclosed suicide attempts, alters' suicide ideation, and alters' emotional distress levels. These measures capture alters' distress absent behavior modeling that distress. Thus, our second hypothesis is:

> *Hypothesis 2:* If emotional contagion underlies the suicide contagion process, alters' undisclosed suicide attempts, suicide ideation, and/or emotional distress at Wave I should be significantly associated with ego's emotional distress and suicidality at Wave II.

Selection versus Influence

Despite the substantial literature demonstrating the significance of suicide contagion, critics sometimes argue that contagion is the product of social selection into friendships rather than friends influencing each other's suicidality (for an example of this argument, see Joiner 2005). To be sure, people often form friendships with similar others (McPherson, Smith-Lovin, and Cook 2001), including others who are similar in terms of their mental health (Schaefer, Kornienko, and Fox 2011). For example, Schaefer and colleagues (2011) found that depressed egos are more likely to be friends with depressed alters, though they determined this is not motivated by a preference for depressed friends but instead by the marginalized location of depressed egos in broader adolescent friendship networks. Additionally, some research supports the idea that egos who are already at risk of suicidality prior to exposure to an alter's suicide attempt are the most susceptible to suicide contagion (Baller and Richardson 2009); however,

research that controls for egos' histories of suicidality still finds a significant increase in risk of suicidality after exposure to an alter's suicide attempt (Abrutyn and Mueller 2014a; Cutler, Glaeser, and Norberg 2001; Liu 2006; Mueller et al. forthcoming; Niederkrotenthaler et al. 2012; Thompson and Light 2011).

It is not necessarily surprising that longitudinal data provide some support for the argument that suicide contagion is about more than just social selection. The desire for similar friends may do more than condition who we are friends with; similarity with a particular friend also foments trust and intimacy, which in turn may increase alter's influence over ego's well-being. This argument is based on a wealth of social psychological literature that shows that individuals are more likely to pass behaviors or attitudes to each other when they engage in a recurring relationship and when each person is recognized as a significant and influential other (Kimura et al. 2008). Nevertheless, this discussion points to the importance of evaluating our hypotheses with longitudinal data (so that we can control for ego's prior mental health) and using controls for (1) factors associated with selection into friendships and (2) factors that put youth at risk of or protect them from suicidality. This leads to our next hypothesis:

> *Hypothesis 3:* If social selection into friendships drives suicide contagion, ego's characteristics at Wave I should account for any significant associations between alter's emotions, suicide ideation, or suicide attempts at Wave I and ego's mental health at Wave II.

A Comment on Gender

Given gender differences in the experience of social relationships and suicidality, it is worth considering how these processes may differ for adolescent boys and girls. There are significant differences in the suicidal behaviors of adolescent boys and girls (Baca-Garcia et al. 2008)—for example, girls are more likely than boys to report nonfatal suicide attempts, while boys are more likely to die by suicide (Eaton et al. 2012). Girls also report suicidal thoughts more frequently than boys (Eaton et al. 2012; Eisenberg and Resnick 2006), and they report higher levels of emotional distress than boys (Hankin and Abramson 2001). Research also shows that women and girls are more vulnerable to their friend's and partner's opinions and pressure (Gilligan 1982; Maccoby 1990, 2002)—and even

their negative emotions (Hochschild 1983; Larson and Almeida 1999; Summers-Effler 2004). Adolescent girls tend to develop fewer but more emotionally charged friendships than boys (Crosnoe 2000). This research suggests that adolescent girls may be particularly vulnerable to their friends' suicidality, both because of the greater intimacy they often experience in their friendships and because this intimacy may lead them to be more vulnerable to emotional contagion. This leads to our final hypothesis concerning gender:

Hypothesis 4: We hypothesize that girls will be significantly more vulnerable to suicide contagion than boys.

To summarize, with this study, we analyze the effect of alters' disclosed suicide attempts, undisclosed suicide attempts, suicide ideation, and emotional distress on egos' mental health approximately one year later to gain insights into the social mechanisms that may underlie the social spread of suicide in adolescence. In general, we expect any significant effects of alter's undisclosed suicide attempts, suicide ideation, or emotional distress to provide evidence for emotional contagion, while any significant effects of disclosed suicide attempts provide support for our cultural mechanism. We also examine the roles of gender and social selection.

DATA AND METHODS

Data

This study employs data from Waves I and II of the National Longitudinal Study of Adolescent to Adult Health. Add Health contains a nationally representative sample of U.S. adolescents in grades 7 through 12 in 132 middle and high schools in 80 different communities. The Add Health sample was chosen from a list of all schools in the United States containing an 11th grade. Add Health began by selecting a nationally representative sample of schools using a school-based, cluster sampling design, with the sample stratified by region, urbanicity, school type, ethnic composition, and size. Nearly all students in Add Health high schools (N = 90,118 students) were interviewed in 1994–1995 as part of the preliminary In-School Survey. From this sample, a nationally representative subsample was interviewed at Wave I (n = 20,745) shortly after the In-School Survey. Wave II followed in 1996 and collected information from 14,738 of the participants from Wave I. Some

groups of egos were generally not followed up at Wave II; the largest of these were Wave I 12th graders who graduated high school before Wave II. Additional information about Add Health can be found in Harris et al. (2009).

