

A Test of the Effectiveness of a List of Suicide Warning Signs for the Public

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In this study we examined the effect that reading a list of warning signs for suicide has on beliefs about suicide, including the belief that one can recognize a suicidal crisis. All participants read two sets of warning signs (with only the experimental group reading the suicide warning signs) and then answered questions concerning beliefs related to three health problems. Results indicate that participants who read the suicide warning signs reported greater abilities to recognize if someone is suicidal but did not report stronger beliefs that suicidal individuals are partly to blame, nor did they report lower likelihoods of befriending suicidal individuals. Results suggest that reading the list of warning signs may be effective in increasing the public's ability to recognize suicidal crises without creating or magnifying stigmatizing beliefs about suicidal individuals.

Assessment of risk for suicidal behavior can take many forms, including the identification of long-standing risk factors that may predispose individuals to suicidal behavior, as well as the identification of more dynamic and proximal factors that may signal a current suicidal crisis (Rudd, 2003; Rudd, Berman et al., 2006). The latter type of risk assessment involves signs of current and immediate suicidal risk which are termed *warning signs* for suicide. Joiner, Walker, Rudd, and Jobes (1999) reported that the key domain in assessment of suicidal risk involves previous history of suicide attempt in combination

with current suicidal symptoms. Thus, long-standing risk factors (e.g., mental illness or history of past suicide attempt) are not sufficient; the current state of the individual must be taken into account in assessing suicidal risk. Silverman and Felner (1995) suggested partitioning the broad term *risk factor* into three conditions of risk: *perpetuating conditions* are those that are immutable (e.g., gender, race, family history); *predisposing conditions* are those that increase overall level of risk (e.g., presence of mental illness, poor coping skills, poor social support); and *precipitating conditions* are those that put individuals at acute risk (e.g., current acute symptoms of psychiatric illness, sudden loss, increased substance abuse). Clinicians need to assess and address precipitating conditions in making decisions about interventions for suicide as these are indicators of acute risk for suicide.

Indicators of risk for suicide may be observed by others or described by the individuals experiencing them. When indicators are observed by others (e.g., clinicians), we refer to them as *signs* and when indicators are

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described by an individual to others, we refer to them as *symptoms*. Thus, clinicians cannot directly observe symptoms; yet signs are conceptualized as behavioral manifestations of underlying symptoms and are directly observable. Thus, warning signs for suicide are the behavioral manifestations of precipitating conditions in a particular individual: they are directly observable, reflect the current state of the individual, and indicate the presence of a suicidal crisis. Warning signs are acute (versus chronic) as well as transient and may resolve with the resolution of a crisis, compared to indicators of risk (*c.f.*, perpetuating and predisposing conditions) that are static, long-standing, and less likely to change over time (Rudd, Berman, et al., 2006). While the presence of perpetuating and predisposing risk conditions elevate long-term probabilistic risk for a suicidal crisis, warning signs indicate the presence of a current suicidal crisis and thus demand specific and immediate intervention (Rudd, Berman, et al., 2006).

One estimate suggests that as many as 75% of individuals who die by suicide are not in contact with mental health professionals at the time of their death (Owens, Booth, Briscoe, Lawrence, & Lloyd, 2003), therefore family, friends, and other individuals in the social networks of suicidal individuals may also benefit from concise information grounded in the empirical literature on how to recognize a suicidal crisis as well as what to do in order to help someone who is suicidal (Hjelmeland & Knizek, 2004). Whereas the intended target groups for suicide risk factors are researchers and clinicians, warning signs for suicide are designed for the lay public as well as researchers and clinicians (Rudd, Berman, et al., 2006). Additionally, the warning signs for suicide investigated in the current study differ from warning signs for many other health problems in that warning signs for other health problems (e.g., heart attacks, diabetes) are directed at the individual who may develop these signs, and encourage the symptomatic individual to seek help for him/herself (American Diabetes Association, 2005a; American Heart Association, 2005). The warning signs for suicide investigated in the

current study are directed at *observers* of individuals in suicidal crises, and thus provide information on how to recognize warning signs in other people. The assumption is that individuals in suicidal crises may not be objective observers of the warning signs.

A working group convened by the American Association of Suicidology (AAS) reviewed the empirical literature and reached consensus on a set of warning signs for suicide (see Rudd, Berman, et al., 2006). These warning signs are presented in Table 1. In addition to listing warning signs for suicidal crises based on the empirical literature, this set of suicidal warning signs contains specific instructions about what to do if someone manifests signs of a suicidal crisis. The warning signs are presented in a hierarchical fashion, with two tiers: the first tier lists three overt warning signs for suicide that are acute signs of a suicidal crisis—suicide threats; preparatory acts; and expressed thoughts about death, dying, or suicide—and directs individuals to call 9-1-1 or seek immediate professional help in response to overt suicide threats. The second tier lists nine warning signs that necessitate assessment by a mental health professional, but not necessarily emergency mental health services; thus, this tier directs the individual to seek help from a mental health professional or to call a national suicide crisis hotline for a referral. This list of warning signs differentiates between levels of risk and highlights symptoms which necessitate immediate intervention.

