Kognito's Avatar-Based Suicide Prevention Training for College Students: Results of a Randomized Controlled Trial and a Naturalistic Evaluation

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Objective: To evaluate the efficacy and effectiveness of Kognito At Risk for College Students, an online, interactive suicide prevention gatekeeper training.
Methods: In Study 1, a randomized controlled trial was conducted to test the efficacy of Kognito. Retention of participants at follow-up was strong. In Study 2, administrative records were used to follow the help-seeking behavior of Kognito trainees for one academic year, contrasted with untrained students.
Results: In Study 1, between-group changes in gatekeeper attitudes were large at time-two, but attenuated modestly by 2-month follow-up. Kognito trainees referred more peers at 2-month follow-up (Cohen's d = .56, p < .05) - training 4 students in Kognito produces 1 more peer referred. In Study 2, the help-seeking rate of Kognito trainees (14.4%) was two-times the rate (6.8%) of untrained students (p < .001). Training 14 students in Kognito leads to 1 more self-referral to the Counseling Center.
Conclusions: This first randomized controlled trial of the college student version of Kognito validates the findings of less rigorous studies. Few brief suicide prevention trainings have shown changes in trainee behaviors such as referrals of at-risk peers and trainees actual help-seeking behavior. These results are promising that Kognito may outperform other similar suicide prevention trainings.

Suicidal behavior in college-age young adults is an urgent public health issue. The second most prevalent cause of death for 15- to 24-year-olds in the United States is suicide, following only accidental deaths (Centers for Disease Control, 2015b). Approximately 8% of college students report past year suicidal ideation, and 1% report a suicide attempt (Centers for Disease Control, 2015a).

In the United States, a widely employed suicide prevention effort is gatekeeper training—developing skills in selected members of a population to more effectively identify those at risk of suicide and to assist them to get professional help. The focus of this study is the gatekeeper training Kognito At-Risk for College Students (hereafter referred to as Kognito). The college student

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version is one of several interactive online sui-cide prevention trainings from Kognito.com that includes others that target college faculty and staff, and high school and junior high school teachers (see www.kognito.com).

Kognito involves the trainee in taking on a role in a simulated college social milieu. The trainee interacts with virtual peers and is given a menu of choices for interactions and is led to identify peers who may be at risk, through engaging the peers in dialogue, deciding if a referral for mental health assis-tance is warranted, and making and facilitat-ing a referral for help. The simulation coaches the trainee in tactful, empathic responding and gives feedback on the choices made in the interactions.

A non-peer-reviewed study posted on the Kognito.com website reported on 270 college students trained in Kognito and found increased perceived preparedness, and increased peer-referral and likelihood of self-referral. The study did not report dropout rates during the study, nor did it calculate common effect sizes (Albright, Goldman, & Shockley, 2013). Bartgis and Albright (2016) also found gains in prevention attitudes in a sample of Native American educators and stu-dents. The authors noted that approximately only 10% of all Kognito trainees complete the 3-month follow-up (Bartgis & Albright, 2016).

Rein et al. (2018) conducted a large one group pre- and postevaluation of faculty and students (N = 2,727) that included 1,124 students who completed the basic Kognito module (others did specialized modules focusing on LGBT or veterans). Retention at follow-up was good (61%), perhaps due to some participants completing Kognito as part of mandatory curricular elements and others receiving incentives. Within-group pre- to post-test effect sizes (uncorrected for correla-tion between time points) were large: ranging from Cohen's d = 1.16 for likelihood to refer a peer at risk to Cohen's d = .79 for self-effi-cacy to help a peer. In summary, this set of studies shows promising results but is limited by lack of a control group, and high attrition (probably 85%–90%), with the exception of

Rein et al. (2018). With this level of attrition, it is unlikely that the study participants are representative of most Kognito trainees.

There were no experimental design studies identified of Kognito for college stu-dents, but the college faculty and staff version of Kognito At-Risk was studied in a random-ized controlled trial of student support pro-fessionals as part of a doctoral dissertation (Jodoin, 2014). The study randomized 74 par-ticipants to either Kognito At-Risk Faculty or a control condition, and 50 returned com-plete and usable questionnaires for a follow-up retention rate of 68%. Participants trained in Kognito At-Risk Faculty had higher prevention attitudes than the control group at 6-week follow-up, though there was no differ-ence in prevention behaviors (identifying and referring at-risk students). Jodoin (2014) sug-gested that the lack of change in prevention behavior may have been due to the study's timing during the summer when fewer stu-dents were on campus, limiting variability for both trained and untrained groups.