Add Health has some unique properties that render it an excellent data set for this project. The data include extensive measures of adolescent life, including measures relating to suicidality, social integration, psychological well-being, and most importantly for this study, friendship nominations. Further, the complex sampling frame resulted in a sample that is highly clustered in schools. Thus, individuals who egos nominated as alters are also often part of the Add Health sample. This allows us to compare ego's reports of alter's behaviors to alter's self-reported behaviors as well as gain information about alter's suicide ideation and distress level—something prior studies of suicide contagion have not considered.

Sample Selection

We used several sample selection filters to produce our analytic samples. First, we selected egos with valid Wave II sample weights so that we could properly account for the complex sampling frame of the Add Health data. Second, we restricted our sample to adolescents who participated in both Waves I and II. These two restrictions resulted in 13,568 egos. Finally, an additional 86 individuals were dropped from the sample because they were missing values on our dependent variables.

To reduce potential biases associated with listwise deletion (Allison 2002), we used multiple imputation using chained equations in Stata SE 13.1 to impute missing values of all independent variables (StataCorp 2013; White, Royston, and Wood 2011). Because approximately 35% of our sample is missing data on our variables measuring alter's mental health (generally because none of their friends answered the Add Health survey), 50 multiple imputation files were created to ensure the robustness of our estimates (M = 50). Additionally, the Monte Carlo errors of all estimates were analyzed to ensure that random variation between imputed files did not affect our conclusions. Multiple variations of the multiple imputation procedure (e.g., not imputing variables based on alters' self-reports at Wave I) were examined to ensure that the method for handling missing data did not affect our conclusions. Generally, our findings were consistent across modeling strategies, and our procedures followed best practices for multiple

Table 1. Weighted Descriptive Statistics for the Analytic Sample (The National Longitudinal Study of Adolescent to Adult Health, 1994–1996, N = 13,482).

	Mean or Proportion
Independent variables (Wave I)	
Alter's suicidality	
Alter disclosed suicide attempt	.214
Alter undisclosed suicide attempt	.065
Alter died by suicide	.040
Alter suicide ideation (no attempt)	.233
Alter's emotional distress	1.831
Ego's suicidality	
Ego suicide attempt	.038
Ego suicide ideation (no attempt)	.094
Ego emotional distress (logged)	.438
Ego's characteristics	
Female	.514
Age	15.582
African American	.213
Latina/o	.168
Asian American	.070
Other race or ethnicity	.028
Parents' education level	4.429
Same-sex attraction (yes/no)	.060
Lives with both biological parents (yes/no)	.532
Family Integration Scale	4.012
Friends don't care (yes/no)	.161
Family suicide attempt or death (yes/no)	.044
Frequent binge drinking (yes/no)	.102
Illegal drug use (yes/no)	.148
Delinquency Scale	2.888
Grade level	9.714
GPA	2.761
Dependent variables (Wave II)	
Emotional distress (logged)	.434
Ego suicide ideation	.108
Ego suicide attempt	.034

imputation (Social Science Computing Cooperative 2013; StataCorp 2013; White et al. 2011). Results from our alternate model specifications are available by request from the authors. Table 1 presents descriptive statistics of our analytic sample.

Measures

Dependent Variables. To assess how alter shapes ego's mental health, we analyzed three dependent variables. *Emotional distress* was measured at Wave II by a 19-item abridged Center for Epidemiological Studies Depression (CES-D) scale (Cronbach's alpha = .87) (the average of the 19 items is taken). To correct for the positive skew of emotional distress, we took the natural log of the variable to produce a more normal distribution. Our second dependent variable, *suicide ideation*, was based on egos' answers to the question: "During the past 12 months, did you ever seriously think about committing suicide?" Egos who answered yes were coded as '1' on a dichotomous outcome indicating suicidal ideation. Egos were then asked, "During the past 12 months, how many times did you actually attempt suicide?" Answers ranged from 0 (0 times) to 4 (6 or more times). Egos' answers were recoded into a

dichotomous variable—*suicide attempts*—where '1' indicated a report of at least one suicide attempt in the past 12 months and '0' indicated no attempts. These three survey items were also asked at Wave I as well; thus, all models included ego's emotional distress, suicide ideation (without an attempt), and suicide attempts at Wave I as an important control for unmeasured confounds (Shadish, Cook, and Campbell 2002).

Independent Variables. We have five key independent variables that capture ego's exposure to suicidality and emotional distress via their alters. At both the in-school survey and the Wave I in-home survey, egos were asked to nominate their five best female and five best male friends (alters). Many egos nominated alters who attend their same school, and many alters also participated in the Add Health survey. We used egos' friendship nominations at both the in-school survey and the Wave I survey to identify alters. We then used both ego and alter's survey responses to code our key independent variables. Because some egos were only allowed to nominate one male and one female friend at Wave I (instead of five) due to an error in data collection, our saturated models include a flag for whether this occurred with a particular ego. This error only occurred during Wave I data collection and did not impact the in-school survey.