In the current study we examined the effect that reading the list of warning signs developed by the AAS has on beliefs about suicide. The goal of this list is to educate the public about the presence of suicidal crises with the ultimate goal of preventing suicides. Public health campaigns have been found to be effective at increasing public awareness of an issue and persuading individuals to engage in a relatively low-effort task such as calling a hotline (Brown & Einsiedel, 1990). We hypothesized that after reading the warning signs for suicide, awareness about the identifiable signs of a suicidal crisis will be increased and individuals will report an in-

TABLE 1*Consensus Warning Signs for Suicide***Are you or someone you love at risk for suicide? Get the facts and take action.**

Call 9-1-1 or seek immediate help from a mental health provider when you hear, say, or see any one of these behaviors:

- Someone threatening to hurt or kill themselves
- Someone looking for ways to kill themselves: seeking access to pills, weapons or other means
- Someone talking or writing about death, dying, or suicide

Seek help by contacting a mental health professional or calling 1-800-SUICIDE for a referral should you witness, hear, say, or see anyone exhibiting any one or more of these behaviors:

- Hopelessness
- Rage, anger, seeking revenge
- Acting reckless or engaging in risky activities, seemingly without thinking
- Feeling trapped—like there's no way out
- Increasing alcohol or drug use
- Withdrawing from friends, family, or society
- Anxiety, agitation, unable to sleep or sleeping all the time
- Dramatic changes in mood
- No reason for living; no sense of purpose in life

creased likelihood to engage in low-effort helping behaviors. More specifically, we investigated attitudes and beliefs about the treatment and prevention of suicide, attitudes toward suicidal individuals (i.e., possible stigmatization of suicidal individuals), and expectancies about the likelihood and ability to help suicidal individuals (through low-effort helping behaviors, such as calling a hotline).

One of the goals of the current study was to examine potential stigmatizing effects of the list of warning signs (i.e., might reading the warning signs backfire?). Stigmatization of individuals with mental illness is prevalent; for example, within a representative sample of the adult population in Great Britain, 20% of respondents indicated that individuals diagnosed with major depression could pull themselves together (if they tried), while 10% indicated that individuals with major depression have themselves to blame (Crisp, Gelder, Rix, Meltzer, & Rowlands, 2000). Lauber, Nordt, Falcato, and Rössler (2004) investigated one consequence of stigma to-

ward individuals with mental illness, an increase in social distancing (i.e., a decrease in the willingness of others to interact with individuals with mental illnesses). They found that increased social distance was predicted by the correct recognition of an individual described in a vignette as mentally ill (the individuals in the vignette exhibited symptoms of major depression and schizophrenia) as well as positive attitudes toward medical treatment. According to the authors, these results suggest that holding a conceptualization of mental illness as a medical problem may relate to less willingness to socially interact with individuals diagnosed with mental illness. This possibility further suggests that in some cases, increased knowledge about a disorder may have stigmatizing effects. The current study investigated the possibility that educating individuals about suicidal signs and symptoms could increase stigmatizing beliefs about suicidal individuals.

An experimental design with two conditions (experimental group and control

group) was used to assess effects of the warning signs. Both experimental and control groups read two sets of warning signs (with only the experimental group reading the AAS suicide warning signs) and then answered questions concerning beliefs related to three health problems (suicide, heart attacks, and diabetes). The experimental condition read a list of warning signs for diabetes followed by warning signs for suicide, while the control condition read a list of warning signs for diabetes followed by warning signs for heart attacks. All participants answered ten sets of health beliefs questions with one item in each set pertaining to diabetes, one to heart attacks, and one to suicide. The item sets covered domains such as the preventable nature of health problems, the extent to which individuals are to blame for health problems, and the ability to recognize health problems in others.

A significant interaction between type of health problem (i.e., diabetes, heart attack, or suicide) by condition (i.e., exposure to heart attack or suicide warning signs) was predicted for each of the ten health belief item sets. The presence of this interaction would suggest that participants' responses to the health belief items depended both on their experimental condition (i.e., whether they read the heart attack or suicide warning signs) and the type of health problem the question referred to. It was predicted that the form of health problem type by condition interactions would indicate significant differences between the experimental and control groups for the suicide and heart attacks items, but not for the diabetes items since all participants read the diabetes warning signs. In other words, participants would report more positive health beliefs for the health problem unique to their condition; that is, participants who read the heart attack warning signs would report more positive health beliefs for heart attack questions compared to participants who read the suicide warning signs, while participants who read the suicide warning signs would report more positive health beliefs for suicide questions compared

to participants who read the heart attack questions. In addition, it was predicted that differences between the experimental and control groups would be smaller for diabetes items compared to suicide items because all participants read the diabetes warning signs, whereas only participants in the experimental condition read the warning signs for suicide. Thus if differences on health beliefs between the experimental and control groups are larger for suicide items than for diabetes items, that difference may be the result of reading the warning signs for suicide.

METHOD

Participants

Participants were 275 introductory psychology students of a large southern state university; participation partially fulfilled a class requirement. Females represented 60% of the sample ($n = 164$). Participation in this experiment was completely anonymous, with no identifying information linking participants to responses. As a result, while the gender distribution is available, these data are not linked to participant responses, thus precluding gender as a covariate in the analyses that follow.

Procedure

All participants read two sets of health warning signs and completed a questionnaire packet. Upon entry to the laboratory, participants were randomly assigned to the experimental or control condition. Participants in the experimental condition first read a list of warning signs about diabetes and then the key list of warning signs about suicide. Participants in the control condition first read the list of warning signs about diabetes (the same list read by participants in the experimental condition) followed by a list of warning signs about heart attacks. Next, both groups completed a mood measure (Positive and Negative Affect Schedule, PANAS; Wat-

son, Clark, & Tellegen, 1988). Finally, both groups answered questions about diabetes, suicide, and heart attacks (Health Beliefs Questionnaire; see Appendix).

Materials and Measures

Suicide Warning Signs. The AAS working group used a consensus process to develop a list of suicide warning signs targeted at the public (see Rudd, Berman, et al., 2006). Key warning signs for suicide are listed (e.g., threats to harm the self, seeking access to means for suicide, and talking or writing about suicide), followed by an instructive message on how to respond to the presence of warning signs for suicide (i.e., call 9-1-1, a mental health professional, or 1-800-SUICIDE).

Diabetes Warning Signs. A list of warning signs for diabetes as well as key steps in the treatment or prevention of diabetes were compiled using information from the American Diabetes Association (2005a, 2005b). Key warning signs are listed for both Type I (e.g., excessive thirst) and Type II diabetes (e.g., insulin resistance), followed by an instructive message on how to respond to the presence of these warning signs (i.e., talk to a doctor about how to lower risk for Type II and/or be tested for diabetes; call the American Diabetes Association at 1-800-232-3472).