The primary focus of Kognito is on preparing college students to support and assist peers, but a secondary focus is on improving trainees' own help-seeking atti-tudes and behaviors. The experience of guid-ing peers to help seeking in the simulated interactions in Kognito At-Risk might increase the acceptability of personal help seeking, perhaps through a fear extinction process. Albright et al. (2013) reported a sta-tistically significant increase in trainees' rat-ing of likelihood of seeking help for themselves at 3-month follow-up. Reviews of studies of interventions designed to increase help seeking have found increases in positive attitudes toward help seeking, but few have found change in self-reported help-seeking behaviors (Hom, Stanley, & Joiner, 2015; Klimes-Dougan, Klingbeil, & Meller, 2013).

A useful comparison to Kognito and its emerging research findings is the evidence base for gatekeeper training generally and of other trainings specifically among college stu-dents. Other gatekeeper trainings include Question Persuade Refer (QPR) that created the genre (QPR Institute, 2017), Campus

Connect (Pasco, Wallack, Sartin, & Dayton, 2012), and the United States Veteran Administration's Operation S.A.V.E (King et al., 2012). Most gatekeeper trainings differ from Kognito in that they are more traditionally didactic, with an emphasis on the presentation of information. While Kognito does contain brief informational sections, it centers on the experience of the simulated interactions with at-risk persons. Research on other gatekeeper trainings has found strong effects on prevention attitudes but most did not evaluate change in prevention behaviors such as referring at-risk persons or found no change (Isaac et al., 2009; Litteken & Sale, 2018; Wyman et al., 2008).

Two studies of brief gatekeeper trainings in college students found an effect on self-reported prevention behaviors, and both included behavioral modeling and rehearsal through role plays. Kuhlman, Walch, Bauer, and Glenn (2017), in a quasi-experimental study, found trainees were more likely to refer at-risk youth (Kuhlman et al., 2017). In the second study, there was a small-medium increase (Cohen's $d = .24$) in number of peers referred in a one group pre- and post-test design of 178 undergraduates (Rallis et al., 2018). Promising results were also observed through the innovation in QPR of adding role plays of interaction with an at-risk person, demonstrating increased gatekeeper skills over those trained in traditional QPR (Cross et al., 2011). These studies underline the importance of behavioral practice of desired gatekeeper skills to have an effect on prevention behaviors.

A final area of interest was in gender differences in engagement and response to suicide prevention training. Several studies have found that women exhibit more positive attitudes toward suicide prevention training (Hamilton & Klimes-Dougan, 2015) and benefitted more from training (Eckert, Miller, Riley-Tillman, & DuPaul, 2006; Overholser, Hemstreet, Spirito, & Vyse, 1989). Specific to gatekeeper training for college students, Rallis et al. (2018) found female trainees made greater gains in knowledge and attitudes and almost three times as many female (15.7%) as male (5.6%) trainees went from zero peer referrals at pre-test to at least one at post-test, but there were no gender difference in the mean change in number of peers referred.

Study 1 utilizes an experimental design to test how Kognito influences prevention preparation and efficacy, ability to identify and refer youth at risk, ask those of concern about suicide, and participants' own self-rated likelihood of help seeking.

Study 2 utilizes administrative data, merging the data on all Fordham students who trained in Kognito with Fordham Counseling and Psychological Services (CPS) database to derive a help-seeking rate for students trained in Kognito. This rate is then contrasted with the help-seeking rate for all remaining Fordham students for the same time period. A secondary interest was to explore the participation in Kognito by gender and if there was any difference in help seeking by gender in trainees.

STUDY 1

Methods

Design and Participants. A randomized controlled trial was conducted. The steps for Kognito participants were as follows: pre-test, Kognito training, post-test, and the 2-month follow-up. For control participants, the steps were as follows: a time-one questionnaire and the 2-month follow-up. The control participants only completed one set of items at time one. It was judged likely to not produce meaningful ratings and lead to increased dropout among controls if they were asked to rate another set of identical items immediately following the pre-test.