Using the friendship nominations and Wave I survey data, we constructed three measures that capture ego's exposure to alters' suicide attempts or deaths. *Alter disclosed suicide attempt* is based on ego's answers to the question: "Have any of your friends tried to kill themselves during the past 12 months?" Egos who responded yes to this but no to the follow up-question "Have any of them succeeded? [*sic*]" were coded as '1' on this dichotomous variable. Egos who: (1) have not had an alter attempt suicide, or (2) who do not know that alter attempted suicide, or (3) who had an alter die by suicide are coded as '0'. *Alter undisclosed suicide attempt* was measured using alters' responses to the question "During the past 12 months, how many times did you actually attempt suicide?" Responses from all of ego's alters were aggregated into one measure indicating that ego had at least one friend who reported attempting suicide at least once. Alter's report was then compared to ego's report. If ego did not report that an alter attempted suicide but alter did report an attempt, ego received a '1' on alter undisclosed suicide attempt. If ego reported either (1) that an alter attempted suicide or (2) died

by suicide, ego received a '0' on this measure. Egos who had no alters attempt suicide (whether disclosed or not) were also coded as '0' on this variable. Finally, we created a dichotomous variable—*alter died by suicide*—where '1' indicated that ego had an alter die by suicide; all other egos are coded as '0' on this measure. Thus, we created a mutually exclusive categorical variable where the options were: alter disclosed suicide attempt, alter undisclosed suicide attempt, and alter died by suicide, with a reference group consisting of egos who had no alters who attempted or died by suicide in the last 12 months.

Next we created two measures of ego's exposure to emotionally distressed alters. First, using alter's survey responses, we created a dichotomous indicator of whether ego had at least one alter who reported suicide ideation (without an attempt) at Wave I (*alter suicide ideation [no attempt]*). Egos who had no alters report suicide ideation were coded as '0'. We limited this measure to suicide ideation without attempt to distinguish the role of ideation from behaviors. Finally, we created a measure of the emotional distress levels of ego's alters. The maximum value among ego's alters was retained to create the variable *alter's emotional distress*, and higher values indicated higher distress levels. For all of our variables using the friendship data, egos with no alters who completed the Add Health survey were coded as missing, and their values were imputed using multiple imputation. The only exceptions to this were if ego reported knowing about alter's suicide attempt or if ego reported having an alter die by suicide, then alter undisclosed suicide attempt was coded as '0'.

Our models also controlled for factors that may protect against suicide identified by prior research. Following Durkheim, we controlled for social integration with families and friends. Our Family Integration Scale (Cronbach's alpha = .77) was based on four items that measured how integrated egos are in their families (Abrutyn and Mueller 2014a; Bjarnason 1994). Egos were asked questions such as how much they feel that their parents care about them and how much people in their family understand them. A higher value on the scale indicated higher family integration. Our measure of egos' feelings toward their relationship with their friends, *friends don't care*, was based on egos' responses to the question, "How much do you feel that your friends care about you?" Egos who answered "not at all" or "very little" or "somewhat" were coded as '1' on this dichotomous indicator.

Additionally, we controlled for known suicide risk factors. These included egos' reports of *same-sex attraction* (Russell and Joyner 2001). At Wave I, egos were asked whether they had "ever had a romantic attraction to a female?" or " . . . to a male?" These questions were used to identify egos who experienced some form of same-sex attraction. We also controlled whether egos have had a family member attempt or die by suicide (*family suicide attempt or death*) as this is a known risk factor for the development of suicidality (Abrutyn and Mueller 2014a). Egos who answered yes to the question "Have any of your family tried to kill themselves during the past 12 months?" were coded as 1 on this dichotomous indicator. Additionally, we controlled for whether egos have used illegal drugs in the past 30 days (0/1) and whether they engaged in frequent binge drinking (0/1). Finally, we included a delinquency scale in all models. Egos were asked about their involvement in 15 different forms of delinquency. Their answers (yes/no) were summed to create our Delinquency Scale. Higher values indicated higher levels of delinquency (Pearce and Haynie 2004). All of these are known to increase the risk of suicidality. Illegal drug use and delinquency are also known to shape friendship formation.

Finally, all models controlled for demographic characteristics associated with suicidality and friendship formation. Egos' overall grade point average (GPA) was a self-reported measure and had the standard range of 0 to 4. *Lives with both biological parents* captured whether or not egos lived in a two–biological parent family. *Race-ethnicity* was coded as five dichotomous variables: Latino/a, (non-Hispanic) black, Asian American, and other race or ethnicity, with (non-Hispanic) white as the reference category. *Parents' education level* was taken from the parent questionnaire (unless the information was missing, in which case we used the students' report), and the maximum value was taken in the case of two parents. Parents' education was coded as: (0) never went to school; (1) less than high school graduation; (2) high school diploma or equivalent; (3) some college, but did not graduate; (4) graduated from a college or university; and (5) professional training beyond a 4-year college or university. Finally, models control from the egos' *grade level* at Wave I, which ranges from 6th grade to 12th grade.

Analytic Plan

To investigate our hypotheses, we estimated a series of nested ordinary least squares (OLS) regressions and logistic regression models using the MI estimate procedure in Stata 13.1 (StataCorp 2013). All of our multivariate regression models are lagged models and include prior measures of our dependent variables to control for potential unmeasured confounds (Shadish et al. 2002). To obtain appropriate estimates and standard errors with Add Health's complex sample, Stata's survey command was used. This method accounts for dependencies in the data due to the complex survey design and adjusts our standard errors to account for clustering within schools. Our models also include normalized sample weights to compensate for the substantial oversampling of certain populations, thus rendering our analyses more representative of the U.S. population than unweighted analyses.

