

Predicting Changes in Behavioral Health Professionals' Clinical Practice Skills for Recognizing and Responding to Suicide Risk

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ABSTRACT *Objective:* Behavioral health professionals who have primary contact with people at risk for suicide play a critical role in suicide prevention. Previous studies suggest that training helps professionals build clinical practice skills to identify and assess suicide risk, but only limited research is available regarding which factors influence changes in clinical practice skills. This study aims to identify those factors, as measured by written responses to 3 vignettes, over time. Social cognitive theory is used as the conceptual framework to develop models of changes in clinical practice skills. *Method:* Secondary data ($n = 314$) from the Recognizing and Responding to Suicide Risk (RRSR) training are analyzed using multilevel modeling analyses. *Results:* Model 1 shows higher levels of self-efficacy and more positive attitudes toward suicide prevention significantly predict improvement in clinical practice skills over time. Model 2 shows other significant predictors of changes in behavioral health professionals' clinical practice skills include self-efficacy, gender, age, and educational degree. *Conclusions:* Findings from the analyses suggest those designing trainings or interventions intended to increase professionals' skills in suicide prevention should account for individual characteristics, differing levels of self-efficacy, and variability in attitudes toward suicide prevention among behavioral health professionals.

KEYWORDS: behavioral health professionals, clinical practice skills, individual characteristics, self-efficacy, attitudes toward suicide prevention

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Suicide and nonfatal suicide behaviors pose a serious public health concern. In the United States in 2013, more than 40,000 people died from suicide, which translates to 12.57 individuals per 100,000 persons in the U.S. population (Centers for Disease Control and Prevention [CDC], 2013). In addition, during the same year, an estimated 500,000 people required hospital care for injuries caused by self-harm behavior (CDC, 2013).

Behavioral health professionals play a critical role in preventing suicide, but they are generally ill-prepared to effectively engage in prevention strategies (Feldman, & Freedenthal, 2006; Jacobson, Ting, Sanders, & Harrington, 2004; Schmitz et al., 2012). To more effectively save lives, behavioral health professionals need to develop their clinical competency and skills in assessing and managing suicide risk (Osteen, Frey, & Ko, 2014; Brunero, Smith, Bates, & Fairbrother, 2008). Even those who have completed advanced clinical training in evidence-based suicide risk assessment and response need to further develop their clinical competency and skills to assess, document, and effectively manage suicide risk (McNiel et al., 2008). Research has shown training improves professionals' competency to work with patients at risk of suicide (McNiel et al., 2008; Oordt, Jobes, Fonseca, & Schmidt, 2009; Pisani, Cross, Watts, & Conner, 2012). However, training and education for suicide prevention typically focus on knowledge of risk factors and attitudes toward suicide rather than actual clinical practice skills (Pisani, Cross, & Gould, 2011).

The Recognizing and Responding to Suicide Risk (RRSR) training, a 2-day skills-based training, was designed and created by the American Association of Suicidology (AAS) to improve professionals' competency and clinical practice skills related to suicide assessment and risk management. The clinical practice skills covered are based on 24 essential core competencies required for effective work with clients at risk of suicide (AAS, n.d.). Trainees learn specific strategies to assess, document, and respond to suicide risk by rehearsing skills and engaging in case application exercises. The strategies include managing the professionals' own reactions to suicide, reconciling potential conflicts between a professional's goal of preventing suicide and the client's goal of eliminating psychological pain via suicidal behavior, maintaining a collaborative stance, and making a realistic assessment of the professional's ability to assess and care for a client at risk for suicide (AAS, n.d.). Jacobson, Osteen, Jones, & Berman (2012) evaluated the RRSR training with a sample of behavioral health professionals during 2008–2009. A comprehensive discussion of the RRSR training and its content and procedures can be found in Jacobson et al. (2012). At the 4-month follow-up, as compared with their skill level at pre- and post-training, the professionals who completed the RRSR training demonstrated a significantly higher level of clinical practice skills related to identification and effective response to suicide risk.