For the test of between-group differences immediately post-training, the research design was a fully experimental post-test only design. Diagrammed as (R = randomization, X = intervention, and O = observation point):

| Kognito condition | R | X | O |
| Control condition | R | | O |

For the test of between-group differences at 2-month follow-up, controlling for pre-test score on the outcome variable, the diagram is as follows:

| Kognito condition | R | O | X | O |
| Control condition | R | O | | O |

For the test of differences immediately post-training, the control condition time-one scores were used to contrast with the Kognito condition post-test scores. For the follow-up test of group difference, the control condition time-one scores were used with the Kognito condition pre-test scores.

Undergraduates were recruited primarily from two large lecture courses typically taken by freshmen and sophomores (83% of participants, $n = 97$), and secondarily from three undergraduate social work courses (16%, $n = 19$) and an undergraduate internship group (~1%, $n = 1$). Participants were randomized to the Kognito condition ($n = 58$) or a no-intervention control group ($n = 59$), and 59% returned the first study packets. Figure 1 shows the flow of participants through the study.

The success of randomization in producing comparable groups was indicated by no differences found between Kognito At-Risk and control conditions at pre-test on demographics (age, gender, white vs. person of color) and the five primary variables of interest (gatekeeper efficacy, gatekeeper preparation, ask about distress/suicide, peers referred, and help-seeking intentions). Retention at follow-up was strong, with 74% of those who completed Time 1 protocols returning a time-two questionnaire ($n = 24$ Kognito At-Risk; $n = 27$ control). There was no difference in dropout at follow-up by condition, age, gender, or race/ethnicity.

There were 18 males (26%) and 51 females (74%). The average age was 20.5 years ($SD = 7.3$). Approximately one-third of the sample identified as White, 27% as Asian,

and 22% as Latino, with small numbers of other ethnic identifications. One third of the participants were in their freshman year and 47% were sophomores.

Measures. The measures were selected from scales used in evaluation of Kognito and scales from studies of QPR typified by Wyman et al. (2008) to provide comparison to the QPR outcome literature. The constructs targeted in studies of Kognito and QPR are quite similar.

Gatekeeper preparation was measured with five items from previous Kognito research and two items from Wyman et al. (2008). The items from the Wyman research were highly correlated with the scale of the five Kognito-sourced items, so a 7-item scale was constructed. Reliability ranged from very good to excellent (T1 $\alpha = .77$; T2 $\alpha = .82$; T3 $\alpha = .93$). A typical item is "I am prepared to recognize when a peer's behavior is a sign of psychological distress."

Gatekeeper efficacy was measured with four items from Wyman et al. (2008), for example: "I am aware of the warning signs of suicide." Reliability of gatekeeper efficacy ranged from marginal at pre-test ($\alpha = .66$) to good at post-test ($\alpha = .71$) and follow-up ($\alpha = .71$). The efficacy items used in Kognito studies are very similar, though more specific about confidence to accomplish discrete gatekeeper tasks. Both Kognito research (Albright et al., 2013) and QPR studies (Wyman et al., 2008) used separate scales of preparedness and efficacy. We followed this convention, though we note the constructs are theoretically closely related and were highly correlated ($r = .71$, $p < .001$) in this sample.