RESULTS

Table 2 presents estimates from our logistic regression models that examine how alter's suicidality and distress at Wave I is associated with ego's likelihood of reporting a suicide attempt at Wave II. We begin by assessing the relationship between alter's mental health and ego's suicide attempts at Wave II, without controlling for ego's characteristics. Model 1 reveals that egos who had an alter disclose a suicide attempt at Wave I (OR = 4.232, $p < .001$) or who had an alter die by suicide at Wave I (OR = 6.433, $p < .001$) are significantly more likely to report a suicide attempt at Wave II compared to egos with no alter suicide attempts. Interestingly, alters' undisclosed suicide attempts and alter's suicide ideation are not significantly associated with ego's likelihood of reporting a suicide attempt at Wave II, even in this basic model (Model 1). Model 2 examines the bivariate effect of alter's emotional distress level and finds that egos whose alters are more distressed are significantly more likely to report suicide attempts at Wave II in our bivariate model (Model 3).

Our next step is to evaluate how robust these relationships are to the addition of controls for ego's characteristics at Wave I. Model 3 demonstrates that egos with alters who either disclosed a suicide attempt or who died by suicide remain significantly more likely to report attempting suicide, net of all other variables. However, the significant effect of alters' emotional distress that we observed in Model 2 is no longer significant in Model 4. As one would expect based on Model 1, the effect of alter's suicide ideation remains insignificant in Model 3.

As a final test, we estimated a saturated model (Model 5). On average, egos who had an alter

Table 2. Estimates from Logistic Regression Models Predicting Suicide Attempts at Wave II Among Adolescents (National Longitudinal Study of Adolescent to Adult Health, 1994–1996, N = 13,482).

	Model 1			Model 2			Model 3			Model 4			Model 5		
	OR	p	95% CI	OR	p	95% CI	OR	p	95% CI	OR	p	95% CI	OR	p	95% CI
Alter's suicidality (Wave I)															
Alter disclosed suicide attempt	4.232	***	(3.374, 5.307)	—			1.901	***	(1.460, 2.474)	—			1.895	***	(1.455, 2.469)
Alter undisclosed suicide attempt	1.539		(.916, 2.587)	—			1.125		(.648, 1.953)	—			1.104		(.613, 1.988)
Alter died by suicide	6.433	***	(4.396, 9.414)	—			2.612	***	(1.633, 4.179)	—			2.604	***	(1.633, 4.151)
Alter suicide ideation (no attempt)	1.196		(.895, 1.600)	—			1.122		(.824, 1.527)	—			1.107		(.805, 1.523)
Alter's emotional distress	—			1.372	*	(1.033, 1.823)	—			1.099		(.800, 1.510)	1.040		(.731, 1.479)
Ego's suicidality (Wave I)															
Ego suicide attempt	—			—			8.196	***	(6.147, 10.928)	9.307	***	(6.996, 12.380)	8.202	***	(6.150, 10.938)
Ego suicide ideation (no attempt)	—			—			3.303	***	(2.540, 4.294)	3.656	***	(2.824, 4.735)	3.303	***	(2.540, 4.296)
Ego emotional distress	—			—			4.122	***	(2.560, 6.639)	4.374	***	(2.717, 7.044)	4.111	***	(2.549, 6.630)
Ego's characteristics (Wave I)															
Female	—			—			1.523	***	(1.207, 1.921)	1.657	***	(1.318, 2.084)	1.521	***	(1.205, 1.920)
Age	—			—			.992		(.849, 1.159)	1.005		(.860, 1.173)	.991		(.847, 1.158)
African American	—			—			.945		(.710, 1.258)	.843		(.637, 1.116)	.944		(.709, 1.257)
Latina/o	—			—			1.206		(.910, 1.599)	1.174		(.888, 1.553)	1.203		(.908, 1.595)
Asian American	—			—			1.002		(.649, 1.546)	.923		(.600, 1.420)	.999		(.647, 1.541)
Other race or ethnicity	—			—			1.173		(.704, 1.953)	1.216		(.729, 2.029)	1.167		(.700, 1.946)
Parents' education level	—			—			1.017		(.955, 1.084)	1.022		(.960, 1.088)	1.018		(.955, 1.085)
Same-sex attraction	—			—			1.253		(.887, 1.769)	1.290		(.916, 1.817)	1.252		(.886, 1.769)
Lives with both biological parents	—			—			.945		(.766, 1.166)	.929		(.754, 1.145)	.946		(.766, 1.167)
Family Integration Scale	—			—			.747	***	(.645, .867)	.744	***	(.643, .861)	.747	***	(.644, .866)
Friends don't care	—			—			.751	*	(.567, .994)	.742	*	(.562, .981)	.750	*	(.567, .994)
Family suicide attempt or death	—			—			1.192		(.849, 1.672)	1.443	*	(1.035, 2.013)	1.194		(.851, 1.677)
Frequent binge drinking	—			—			.877		(.636, 1.210)	.867		(.630, 1.194)	.877		(.636, 1.210)
Illegal drug use	—			—			1.170		(.896, 1.528)	1.206		(.925, 1.573)	1.170		(.896, 1.528)
Delinquency Scale	—			—			1.015		(.978, 1.054)	1.031		(.995, 1.070)	1.015		(.978, 1.053)
Grade level	—			—			.790	**	(.667, .935)	.783	**	(.663, .926)	.790	**	(.667, .935)
GPA	—			—			.875		(.760, 1.008)	.860	*	(.747, .990)	.876		(.760, 1.009)

*p < .05, **p < .01, ***p < .001 (two-tailed tests).