Heart Attacks Warning Signs. A list of warning signs for heart attacks (and cardiac arrest) as well as key steps in the treatment of heart attacks were compiled using information from the American Heart Association (2005). Key warning signs for heart attacks were listed (e.g., discomfort in the center of the chest, shortness of breath, lightheadedness), followed by an instructive message on how to respond to the presence of warning signs for heart attacks (i.e., call 9-1-1 and get to a hospital right away).

Health Beliefs Questionnaire. Designed for the current study, the Health Beliefs Questionnaire measures attitudes, beliefs, and expectancies related to three health conditions—diabetes, heart attacks, and suicide. Participants rate their agreement with 27 statements on a 7-point Likert scale (higher

numbers indicate greater agreement; see Appendix). The questionnaire taps nine types of health-related attitudes, beliefs, and expectancies: (1) beliefs that health problems should be taken seriously; (2) beliefs that individuals are to blame for their health conditions; (3) beliefs that health conditions are preventable; (4) beliefs that health conditions are treatable; (5) attitudes toward being friends with individuals with health conditions; (6) expectancies regarding the likelihood of seeking help when encountering health conditions; (7) beliefs in one's ability to recognize health conditions; (8) beliefs that health conditions happen without warning; and (9) beliefs that health conditions will inevitably worsen. Total scores range from 1–7, with some items reverse-coded such that higher scores represent more positive health beliefs.

Positive and Negative Affect Schedule (Watson et al., 1998). The PANAS is a 20-item self-report measure of mood, which measures levels of both positive and negative affect. Positive affect is measured by ten items (attentive, interested, alert, excited, enthusiastic, inspired, proud, determined, strong, and active), and negative affect by another ten items (distressed, upset, hostile, irritable, scared, afraid, ashamed, guilty, nervous, and jittery). In the current study, participants rated the extent to which they usually or typically experience the PANAS dimensions of affect (on a 5-point Likert scale). Using this general framework, Watson et al. presented internal consistency reliabilities for both positive affect items (Cronbach's coefficient $\alpha = .88$) and negative affect items (Cronbach's coefficient $\alpha = .87$), as well as 8-week test-retest reliabilities for both positive affect items ($r = .68$) and negative affect items ($r = .71$). Internal consistency reliabilities for the current study are comparable those reported in the literature for both positive affect ($\alpha = .87$) and negative affect ($\alpha = .82$).

RESULTS

Preliminary analyses were run to investigate the possibility that participants in

the experimental and control conditions differed on levels of positive and negative affect after reading the warning signs.¹ A moderate level of positive affect was reported by the experimental group ($M = 3.72$, $SD = .61$) and the control group ($M = 3.70$, $SD = .67$). Level of positive affect did not significantly differ between the groups, $t(178) = -.25$, $p = .81$. Low levels of negative affect were reported by both the experimental group ($M = 1.66$, $SD = .50$) and the control group ($M = 1.81$, $SD = .51$). Level of negative affect did significantly differ between the groups, $t(178) = 2.06$, $p = .04$. The mean level of negative affect was higher for participants who read the heart attacks warning signs than for participants who read the suicide warning signs; the size of this difference represents a small to medium effect ($d = .41$; Cohen, 1988). Consequently, level of negative affect is included in all analyses which follow (unless otherwise noted). The observed difference in level of negative affect suggests that reading the warning signs for heart attacks was a more emotionally distressing event than reading the warning signs for suicide. This may be due to greater perceived risk for heart attacks (versus suicide) as a potential personal health problem; this possibility will be discussed in more depth below.

To investigate mean differences on health beliefs as a function of both experimental condition and type of health problem (i.e., diabetes, heart attacks, and suicide), nine mixed-model analyses of covariance (ANCOVAs) were conducted—one for each set of health beliefs. For each type of health belief, a 3×2 mixed-model ANCOVA was conducted with one within-subjects effect (health problem type: suicide, diabetes, heart attack), one be-

tween-subjects effect (experimental condition: experimental or control), and one covariate (negative affect). Geisser-Greenhouse epsilon hat adjustments were used to adjust for violations of homogeneity of treatment differences variances. Maxwell and Delaney (2004) recommend using this correction because it controls Type I error without a severe reduction in power that is often observed with other corrections (e.g., lower-bound). Exact p values are reported to allow readers to apply their own criterion of statistical significance given that multiple tests were conducted.

For each set of health beliefs, the three-way interaction of condition, health problem type, and negative affect was non-significant; therefore, it was removed from all models. A significant main effect of health problem type (i.e., diabetes, heart attack, or suicide) emerged for four of the health belief sets, "Preventable," "Get Help," "Recognition," and "Without Warning." Table 2 presents means for each of these health beliefs sets grouped by condition as well as collapsed across condition. An inspection of these means indicates that participants reported the highest levels of preventability for suicide ($M = 5.87$), followed by heart attacks, ($M = 4.15$), and diabetes ($M = 3.90$). Participants reported the greatest likelihood of seeking help for heart attacks ($M = 6.91$), followed by suicide ($M = 6.57$), and diabetes ($M = 5.66$). Participants reported the highest levels of recognition for heart attacks ($M = 5.40$), followed by suicide ($M = 4.57$), and diabetes ($M = 2.97$). Participants attributed the highest level of unpredictability to suicide ($M = 4.72$), followed by diabetes ($M = 3.68$), and heart attacks ($M = 2.48$).

The key health problem type by condition interaction emerged as significant for only one of the health belief sets, "Recognition," $F(1.98, 350.45) = 5.73$, $p = .004$. The within-subjects effects for this ANCOVA (including level of observed power) are presented in Table 3. For this health belief set, participants rated the extent to which they would be able to recognize if someone had diabetes, was having a heart attack, or was

1. Due to an error in data collection, not all participants received the mood measure. There is no reason to expect that participants who received the mood measure differed systematically from participants who did not receive the mood measure. In the analyses that follow, only the 180 participants with complete mood data are included: 91 in the control group and 89 in the experimental group.