Ask about distress and suicide was measured with four items from Wyman et al. (2008) that assess the frequency over the previous 2 months that the participant has identified and asked a peer about distress or suicide, for example: "How many times in the last 2 months have you thought a friend's or peer's behavior might indicate they were considering suicide?" Reliability was good at pre-test ($\alpha = .72$) and very good at follow-up ($\alpha = .86$).
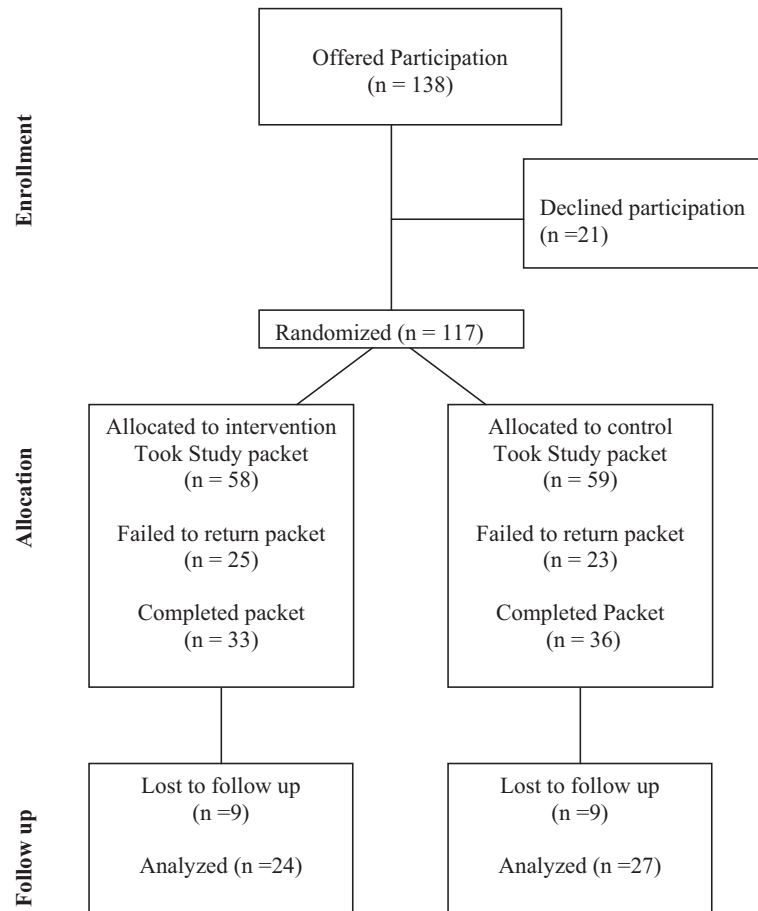
Figure 1. Flow of participants through study.

Single items assessed number of peers referred for help in past 2 months and likelihood of personal help seeking.

Analysis. The composition of both the experimental versus the control group, and the completers versus non-completers, was evaluated using *t* tests and chi-square of demographics and pre-training variables. To test for differences immediately post-training, *t* tests were run. Group differences at follow-up were evaluated using analysis of covariance (ANCOVA) controlling for pre-training scores on the outcome variable. ANCOVA was selected over two-way ANOVA as it provides an incremental improvement in power (Van Breukelen, 2006). Cohen's *d* was computed for the mean between-group differences at post-training and follow-up. For peers referred, the number needed to treat (NNT) to produce additional referrals was calculated from Cohen's *d* using Kraemer and Kupfer's (2006) formula.

Results

Table 1 displays the primary study results. There were immediate post-training (T2) effects of Kognito on participants' perception of their ability to identify and intervene with a peer at risk. The effect size of these changes was large: For gatekeeper efficacy (Cohen's $d = 1.05$, $p < .01$), the average trained participant scored higher than 84% of the controls, and for gatekeeper preparation ($d = .77$, $p < .01$), the average Kognito

TABLE 1

Pre-training (T1), Post-training (T2), and Follow-up (T3) Descriptives and T2 and T3 Between-group Differences

Variable	T1 M (SD)	T2 M (SD)	T3 M (SD)	Between group Cohen's d T2	Between group Cohen's d T3	Between group t test T2	Between group tests of significance ANCOVA T3
Gatekeeper preparedness							
Kognito	3.66 (.84)	4.01 (.50)	4.11 (.53)	.77	.65	2.92**	F = 11.02**
Control	3.61 (.56)	3.61 (.56)	3.69 (.75)				
Gatekeeper efficacy							
Kognito	3.04 (.79)	3.56 (.63)	3.50 (.59)	1.05	.62	4.10**	F = 6.09*
Control	2.86 (.69)	2.86 (.69)	3.08 (.75)				
Ask about distress/suicide							
Kognito	1.72 (2.0)	–	1.79 (1.7)	–	−.08	–	F = 0.01
Control	2.24 (2.7)	–	1.98 (2.5)				
Youth referred							
Kognito	.15 (.44)	–	.88 (1.4)	–	.56	–	F = 4.74*
Control	.29 (.53)	–	.30 (.54)				
Help-seeking intention							
Kognito	3.70 (.95)	4.11 (.97)	3.96 (.99)	.64	.35	2.38*	F = 0.37
Control	3.43 (1.2)	3.43 (1.2)	3.59 (1.1)				

ANCOVA column reports F test of T3 group difference controlling for T1 score of dependent variable.
*p < .05, **p < .01.

participant scored higher than 76% of controls. These effects did attenuate at the 2-month follow-up (T3), falling to medium–large size effects (d = .65 for efficacy and d = .62 for preparedness, both p < .05).