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disclose a suicide attempt at Wave I are 1.895 times more likely to report attempting suicide themselves at Wave II, net of all other variables. Egos who had an alter die by suicide were also more likely to report a suicide attempt at Wave II: On average, net of all other control variables, egos who reported at Wave I that an alter died by suicide are 2.604 times more likely to report a suicide attempt at Wave II than egos with no alters that attempted or completed suicide. Alters' undisclosed suicide attempts, suicide ideation, and emotional distress, however, were not significantly related to ego's probability of reporting a suicide attempt, net of our controls. Taken as a whole, these findings provide support for our hypothesized cultural mechanism: alters' disclosed suicide attempts play an important role in shaping ego's suicide attempts one year later. Because this finding is robust to substantial controls, including whether ego attempted suicide at Wave I, this association is likely not simply due to social selection into friendships. However, ego's background characteristics do appear to account for some of the observed association between ego's Wave II and alter's Wave I suicidality, suggesting that social selection is at least part of the story.

Next we turn to Table 3 and our analyses of our dependent variable, suicide ideation. Our models predicting ego's suicide ideation (Table 3) offer similar findings to our analyses predicting egos' suicide attempts (Table 2): Alter's disclosed suicide attempt and death by suicide are significantly associated with ego's likelihood of reporting suicide ideation approximately a year later, even net of substantial controls (Model 5). There is one minor difference. In Model 1 (which has no controls for ego's characteristics), there is a significant and positive effect of alter's undisclosed suicide attempt on ego's likelihood of reporting suicide ideation at Wave II; however, this effect is rendered insignificant by the addition of controls for ego's characteristics to the model (compare Model 1 to Model 3). Alter's suicide ideation (Model 3) and emotional distress (Model 4) are not significantly associated with ego's suicide ideation (approximately one year later), at least not once controls for ego's characteristics are included in the model in the case of alter's emotional distress. Overall, these models provide further evidence for our cultural mechanism, though as we would expect, we also find some support for the idea that social selection into friendships matters.

Table 4 presents our final set of analyses examining how alters shape ego's emotional distress at Wave II. Similar to our findings presented in Tables 2 and 3, having an alter disclose a suicide attempt has a significant and negative effect on ego's emotional distress, even net of significant controls (see Models 3 and 5). Alter's death by suicide is not significantly associated with ego's emotional distress once controls for ego's mental health at Time 1 are included in the model (though the *p* value approaches the .05 threshold, *p* value = .07). Additionally, alter's suicide ideation is not significantly associated with ego's emotional distress, even in Model 1, which excludes controls for ego's characteristics.

However, our findings regarding the effect of alter's emotional distress on ego's emotional distress differ from what we observed for suicide ideation and suicide attempts in Tables 2 and 3 and provide new insights into the role emotional contagion may play in adolescent mental health. Specifically, alter's emotional distress is significantly and positively associated with ego's distress (Model 2), and this effect is robust to the addition of controls, such as ego's emotional distress level at Wave I (Model 4) and alter's suicidality (Model 5). In Model 5 we do find one effect of alter's suicide ideation that is contrary to expectations; we find that in our saturated model, it is negatively associated with ego's emotional distress. Because this effect only appears in our saturated model, we hesitate to read too much into it. Future research should examine this finding in more detail—are there certain situations where having distressed peers is protective? Taken as a whole, our findings presented in Table 4 provide our strongest evidence of emotional contagion in adolescence; however, they also suggest that emotional contagion may not undergird suicide contagion since we only found robust evidence of it for ego's emotional distress and not ego's suicidality.

Finally, in separate analyses (available from the authors by request), we examined our final hypothesis, that gender may condition the experience of alter's mental health. Interestingly, we found no significant gender interactions. We did find, in descriptive analyses of the unimputed data, that significantly more girls than boys report having alters disclose a suicide attempt to them (30.3% of girls compared to 18.3% of boys; chi square = 178.80, *p* value < .001). While there were no substantial gender gaps in the prevalence of alter's undisclosed suicide attempts (5.57% of girls vs. 6.51% of boys) or suicide deaths (5.59% of girls vs. 4.41% of boys), many more boys reported not having any friends who are suicidal (58.54% vs. 70.78% of boys). These patterns were replicated in

Table 3. Estimates from Logistic Regression Models Predicting Suicide Ideation at Wave II among Adolescents (National Longitudinal Study of Adolescent to Adult Health, 1994–1996, N = 13,482).