TABLE 2
“Preventable,” “Get Help,” “Recognition,” and “Without Warning” Means and Adjusted Means for Experimental and Control Groups

Health belief type	Experimental ^a			Control ^a			Total ^a		
	<i>M</i> ^b	<i>SD</i>	<i>M</i> ^c	<i>M</i> ^b	<i>SD</i>	<i>M</i> ^c	<i>M</i> ^b	<i>SD</i>	<i>M</i> ^c
“Preventable” item set									
Diabetes	3.75	1.50	3.78	4.05	1.46	4.03	3.91	1.48	3.90
Heart Attacks	3.99	1.36	4.01	4.32	1.41	4.30	4.16	1.39	4.15
Suicide	5.73	1.60	5.72	6.01	1.37	6.02	5.87	1.49	5.87
“Get help” item set									
Diabetes	5.70	1.46	5.70	5.62	1.41	5.62	5.66	1.43	5.66
Heart Attacks	6.96	.21	6.70	6.87	.48	6.70	6.91	.37	6.91
Suicide	6.49	1.00	6.50	6.31	1.22	6.31	6.40	1.12	6.57
“Recognition” item set									
Diabetes	2.99	1.33	2.99	2.95	1.19	2.95	2.97	1.19	2.97
Heart Attacks	5.39	1.16	5.36	5.41	1.24	5.44	5.40	1.20	5.40
Suicide	4.89	1.29	4.91	4.24	1.57	4.22	4.56	1.47	4.57
“Without warning” item set									
Diabetes	3.81	1.54	3.79	3.55	1.64	3.57	3.68	1.59	3.68
Heart Attacks	2.56	1.36	2.55	2.41	1.39	2.42	2.48	1.37	2.48
Suicide	4.85	1.79	4.86	4.58	1.69	4.58	4.72	1.74	4.72

^aExperimental group $n = 89$; Control group $n = 91$.

^bUnadjusted means.

^cMeans adjusted for overall mean level of negative affect, $M = 1.74$.

suicidal. Following the recommendations of Olejnik and Algina (2000), an omega squared effect size was calculated for the Recognition effect. The size of the effect ($\omega^2 = .01$) indicates that approximately 1% of the variance in scores on the recognition items can be accounted for by the condition by health problem type interaction. Observed power for the health problem type by condition interaction

for recognition item set was acceptably high (.86) and suggests that the current study had sufficient statistical power for the magnitude of the effects under investigation. To examine the form of the effect, the Recognition means for each of the health problem types grouped by experimental condition are depicted graphically in Figure 1. In addition, planned comparisons (pairwise and interaction contrasts)

TABLE 3
Univariate Within-Subjects Effects for “Recognition” Health Beliefs Set

Effect	<i>F</i>	<i>df</i>	<i>p</i>	<i>Power</i> ^a
Health type	27.94	1.98, 350.45	.00*	1.00
Health type by condition	5.73	1.98, 350.45	.00*	.86
Health type by negative affect	4.71	1.98, 350.45	.01*	.78

^aObserved power, with alpha set to .05.

* $p < .01$.

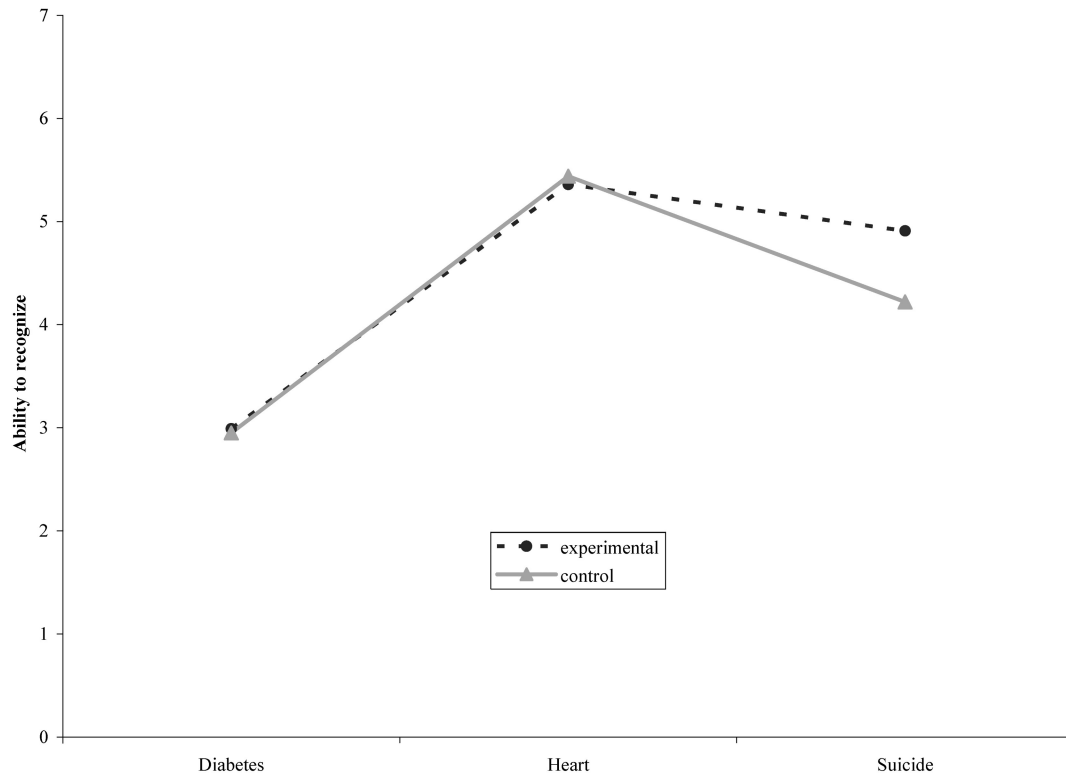


Figure 1. Self-reported ability to recognize diabetes, heart attacks, and suicide grouped by experimental condition. Higher numbers represent higher levels of self-reported ability to recognize the health problems.

were conducted to follow-up the interaction of health problem type and condition.