For self-reported prevention behaviors, there was a medium-size increase (d = .56, p < .05) in referring peers for mental health services at follow-up. This corresponds to a number needed to treat of 3.15, meaning that training four students in Kognito would produce one more student referred for mental health services in the subsequent 2 months. In contrast, asking peers about distress or suicidal thoughts showed no difference at follow-up.

Finally, participants' ratings of their likelihood of seeking help themselves showed a medium–large difference at T2 (d = .64, p < .05), but this dropped to a not statistically significant small–medium difference at follow-up (d = .35).

Discussion

In Study 1, an experimental design tested the effect of Kognito At-Risk training on students' suicide prevention-related attitudes and behaviors. The strong retention of participants at 2-month follow-up (74%) reduces the likelihood of the threat of self-selection bias. Robust effects were found for prevention attitudes immediately post-training with a modest deterioration by 2-month follow-up. More importantly, there was a medium-size increase in the number of peers referred for mental health services by participants. The NNT analysis perhaps better reflects the magnitude of the effect on referral of at-risk peers: Training four students in Kognito At-Risk would result in one more at-risk student being referred for mental health services in the 2 months following training.

In the rigorous context of an experimental study with good retention of subjects,

only partial effects on the likelihood of personal help-seeking finding were found. While there was a medium-size effect immediately post-training, this deteriorated to a small and non-significant difference at 2-month follow-up. No known studies have collected trainee help-seeking behavior following Kognito At-Risk training. This was the focus of Study 2.

STUDY 2

Methods

The use of administrative data was reviewed and approved by the Fordham University IRB. Only clinical or administrative staff had access to confidential clinical information, and only non-identifying data were provided to the researchers.

Data were extracted to compute help-seeking rates for students trained in Kognito and all remaining students over two consecutive academic years. Each academic year was treated separately for tracking help seeking and the results aggregated. All students trained in Kognito between 8/1/15 and 12/31/15, and 8/1/16 and 12/31/16, were matched to CPS records and coded as help seeking if they contacted CPS after the Kognito training date and before the end of the respective academic year (5/31/16 or 5/31/17). Students who were currently clients of CPS at the time of Kognito training were dropped from the analysis ($n = 11$).

To compose the comparison group, the student census of the university for the 2015–2016 and 2016–2017 academic years was averaged ($n = 16272$). The newly matriculated undergraduates and graduate students for 2016–2017 ($n = 3700$) were added to this total as this group of students represented a new cohort for potential help seeking who were not counted in the 2015–2016 data. An estimated number of students who were active clients of CPS on 9/30/15 and 9/30/16 was subtracted from the total number of Fordham students ($n = 1400$), as they would not have an opportunity for new help seeking during the study period. CPS administrative records were queried to provide the number of students newly seeking mental health services between 10/1/15 and 5/31/16, and 10/1/16 and 5/31/17. October 1 was selected as the start date as the Kognito training dates were evenly distributed between August 1 and December 31 of each of the two academic years, so October 1 gave the comparison group a comparable temporal span for help seeking to the Kognito group.

Using the above data, a 2×2 table was constructed. The difference in proportions was tested via a chi-square test, and the odds ratio and NNT were computed.

Results

Table 2 displays the cross-tabulation of help seeking among the 153 Kognito trainees and the remaining student body. The help-seeking rate of Kognito trainees (14.4%) was over two times the rate (6.8%) of the remaining student body, a moderate size effect ($p < .001$). An additional four students trained in 2015–2016 sought help during 2016–2017, but were not counted as they fell outside the selected time frame.

TABLE 2

Cross-tabulation of Kognito At-Risk Trainees and all Students by Help Seeking

	No CPS contact N (%)	Sought help N (%)	Total N (%)
Kognito-trained	131 (85.6)	22 (14.4)	153 (100)
All other students	18402 (93.2)	1342 (6.8)	19744 (100)
Total	18533 (93.1)	1364 (6.9)	19897 (100)

$\chi^2 (1) = 13.7$, $p < .001$; odds ratio = 2.3; CPS, Counseling and Psychological Services.