	Model 1			Model 2			Model 3			Model 4			Model 5		
	OR	p	95% CI	OR	p	95% CI	OR	p	95% CI	OR	p	95% CI	OR	p	95% CI
Alter's suicidality (Wave I)															
Alter disclosed suicide attempt	2.759	***	(2.408, 3.161)	—			1.435	***	(1.222, 1.686)	—			1.438	***	(1.223, 1.690)
Alter undisclosed suicide attempt	1.354	*	(1.030, 1.780)	—			1.080		(.808, 1.443)	—			1.095		(.813, 1.473)
Alter died by suicide	3.389	***	(2.630, 4.365)	—			1.468	*	(1.092, 1.973)	—			1.471	*	(1.095, 1.977)
Alter suicide ideation (no attempt)	1.148		(.971, 1.357)	—			1.037		(.863, 1.246)	—			1.047		(.868, 1.263)
Alter's emotional distress	—			1.210	*	(1.032, 1.420)				1.004		(.832, 1.212)	.971		(.795, 1.186)
Ego's suicidality (Wave I)															
Ego suicide attempt	—			—			5.770	***	(4.657, 7.149)	6.169	***	(4.990, 7.627)	5.769	***	(4.656, 7.148)
Ego suicide ideation (no attempt)	—			—			5.193	***	(4.467, 6.036)	5.429	***	(4.677, 6.302)	5.193	***	(4.467, 6.037)
Ego emotional distress	—			—			3.229	***	(2.418, 4.313)	3.343	***	(2.505, 4.462)	3.237	***	(2.423, 4.325)
Ego's characteristics (Wave I)															
Female	—			—			1.285	***	(1.127, 1.466)	1.349	***	(1.185, 1.535)	1.286	***	(1.128, 1.467)
Age	—			—			1.013		(.922, 1.113)	1.020		(.928, 1.120)	1.013		(.922, 1.113)
African American	—			—			.667	***	(.562, .792)	.636	***	(.537, .753)	.668	***	(.562, .793)
Latina/o	—			—			.856		(.718, 1.022)	.854		(.716, 1.018)	.858		(.719, 1.024)
Asian American	—			—			1.035		(.817, 1.310)	1.005		(.794, 1.272)	1.037		(.819, 1.315)
Other race or ethnicity	—			—			1.040		(.750, 1.443)	1.066		(.769, 1.479)	1.043		(.752, 1.448)
Parents' education level	—			—			1.046	*	(1.007, 1.086)	1.048	*	(1.009, 1.088)	1.045	*	(1.006, 1.086)
Same-sex attraction	—			—			1.325	*	(1.063, 1.652)	1.339	**	(1.075, 1.668)	1.326	*	(1.063, 1.654)
Lives with both biological parents	—			—			.860	*	(.759, .974)	.853	*	(.753, .966)	.860	*	(.759, .974)
Family Integration Scale	—			—			.777	***	(.708, .852)	.771	***	(.703, .845)	.777	***	(.708, .852)
Friends don't care	—			—			.849		(.719, 1.003)	.840	*	(.712, .992)	.850		(.719, 1.004)
Family suicide attempt or death	—			—			1.406	**	(1.118, 1.769)	1.554	***	(1.241, 1.947)	1.405	**	(1.117, 1.767)
Frequent binge drinking	—			—			.854		(.697, 1.047)	.848		(.692, 1.040)	.854		(.697, 1.047)
Illegal drug use	—			—			1.152		(.973, 1.364)	1.169		(.988, 1.383)	1.152		(.973, 1.364)
Delinquency Scale	—			—			1.014		(.991, 1.038)	1.023	*	(1.000, 1.047)	1.014		(.991, 1.038)
Grade Level	—			—			.862	**	(.779, .954)	.856	**	(.774, .947)	.862	**	(.779, .954)
GPA	—			—			.927		(.852, 1.009)	.918	*	(.844, .999)	.927		(.851, 1.009)

*p < .05, **p < .01, ***p < .001 (two-tailed tests).

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Table 4. Estimates from Ordinary Least Squares Regression Models Predicting Emotional Distress (Logged) at Wave II among Adolescents (National Longitudinal Study of Adolescent to Adult Health, 1994–1996, N = 13,480).

	Model 1		Model 2		Model 3		Model 4		Model 5	
	Coefficient (SE)	p	Coefficient (SE)	p	Coefficient (SE)	p	Coefficient (SE)	p	Coefficient (SE)	p
Alter's suicidality (Wave I)										
Alter disclosed suicide attempt	.094 (.006)	***	—		.025 (.005)	***	—		.024 (.005)	***
Alter undisclosed suicide attempt	.031 (.010)	**	—		.005 (.008)		—		-.001 (.008)	
Alter died by suicide	.116 (.012)	***	—		.019 (.010)		—		.019 (.010)	
Alter suicide ideation (no attempt)	.005 (.006)		—		-.007 (.005)		—		-.012 (.005)	*
Alter's emotional distress	—		.059 (.006)	***	—		.009 (.004)	*	.013 (.005)	*
Ego's suicidality (Wave I)										
Ego suicide attempt	—		—		.019 (.009)	*	.023 (.009)	**	.019 (.009)	*
Ego suicide ideation (no attempt)	—		—		.019 (.006)	**	.021 (.006)	***	.019 (.006)	**
Ego emotional distress	—		—		.513 (.008)	***	.515 (.008)	***	.512 (.008)	***
Ego's characteristics (Wave I)										
Female	—		—		.028 (.003)	***	.031 (.003)	***	.028 (.003)	***
Age	—		—		.014 (.003)	***	.014 (.003)	***	.014 (.003)	***
African American	—		—		.017 (.004)	***	.015 (.004)	***	.016 (.004)	***
Latina/o	—		—		.022 (.005)	***	.022 (.005)	***	.021 (.005)	***
Asian American	—		—		.056 (.007)	***	.054 (.007)	***	.055 (.007)	***
Other race or ethnicity	—		—		.021 (.010)	*	.021 (.010)	*	.020 (.010)	*
Parents' education level	—		—		-.006 (.001)	***	-.005 (.001)	***	-.006 (.001)	***
Same-sex attraction	—		—		.030 (.007)	***	.031 (.007)	***	.030 (.007)	***
Lives with both biological parents	—		—		-.006 (.003)	***	-.006 (.003)	***	-.006 (.003)	***
Family Integration Scale	—		—		-.024 (.003)	***	-.024 (.003)	***	-.024 (.003)	***
Friends don't care	—		—		.016 (.005)	***	.016 (.005)	**	.016 (.005)	***
Family suicide attempt or death	—		—		-.008 (.008)		-.002 (.008)		-.008 (.008)	
Frequent binge drinking	—		—		-.002 (.006)		-.002 (.006)		-.002 (.006)	
Illegal drug use	—		—		.004 (.005)		.004 (.005)		.004 (.005)	
Delinquency Scale	—		—		.003 (.001)	***	.003 (.001)	***	.003 (.001)	***
Grade level	—		—		-.013 (.003)	***	-.014 (.003)	***	-.013 (.003)	***
GPA	—		—		-.013 (.002)	***	-.013 (.002)	***	-.013 (.002)	***
Intercept	.406 (.003)	***	.327 (.010)	***	.238 (.026)	***	.224 (.027)	***	.220 (.027)	***