A series of pairwise comparisons was conducted to compare the experimental and control groups on levels of recognition ability for each of the three health problems. For diabetes, levels of recognition ability reported by the experimental ($M = 2.99$) and the control conditions ($M = 2.95$) differed by .04; this difference was not statistically significant, $p = .84$, 95% Confidence Interval (CI) for mean difference = $-.41-.34$. For heart attacks, levels of recognition ability reported by the experimental ($M = 5.36$) and the control conditions ($M = 5.44$) differed by .08; this difference was not statistically significant, $p = .63$, 95% CI for mean difference = $-.27-.44$. For suicide, levels of recognition ability reported by the experimental ($M = 4.91$) and the control conditions ($M = 4.22$) differed by .69, which represents a small to medium ef-

fect according to Cohen's (1988) recommendations ($d = .31$); this difference was statistically significant, $p = .002$, 95% CI for mean difference = $-1.11-.26$. The experimental and control conditions only differed significantly in self-reported ability to recognize a health problem when the problem was suicide (not diabetes or heart attacks). Participants who read the suicide warning signs (compared to participants who read the heart attack warning signs) reported greater abilities to recognize if someone was suicidal.

Interaction contrasts were conducted to determine if mean differences between the experimental and control groups were different for the diabetes question than for the suicide question. All participants read the diabetes warning signs, whereas only participants in the experimental condition read the warning signs for suicide. Thus, if the difference between the experimental and control groups

is different for the diabetes item than for the suicide item, that difference may be the result of reading the warning signs for suicide. An interaction contrast indicated that the difference between the experimental and control conditions for the diabetes recognition question (mean difference = .04) is significantly different from the difference between the experimental and control conditions for the suicide recognition question (mean difference = .69), contrast difference = .65, $p = .01$, 95 % CI = .14–1.16. An additional interaction contrast indicated that the difference between the experimental and control conditions for the diabetes recognition question (mean difference = .04) is not significantly different than the difference between the experimental and control conditions for the heart attacks recognition question (mean difference = .08), contrast difference = .13, $p = .60$, 95 % CI = -.60–.35. These interaction contrasts indicate that the difference between conditions for the suicide recognition question was significantly larger than the difference between conditions for the diabetes recognition question. The same pattern was not found for the heart attack question: the difference between the experimental groups for the heart attack recognition question was not significantly different than the difference between the experimental groups for the diabetes recognition question.

The health problem type (i.e., diabetes, heart attacks, suicide) by negative affect interaction for the Recognition' health belief set as well as the differences between conditions on negative affect suggest that negative mood could contribute to the effect of experimental condition on the Recognition set. To test for moderation, the three-way interaction of health problem type, experimental condition, and negative mood was entered in the model; as stated earlier, this interaction was not significant, $F(1.98, 348.46) = .26$, $p = .77$. To explore the possibility that negative mood mediates the effect of experimental condition (i.e., reading suicide or heart attack warning signs), two sets of regression equations following the recommendations of Baron and Kenny (1986) were constructed. In order

to proceed within a regression framework, the suicide and heart attack recognition questions were examined separately (i.e., without the within-subject effect). The first set of regression equations was used to explore the potential mediating role of negative mood on responses to the suicide recognition question, while the second set of regression equations was used to explore the relation between negative mood and the heart attack recognition question. Mediation was not tested for the diabetes question due to the lack of an effect for experimental condition, thus precluding mood as a mediator. The relation between mood and the heart attack question was explored despite the lack of an effect of experimental condition for this question due to the differing levels of negative affect between the two groups: the experimental and control groups differed on what type of warning sign was read second (heart attacks or suicide). A greater level of negative mood in the control group could be due to the experience of reading the heart attack warning signs.

In step one, experimental condition was found to predict levels of negative affect, $\beta = -.15$, $F(1, 178) = 4.25$, $p = .04$. The negative beta weight indicates that experimental group membership was associated with lower levels of negative affect. The model only accounted for 2% of the variance in negative affect, with an associated f^2 effect size of .02—a small effect (Cohen, 1988). In step two, negative affect was used to predict scores on the recognition questions. In the first equation, the suicide recognition question was regressed on negative affect; this model accounted for less than 1 percent of the variance in suicide recognition ability ($f^2 < .01$) and was non-significant, $F(1, 178) = .55$, $p = .46$. This result indicates that level of negative affect did not predict scores on the suicide recognition question, thus precluding negative mood as a mediator of the experimental condition effect. In the second equation, the heart attacks recognition question was regressed on negative affect. Negative affect negatively predicted ability to recognize heart attacks, indicating that lower self-reported

abilities to recognize heart attacks were associated with higher levels of negative affect, $\beta = -.20$, $F(1, 178) = 7.03$, $p = .01$. This model accounted for 4% of the variance in heart attack recognition scores (f^2 effect size = .04), a small to medium effect (Cohen, 1988). In step 3, an equation was only constructed for the heart attack recognition question due to the failure to meet necessary conditions for mediation for the suicide recognition question. The heart attack recognition question was regressed on condition; this model accounted for a negligible amount of the variance on the heart attack recognition question ($R^2 < .001$) and was nonsignificant, $F(1, 178) = .01$, $p = .94$. This result indicates that experimental condition did not predict scores on the heart attack recognition question, which is consistent with the results presented above (and precludes mood as a mediator for the heart attacks recognition question). Taken together, the results from these regression equations do not indicate mediation of the condition-suicide recognition effect. Rather, results indicate that higher levels of negative affect at the end of the experiment predicted lower self-reported ability to recognize heart attacks. The failure to demonstrate mediation suggests that negative affect cannot account for the higher self-reported ability of the experimental condition to recognize if someone is suicidal.