Women were over three times more likely to take the Kognito training than men: 78% of the trainees were female. There was no difference in help seeking between the male and female Kognito trainees. Of the 22 students trained in Kognito who sought help, 17 were female (77%) and five were male (23%), almost directly proportional to the gender ratio of all Kognito trainees.

Discussion

The tracking of Kognito trainees' actual help-seeking behavior in Study 2 found that they were twice as likely as untrained students to seek help from the counseling center within the academic year. The experience in the simulation of assisting at-risk students may increase the acceptability of seeking help and decrease fears or judgmental attitudes. This is an important secondary benefit of Kognito trainings.

Exploration of gender differences in Kognito training found that women were markedly more likely to take the training. This willingness to engage in a mental health prevention activity closely mirrors the disproportionate participation of women in mental health services generally (Hamilton & Klimes-Dougan, 2015).

GENERAL DISCUSSION

The experimental and naturalistic components of this report each represent advances in the evidence for Kognito trainings. This is the second known randomized trial of one of the Kognito prevention trainings and the first randomized trial of the widely used college student version. The robust changes in gatekeeper preparedness and efficacy are consistent with previous pre-experimental research on Kognito trainings, as well as studies of other gatekeeper trainings. This clinical trial validates the findings of those earlier less rigorous studies, affirming that the changes found in the previous studies were likely not due to the numerous uncontrolled threats to validity. While nearly all

studies include subjective ratings of attitudinal variables, fewer studies assess indicators of trainee behavioral change, even self-report, and the one previous clinical trial (of the faculty version of Kognito) found no difference in self-reported suicide prevention behaviors. In contrast, this study found that Kognito led to a medium-size difference in the number of peers referred to mental health services. The prevention impact of this change is illustrated by the finding that training four students in Kognito At-Risk would lead to one more at-risk student referred. Considering that each additional at-risk student referred for help may represent an averted episode of suicidal behavior, this is an important public health finding.

As noted in the introduction, most studies of other brief gatekeeper trainings have not found an effect for training on self-reported prevention behaviors, with the exception of trainings that include behavioral modeling and rehearsal of skills (Cross et al., 2011; Kuhlman et al., 2017; Rallis et al., 2018). The interactive experience of the Kognito simulation may function like the role play enhanced didactic gatekeeper trainings, engaging the trainee in a behavioral learning experience. It is unknown to what extent gatekeeper trainings in practice have integrated role play protocols, and there are no known online gatekeeper trainings that have a role play or other behavioral component. If the finding is replicated that Kognito training leads to a medium-size increase in referring of persons at-risk, this is a clear advantage of Kognito as a frontline, low-cost suicide prevention training.

There was no training effect found for the suicide prevention behavior of asking about suicide. Asking about suicide is an integral part of QPR and Operation S.A.V.E and receives some emphasis in Campus Connect. However, in Kognito this is not emphasized. Kognito coaches the trainee toward identifying and clarifying risk and then encouraging and supporting a person at risk to get help, but does not instruct trainees to directly ask about suicidal thoughts or behaviors. To ask about suicidal thoughts and behavior is

critical within a clinical context with a professional helper, but may not be essential with a layperson helper. In one of our observations and discussions (DC) with QPR trainers, there is substantial anxiety in trainees about being frank with at-risk persons about suicide and this anxiety may pose a barrier to smooth engagement and referral of the person at risk to professional help. A question for further research is if direct queries about suicidal thoughts are a necessary ingredient of layperson identification and referral of those at risk of suicidal behavior.

The findings were also mixed for the participants' self-rating of their likelihood of seeking help, with changes observed immediately post-training (T2) but falling to a trivial difference by follow-up. Kognito's own pre-experimental studies found a significant effect at follow-up for self-rated help seeking (Albright et al., 2013). This difference may be due to the highly self-selected nature of the sample in that study, with dropout rates likely between 80% and 90%. The remaining participants may be the most psychologically minded and motivated of the trainees, where in our experimental study we retained a more typical range of Kognito trainees. Additionally, the rating of likelihood of personal help seeking is a relatively weak measure, asking participants to rate a hypothetical situation. This gap motivated us to construct Study 2, yielding the first known investigation to track actual help-seeking behavior of a sample of Kognito trainees.