*p < .05, **p < .01, ***p < .001 (two-tailed tests).

the imputed data. This may suggest that while both boys' and girls' mental health suffers when an alter attempts suicide, there may be gender differences in exposure to this important risk factor for suicidality.

DISCUSSION

A robust literature has demonstrated that adolescents' suicidality is in part shaped by exposure to their friends' suicide attempts, suggesting that suicide may be socially contagious among youth. Despite rich sociological theories that point to mechanisms that may facilitate contagion, little research has focused on understanding how and why suicides spread between individuals who know each other. With this study, we examine different aspects of alter's distress and suicidality in order to better understand how cultural and emotional mechanisms contribute to the suicide contagion process while controlling for factors related to (1) ego's risk of suicide and (2) the likelihood that ego and alter would become friends. We found that when ego knows about alter's suicide attempt, alter's attempt is significantly associated with ego's emotional distress, suicide ideation, and attempts, net of our substantial controls. This finding is consistent with past research using Add Health, which has shown that ego's report of alter's suicide attempt is significantly associated with ego's suicidality (Abrutyn and Mueller 2014a; Bearman and Moody 2004; Cutler et al. 2001; Liu 2006; Mueller et al. forthcoming; Niederkrotenthaler et al. 2012; Thompson and Light 2011); however, unlike past research, we also analyzed the effect of alter's undisclosed suicide attempts, alter's distress levels, and alter's suicide ideation. Including these additional measures of alter's mental health allowed us to determine that ego must know about alter's suicide attempt in order for suicide contagion to occur and that alter's suicide ideation and emotional distress is not associated with an increased risk of suicidality for ego. However, we did find evidence of emotional contagion: Egos with more distressed alters (at Wave I) report higher levels of emotional distress themselves (at Wave II) but not higher probabilities of reporting suicide ideation or attempts (at Wave II).

Finally, though we examined gender differences, we found no significant differences in these mechanisms by gender, even though significantly more girls than boys report having alters with disclosed suicide attempts and more boys than girls report having no friends with suicide attempts

(whether disclosed or undisclosed). Our study is consistent with past research that finds that both boys and girls are more likely to report suicide ideation after experiencing the suicide attempt of a friend (Abrutyn and Mueller 2014a; Liu 2006). Worth noting, however, is that past research has found important gendered nuances in how contagion operates. For example, Liu (2006) found that highly distressed boys were less vulnerable to contagion than boys with average or low distress levels (but that distress does not change girls' response to their friends' attempt), and Abrutyn and Mueller (2014a) found that for girls (but not boys), the impact of a friend's suicide attempt in adolescence can last into young adulthood. Thus, the gender differences highlighted by past research, in addition to our own finding that girls report more exposure to the disclosed suicide attempts of friends, suggest that researchers should continue to examine how gender conditions contagion.

More generally, our findings offer several insights into the suicide contagion process. First, the importance of disclosure implicates a cultural explanation for the social contagion of suicide and adds credence to Tarde's (1903) assertion that language is the great "vehicle" of suggestion. When individuals make their subjective experiences available to their significant others, they transform these experiences into intersubjective social facts (Berger and Luckmann 1966) that in turn may shape decision making, feelings, and interpretations of reality and self. Significant others are significant because we trust them, recognize their experiences as relevant and important to our own understanding of the world, and identify with their social reality. As such, the suicide attempt of a friend may transform the distant idea of suicide into a meaningful cultural script that individuals use to express themselves to society and significant others and importantly, self-reflexively.

In this conceptualization, the salience of suicide as a cultural script for teens is not centered on teens observing the social rewards or sanctions that may accrue to someone who attempts suicide—though social rewards or sanctions may still play a role—but rather on an individual's examination of where he or she fits into society relative to his or her social and personal experiences with shared culture and cultural symbols (Goffman 1967). Future work on suicide contagion should continue to explore the role of culture and the potential for suicide to become a cultural script in a community or school. While this study takes a step in that direction, there is much about culture and how individuals make

sense of experiences with significant others that is unknowable using available quantitative data. For instance, while we find that disclosed suicide attempts between friends carry an increased risk of suicidality, discussing suicide with friends may also discourage suicidality or prevent its escalation to a serious attempt by deepening bonds of trust between friends and generating opportunities for social support and integration. Additionally, one of our more puzzling findings was that alter's suicide ideation was not associated with ego's mental health. Future research should continue to examine what is different about alter's suicide ideation compared to alter's emotional distress or suicide attempt. Regardless, this study provides an important first step that we hope will stimulate a larger project for sociologists. We have the tools to improve the understanding of how social relationships and cultural scripts contribute to suicide contagion and thus have an opportunity to augment the contribution of sociology to suicidology.