Given the null findings for the other health belief item sets (and the risk of committing Type II errors), an additional set of analyses was conducted to examine the pattern of responses on the suicide questions as a function of experimental condition. In these analyses, responses to the heart attack and diabetes questions are not considered, thus yielding only between-subjects effects. In addition, all participants are included in this set of analyses (i.e., not just participants with complete mood data). A series of oneway ANOVAs were conducted with scores on the suicide items from the Health Beliefs Questionnaire as dependent variables and experimental condition as the between-subjects factor. Suicide item means grouped by experimental condition are presented in Table 4

and depicted graphically in Figure 2. Items were keyed such that higher values reflect more positive health beliefs. Thus, if reading the warning signs has a positive effect on beliefs about suicide and does not induce stigma about suicidal individuals, higher values would be observed for participants in the experimental condition (who read the suicide warning signs) than participants in the control condition (who read the heart attack warning signs). Although the only mean difference that reached significance was for the Recognition item (as discussed above), a visual inspection of the means indicates that the experimental condition reported more positive (or equally positive) suicide health beliefs for six of the nine items.

DISCUSSION

We investigated the effect that reading a list of warning signs for suicide has on beliefs, attitudes, and expectancies related to suicide. The suicide warning signs used in the current study were developed through an expert-consensus process by a panel convened by the AAS. We were also interested in possible stigmatizing effects of the warning signs as well as initial signs of the efficacy of the warning signs (e.g., increased knowledge about the warning signs of suicide). We randomly assigned participants to one of two conditions: participants in the control condition read a set of warning signs about diabetes followed by a set of warning signs about heart attacks, while participants in the experimental group read the same list of warning signs about diabetes followed by the key set of warning signs about suicide. All participants responded to nine sets of items about health beliefs, with one question in each item set for diabetes, one for heart attacks, and one for suicide. We predicted a health problem type (i.e., diabetes, heart attack, suicide) by condition interaction for each of the nine health belief item sets. The presence of this interaction would suggest that participants' responses to the health belief items depended both on their experimental condition (i.e.,

TABLE 4*Comparison of Means Between Experimental and Control Groups for All Suicide Health Belief Items*

	Experimental group ^a			Control group ^b			<i>F</i>	<i>df</i>	<i>p</i>	Power ^c
	<i>M</i>	<i>SD</i>	95% CI	<i>M</i>	<i>SD</i>	95% CI				
Should not be taken seriously ^d	6.81	.85	6.66–6.95	6.81	.90	6.67–6.95	.001	1, 274	.97	.05
Partly to blame ^d	5.21	1.43	4.96–5.46	5.13	1.48	4.89–5.37	.22	1, 274	.64	.08
Preventable	5.66	1.60	5.40–5.93	5.76	1.50	5.50–6.02	.27	1, 274	.27	.08
Can be treated	6.05	1.49	5.78–6.33	5.79	1.71	5.52–6.06	1.85	1, 274	.18	.27
Would not befriend ^d	5.66	2.12	5.32–6.01	5.80	1.98	5.46–6.14	.28	1, 274	.60	.08
Call 9-1-1 or hotline	6.47	.95	6.30–6.65	6.44	1.08	6.27–6.61	.09	1, 273 ^e	.76	.06
Able to recognize	4.83	1.38	4.58–5.07	4.32	1.50	4.09–4.56	8.32	1, 273 ^e	.004	.82
Happens without warning ^d	4.74	1.82	4.45–5.04	4.51	1.69	4.22–4.80	1.26	1, 273 ^e	.26	.20
Will always be suicidal ^d	6.21	1.08	6.01–6.41	6.30	1.27	6.11–6.50	.42	1, 273 ^e	.52	.10

^aAll 275 participants were included in above analyses (i.e., those with and without complete mood data). Experimental group *n* = 134

^bControl group *n* = 142

^cObserved power computed with alpha criterion = .05

^dMean values represent reverse coding

^eOne participant from the experimental group had missing data for this question.

whether they read the heart attack or suicide warning signs) and the type of health problem (i.e., diabetes, heart attacks, or suicide). This key interaction emerged for only one of the health belief item sets, Recognition, in which participants rated the extent to which they would be able to recognize if someone had diabetes, was having a heart attack, or was suicidal. Results indicated that participants who read the suicide warning signs (compared to participants who read the heart attack warning signs) reported greater abilities to recognize if someone is suicidal but not greater abilities to recognize if someone is diabetic or having a heart attack. The difference between the experimental conditions for the suicide recognition item was greater than the difference between the experimental conditions for the diabetes recognition item. All participants read the diabetes warning signs, whereas only participants in the experimental condition read the warning signs for suicide. Thus, the larger difference between

the conditions for the suicide recognition item compared to the diabetes recognition item is likely the result of reading the warning signs for suicide.

Our finding that participants who read the warning signs for suicide on average reported greater abilities to recognize if someone is suicidal suggests that reading the list of warning signs may be effective in increasing the public's knowledge about—and ability to respond to—suicidal crises. We did not find support for the efficacy of the warning signs in increasing awareness of the seriousness of signs for suicide or for increasing awareness of the preventable and treatable nature of suicide. This suggests that brief exposure to the list of warning signs may not be sufficient to produce large changes in knowledge or beliefs; however, we also did not find support for the hypothesis that reading the list of warning signs may create or magnify stigmatizing beliefs about suicidal individuals. Significant differences were not