Along with the increase in referrals of at-risk peers, another important finding of this paper is the doubling of personal help seeking among Kognito trainees found in Study 2. This is the more remarkable because few interventions primarily designed to increase help-seeking behavior have shown changes in help-seeking behavior (Hom et al., 2015; Klimes-Dougan et al., 2013). The experience of assisting a fellow student to access help in the Kognito simulation may erode cognitive barriers to personal help seeking such as stigma and increase positive help-seeking attributions. The help-seeking content may be more acceptable in the

displacement of the focus on helping at-risk peers, not oneself. Evaluating the secondary benefit of gatekeeper trainings increasing trainee's own help seeking will be a valuable component to include in future studies of Kognito and other gatekeeper trainings.

The higher rate of participation of women in the Kognito training was not unexpected but is worthy of note. Suicidal behavior is substantially influenced by gender: Men die by suicide at approximately three times the rate of women (WHO, 2016), but women make more non-lethal suicide attempts than men (Nock et al., 2008). Kognito includes narratives about both male and female characters, which should engage users of the simulation, but the challenge remains of making the suicide prevention training attractive to males. A training, and recruitment materials, could be constructed that attempts to work within masculine gender role norms, analogous to the public awareness and education campaign "man therapy" (https://mantherapy.org/). Kognito does have a specialized version of the training that focuses on student military veterans that might provide a starting point.

Even beyond the issue of men and Kognito, there is a general challenge of stimulating and encouraging participation in the training. In the two academic years covered by Study 2, even with an active campaign of stimulating participation in Kognito, approximately 1% of the student body completed the training. It is unknown how different levels of participation influence the suicide prevention climate in a semi-closed system like a college campus and what is a desired proportion of the student body to train in Kognito. Nonetheless, it is probably desirable to train more than 1% of the student body. Some institutions have made Kognito training a required component of mandatory orientation or wellness curriculums. It would be valuable to study the impact at the campus level of different proportions of a community receiving Kognito training.

Kognito.com is a for-profit company. This study was conducted independently of Kognito—none of the authors have any

relationship or interest in the company. Of the known studies of Kognito suicide prevention trainings, two were also conducted independently of Kognito, Rein et al. (2018) and Jodoin (2014). To date, the findings of the independent studies converge with those conducted by Kognito.

Strengths of Study 1 include the rigorous design and good retention of participants at follow-up. The randomized trial design controls for most alternate explanations for these findings, providing the first efficacy evidence for a Kognito training increasing prevention behaviors. Limitations of Study 1 include a relatively small, purposive sample. Experimental studies of interventions are typically limited to purposive sampling, but for a brief online training like Kognito, it would be possible to use the emerging methodology of the population-based survey experiment through a survey research firm (Mutz, 2011). These studies draw a nationally representative random sample who are then randomized to conditions. Another limitation is the suicide prevention behaviors are measured by self-report. Participants might have divergent understandings of what it means to refer a peer, and the outcomes of these referrals are unknown. An additional limitation is that participants knew they were in either the experimental or control condition, which might have biased their responses. An experimental study comparing Kognito to an alternate training would provide an opportunity of blinding participants to condition.

Major strengths of Study 2 include tracking actual help-seeking behavior, an adequate sample size of Kognito trainees, and a large sample of a comparison group. Since this was a naturalistic follow-up, those who elect to complete Kognito training may be already predisposed to having a positive attitude about mental health services. Participants might also have sought mental health services outside of the University, but this likely would be proportionally distributed between experimental and control, so should not bias results.

Public health practice must often operate on incomplete research evidence; however, we should strive to fill in gaps in the evidence and update practices in response to emerging evidence. Though replication and extension are needed, this paper elevates the evidence base for the efficacy and effectiveness of Kognito. The results generate the hypothesis that Kognito may be more effective than other similar gatekeeper training programs, though the inclusion of behavioral modeling and rehearsal in traditional didactic gatekeeper training may close that gap. Kognito is particularly well-suited to specific semi-closed contexts such as colleges or high schools, but is unlikely to be feasible in a broader community application because of the diversity of scenarios that would be needed in the simulation. We encourage the continued development of versions of Kognito, or similar simulations, for additional specific contexts such as the military, workplaces such as factories or retail, perhaps even those who might be particularly likely to encounter those at risk of suicide such as bartenders or gun shop owners.

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