Our second implication concerns the relevance of emotional contagion to suicide contagion. While we did not find that alter's undisclosed suicide attempts, suicide ideation, or emotional distress (at Wave I) are significantly associated with ego's suicidality (at Wave II), and therefore did not find any direct evidence that emotional contagion undergirds suicide contagion, we acknowledge that our findings cannot determine the full role emotional contagion may play in the social contagion of suicide. Emotions may still play an indirect, supportive role in suicide contagion. For example, similar to prior research (Kramer et al. 2014), we do find evidence of the social contagion of negative emotions: Alter's emotional distress is significantly associated with ego's distress one year later (and net of important controls). However, our results suggest that emotional contagion may not be relevant to the social contagion of suicide *absent* conscious awareness of a friend's behaviors. Thus, while emotional contagion may be one reason why alters' disclosed suicide attempts have such a robust association with ego's mental health and suicidality, without disclosure, they may lack the ability to shape suicidal thoughts or behaviors. Given the robust literature identifying emotional contagion between human beings (Kramer et al. 2014) and its centrality in helping people construct meanings and formulate motivation (Turner 2007), future research should continue to parse out the role emotional contagion plays in mental health more generally and the spread of suicide more specifically.

Our third contribution to the existing literature stems from the evidence we provide regarding the role selection into friendships plays in suicide contagion. One criticism of suicide contagion is that observed similarities between friends' suicidality may not be due to social influence but instead due to social selection. To the extent possible with survey data, we strived to address this issue by using longitudinal data and including substantial controls in our models. Our findings suggest that the disclosed suicide attempt or death of a friend has an impact on adolescent's mental health and that this impact exists above and beyond observed similarities between friends, such as shared risk factors for suicide. Though surveys can never fully account for potential selection effects and there may be unobserved similarities between friends, the evidence offered by this study, complemented by evidence by other studies using diverse statistical methodologies (Abrutyn and Mueller 2014a; Cutler et al. 2001; Gould et al. 2014; Liu 2006; Niederkrotenthaler et al. 2012), suggests that experiencing the suicide attempt or death of a friend shapes adolescents' mental health in important ways.

Limitations

Although our findings provide new and important insights, this study is not without its limitations. First, we are limited to analyzing ego's suicidal behaviors and emotional distress and not deaths as there are too few known cases in the Add Health data of suicide deaths. If egos are missing due to suicide deaths, we may be missing those individuals most likely to be affected by suicide contagion. Fortunately, suicide is rare among adolescents and Add Health respondents, suggesting that if this introduces any bias into our estimates, it should be minimal and if anything, should cause us to underestimate the effect of suicide contagion. This is a common limitation in the suicide contagion literature; much could be gained if future research could find a way to analyze the "lethality" of suicide contagion.

Second, while we take advantage of the unique design of Add Health to examine the mechanisms behind suicide contagion, there are limitations to the Add Health network data. First, the alters in our data are restricted to school-based friends, and thus, we probably do not have measures of all of an adolescent's friends. Another limitation is that while we leverage the data to identify disclosed and undisclosed suicide attempts of friends, we do not

have dyadic measures of suicidal disclosures. Egos were not asked whether they know whether a specific alter was suicidal—rather, egos were asked generally whether *any* of their friends had attempted suicide. In the case of undisclosed suicide attempts, we do know that ego, who identified alter as a close friend, does not report knowing about alter's suicide attempt. Additionally, we do not know how close ego and alter are (since our measure of disclosure is not dyadic even though the friends data are). Similarly, egos were not asked whether any of their friends have suicidal thoughts; thus, we have no way of knowing whether ego knows about alter's suicide ideation. It may be that knowing about alter's suicide ideation is key to whether alter's ideation is relevant to ego's mental health. Despite these limitations, we know of no other data set that could allow us to examine suicide contagion in this much detail.

Having dyadic data that examine suicide contagion and address these limitations would greatly improve our understanding of how and why suicide contagion happens. Not surprisingly, we are not the first to suggest this. Baller and Richardson (2009:271) in their study of the diffusion of suicidal thoughts note that "[attaching] information flows and influence to specific ties and sources would be an improvement over [existing research]." This would be an excellent direction for future research. Despite these limitations, our study provides one of the best efforts to date to identify the social mechanisms that underlie the suicide contagion process.

Conclusion

Though the most recognized sociological contribution to the scientific understanding of suicide is Durkheim's ideas regarding social integration and regulation, sociology has much to offer in terms of preventing suicides and helping social scientists and practitioners understand how our experiences in social relationships shape suicidality and emotional well-being. That social relationships can both hurt and comfort individuals is a well-accepted idea in most branches of sociology; integrating this into the sociology of suicide in order to generate a more general and robust sociological theory of suicide would dramatically improve sociology's contribution to the important field of suicide prevention, a project that is the central theme of the most recent review of sociological research on suicide (Wray et al. 2011). By doing so, the Durkheimian mechanisms of protection, social integration, and moral regulation can

be elaborated and given greater depth by considering how social psychological, emotional, and network-level dynamics shape adolescents' emotional distress, suicidal thoughts, and behaviors.

AUTHORS' NOTE

ACKNOWLEDGMENTS

FUNDING

NOTE

1. In the social networks literature, *ego* refers to respondents, and *alter* refers to, in our case, friends of respondents. In our data we have both ego's and alter's reports of alter's suicidality. From this point on, we use the terms *ego* and *alter* to improve clarity.

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