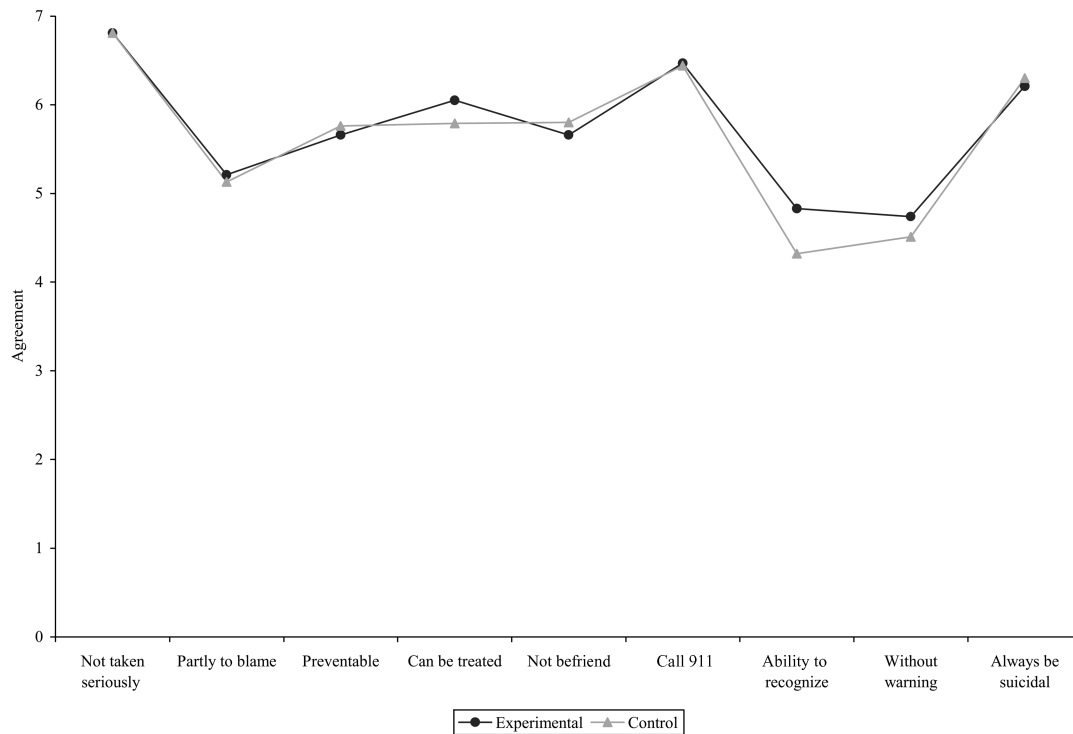


Figure 2. Mean scores grouped by condition for all suicide items on the Health Beliefs Questionnaire. Items are reversed score such that higher numbers reflect more positive health beliefs (e.g., suicidal individuals are not partly to blame, suicide does not happen without warning, etc.).

found between the experimental conditions for an item involving the beliefs that suicidal individuals are partly to blame, nor for an item involving the likelihood of befriending suicidal individuals. Wainer and Robinson (2003) suggest that nonsignificant differences between groups should be interpreted as a lack of data to determine the direction of the effect rather than as support for a lack of differences between groups. They further suggest that nonsignificant findings should be investigated in future studies to determine if a reliable effect exists when the potential effect is of interest. We suggest that potential stigmatizing effects of reading warning signs meet this condition—even if effects are small, they may be of practical and clinical significance.

We examined the possibility that differences between experimental conditions on self-reported ability to recognize suicide could be accounted for by differences in mood. Analyses indicated that after reading the

warning signs, participants in the control group (who read the warning signs for heart attacks) reported, on average, higher levels of negative affect than participants in the experimental group (who read the warning signs for suicide). As noted above, the public may be aware that heart attacks are a potential health problem for most Americans, but less so for diabetes or suicide, possibly because public health campaigns for diabetes and suicide are not as highly developed as for heart disease. Further analyses indicated that a significant health problem type by negative affect interaction emerged for the Recognition set, suggesting that responses to the Recognition set depended on the type of health problem as well as level of negative affect; however, the three-way interaction including condition was not a significant predictor of responses to the Recognition set. This suggests that differences as a function of experimental condition are not moderated by the

interaction of health problem type and mood. The low observed power to detect this three-way interaction also leaves open the possibility that the size of the effect was too small to be detected by the current study. We also conducted two mediational analyses with separate sets of regression equations for the suicide recognition question and heart attacks recognition question. For the suicide recognition question, level of negative affect did not predict scores on the suicide recognition question, thus precluding negative mood as a mediator of the experimental condition effect on suicide recognition. Experimental condition did not predict scores on the heart attack recognition question, thus also precluding mediational effects due to mood for the heart attack question. Results suggest that negative mood after reading warning signs and answering questions about warning signs cannot account for—nor does it appear to moderate—the effect of reading warning signs (i.e., the effect of condition) on self-reported ability to recognize suicide.

Although not the primary concern of the present study, regression analyses did indicate that higher levels of negative affect at the end of the experiment predicted lower self-reported ability to recognize heart attacks. Participants completed the Health Beliefs Questionnaire immediately before completing the mood measure. It is possible that participants who reported lower levels of recognition ability for heart attacks were disturbed by this awareness and thus subsequently reported higher levels of negative affect. In order for this hypothesis to merit consideration, however, an additional hypothesis is needed to explain why this sequence is only posited to occur for heart attack, not suicide, recognition ability. In other words, why would low levels of an ability to recognize suicide not lead to higher levels of negative affect? One explanation may relate to our finding that participants in the control condition who read the warning signs for heart attacks, reported on average higher levels of negative affect than participants in the experimental condition (who read the suicide warning signs). This suggests that reading

the warning signs for heart attacks was a more emotionally distressing event than reading the warning signs for suicide—and that answering questions about heart attacks may also be more emotionally distressing than answering questions about suicide.

Differences in the base rates of heart attacks and suicide attempts and completions may provide a rationale for the preceding hypothesis. We do not mean to suggest that participants were aware of the relative base rates of these health problems: people tend to underutilize or completely ignore base rates when making predictions and judgments (e.g., Nisbett & Ross, 1980); however, the relative base rates of these phenomena are likely to influence participants' experiences with—and exposure to—heart attacks and suicidality. In 2002, the leading cause of death for both males and females was heart disease: for males approximately 28% of deaths were due to heart disease and approximately 29% of deaths for females were due to heart attacks, with a total of 696,947 deaths due to heart disease (Anderson & Smith, 2005). In contrast, the percentage of deaths due to suicide in 2002 was lower than for heart attacks and reflects the consistent finding of gender differences for completed suicides (e.g., Moscicki, 2001): for males, approximately 2.1% of deaths were due to suicide and approximately 0.5% of deaths for females were due to suicide, for a total of 31,655 completed suicides (Anderson & Smith, 2005). While these statistics do not consider the number of nonfatal heart attacks (or other nonfatal forms of heart disease) nor nonfatal suicide attempts, the greater number of deaths due to heart disease compared to suicide does suggest that participants in the current study were more likely to have personally known an individual who died from heart disease than from suicide. Greater personal experience with heart attacks may increase the likelihood than individuals would realize that they are, themselves, at increased risk for a heart attack down the line. Greater personal relevance may have made reading about, and responding to, warning signs for heart attacks a more emotionally distressing experience

than reading about, and responding to, warning signs for suicide. While additional research is needed to further examine the emotional impact of reading warning signs for suicide, our initial results are consistent with the findings of Rudd, Mandrusiak et al. (2006) and do not indicate increased negative affect due to reading the AAS warning signs for suicide. This suggests that dissemination of warning signs for suicide need not be precluded by concerns about the negative emotional impact of thinking about suicide: warning signs for heart attacks, which may be more emotionally distressing, are widely disseminated, with some indicators of a positive impact (e.g., Barnhart, Cohen, Kramer, Wilkins, & Wylie-Rosett, 2005).

The current study has several limitations. The finding that participants who read the warning signs for suicide on average reported greater abilities to recognize if someone is suicidal indicates that reading the list of warning signs may be effective in increasing the public's ability to recognize and respond to suicidal crises; however, that implication should be moderated by the lack of significant findings for the other health belief items (e.g., seriousness, preventable, and treatable nature of suicidal symptoms). As mentioned above, this suggests that the design of our intervention (i.e., brief exposure to the suicide warning signs) may not be sufficient to produce large changes in knowledge or beliefs. In addition, due to the potential practical importance of stigmatizing effects on suicidal individuals as a result of reading suicide warning signs, future research with more powerful interventions (e.g., increased exposure to the warning signs) and more powerful sample sizes is needed before conclusions can be drawn about the null findings related to stigmatism in the current study. Additionally, the current study did not examine actual abilities to recognize suicide, nor actual helping behaviors (such as calling 9-1-1 or a suicide hotline). Future investigations should investigate the impact of reading suicide warning signs on actual behavior. Finally, our sample may limit the generalizability of our findings: participants were young

adult college students whose levels of education as well as actual risk for the investigated health problems do not represent the entire target population of for the suicide warning signs. Future studies could investigate level of education as a potential moderator of the effectiveness of the AAS suicide warning signs. Additionally, future studies could address the degree to which age relates to differing salience of the health problems and potential resulting differences in emotional impact and effectiveness of warning signs. For example, might older individuals—who are at heightened risk for heart attacks, Type II diabetes, as well as completed suicide (Moscicki, 2001)—have more intense emotional reactions to warning signs?

Future research on the effectiveness and potential emotional and interpersonal effects (e.g., stigmatization) of reading the list of suicide warning signs needs to focus on the use of more intense dissemination efforts and larger (as well as more population-representative) samples. For example, the impact of more frequent exposure (i.e., more than once) to the warning signs may be the next step to undertake. It should also be noted, however, that the success of dissemination about warning signs for heart attacks was measured in terms of individuals' confidence in recognizing the warning signs of heart attacks (Barnhart et al., 2005). The authors suggest that the success of interventions for cardiac emergencies depends on the public's knowledge of heart attacks; thus the key outcome measure for interventions designed to disseminate information about warning signs for health problems may be the public's self-reported ability and confidence to recognize warning signs. The current study provides initial support indicating that reading the suicide warning signs created by the AAS may fulfill that key positive outcome requirement.

Future studies and intervention efforts could also capitalize on the public's current knowledge and beliefs about suicide to maximize prevention efforts. For example, the highest levels of agreement were given for the statement "suicide is preventable" compared to parallel statements for heart attacks

and diabetes. Similarly, a survey of the general public (in Norway) on attitudes toward suicide found that the majority of their sample (83%) agreed with the statement that suicide can be prevented (Hjelmeland & Knizek, 2004). A potentially efficacious dissemination effort (and thus area for future research) could emphasize that recognizing and acting on the warning signs are the keys to preventing suicide. In our sample the highest level of unpredictability was attributed to suicide (relative to heart attacks and diabetes); our data indicate that the public may already have confidence in the preventable nature of suicide and that warning signs for suicide may provide the public with the necessary tools to overcome the difficult task of predicting and thus preventing suicide.

APPENDIX. HEALTH BELIEFS ITEMS

1. Diabetes should not be taken seriously.
2. Heart disease should not be taken seriously.
3. Suicide should not be taken seriously.
4. The person is partly to blame for their diabetes.
5. The person is partly to blame for their heart disease.
6. The suicidal person is partly to blame for their condition.
7. Diabetes is preventable.
8. Heart disease is preventable.
9. Suicide is preventable.

10. Diabetes can be treated.
11. Heart disease can be treated.
12. Suicide can be treated.
13. I would not befriend someone who was a diabetic.
14. I would not befriend someone who had heart disease.
15. I would not befriend someone who was suicidal.
16. If I suspect someone has diabetes I would take him/her to see a doctor or call the American Diabetes Association.
17. If I suspected someone was having a heart attack I would call 9-1-1.
18. If I suspected someone was suicidal I would call 9-1-1 or a suicide hotline.
19. I would be able to recognize if someone has diabetes.
20. I would be able to recognize if someone was having a heart attack.
21. I would be able to recognize if someone was suicidal.
22. Diabetes can happen without warning.
23. Heart attacks happen without warning.
24. Suicide happens without warning.
25. Once a person is diagnosed with diabetes, he/she can't prevent getting worse.
26. Once a person is diagnosed with heart disease, he/she can't prevent having a heart attack.
27. Once an attempt has been made, the suicidal person will always be suicidal.

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