The present study aimed to further examine the mechanisms by which improvements in clinical practice skills among behavioral health professionals can be made by application of social cognitive theory (SCT) to adult learning (Gibson, 2004). Designing and developing trainings to improve professionals' ability to identify and respond to suicide risk is an important goal for researchers and practitioners in mental health, as is understanding which factors contribute to positive changes in professionals' clinical practice skills. However, little research has been conducted on identifying the predictors of clinical practice skill change. Perkins

and colleagues (2007) suggested the keys to developing a training intervention that affects behavioral health professionals' clinical practice skills are a theory-driven understanding of factors that influence clinical practice skills and offering appropriate supports.

Literature Review

The many different suicide prevention trainings for gatekeepers and behavioral health professionals can be differentiated by theoretical basis, training content, target audience, and method of delivery. In addition, all trainings do not target the same constructs, and target outcomes vary among trainings. For example, trainings might target improving trainees' knowledge of suicide risk factors and suicide prevention, self-efficacy to work with patients at risk for suicide, or improving different clinical skills. However, attitudes toward suicide prevention, self-efficacy, and clinical practice skills have also often been the targets of studies on suicide prevention training (Jacobson et al., 2012; Buckelew, Adams, Irwin, Gee, & Ozer, 2008; Coppens et al., 2014; Fenwick, Vassilas, Carter, & Haque, 2004; Gask, Dixon, Morriss, Appleby, & Green, 2006; McNiel et al., 2008; Pisani et al., 2012; Smith, Silva, Covington, & Joiner, 2014).

Although studies generally show that trainings can improve behavioral health professional's self-efficacy (Jacobson et al., 2012; Buckelew et al., 2008; Coppens et al., 2014; Fenwick et al., 2004; Smith et al., 2014), inconsistent results have been found regarding improvements in attitudes toward suicide and suicide prevention. For example, although Gask et al. (2006) and Pisani et al. (2012) observed positive changes in attitudes Jacobson et al. (2012) found no statistically significant changes in attitudes over time. Changes in clinical practice skills have been much more difficult to measure because of the reliance on self-report instead of direct observation of clinical practice skills. Nonetheless, several studies have shown improvements in suicide risk assessment skills (Jacobson et al., 2012; Fenwick et al., 2004; McNiel et al., 2008), and other studies have shown improvements in other practice skills such as documentation of suicide assessment and management of suicide risks (McNiel et al., 2008; Pisani et al., 2012). However, not all studies have reported improvements in clinical practice skills (Gask et al., 2006).

Overall, these studies provide varying degrees of evidence for the potential of behavioral health professionals to improve their attitudes, self-efficacy, and clinical practice skills through training; however, changes in attitudes and efficacy do not automatically translate into improved clinical practice skills (Osteen et al., 2014; Pisani et al., 2011; Suicide Prevention Research Center, 2010). In addition, behavioral health professionals' attitudes are proposed to be an important factor in determining successful responses to patients at risk for suicide (Valente, 2002; Valente & Saunders, 2004), and negative attitudes, coupled with decreased feelings of self-efficacy to work with clients at risk for suicide, can prevent pro-

professionals' from providing effective and compassionate care to their clients (Kaniwa, Kawanishi, Suda, & Hirayasu, 2012; Pompili, Girardi, Ruberto, Kotzalidis, & Tatarelli, 2005). Nonetheless, relationships between the target constructs have not been explored in this area of suicide prevention training. Many studies approach longitudinal analysis of training outcomes as independent hypotheses; for example, one analysis tested changes in self-efficacy over time, whereas another analysis tested changes in clinical practice skills over time, without considering the interaction between the different types of target outcomes. Jacobson et al. (2014) initially found significant correlations among attitudes, self-efficacy, and practice skills prior to training, supporting the use of longitudinal analyses to further explicate the nature of these interrelationships. Further examination of the relationships between constructs over time through longitudinal analyses will inform the development and implementation of suicide prevention trainings by identifying the critical elements of training that support best practices.

Social Cognitive Theory

Social cognitive theory (SCT) suggests a model of reciprocal determinism that implies behavior, personal characteristics, and environmental influences all function interactively (Bandura, 1986). Although each component is believed to influence the others bidirectionally, the relative influence imposed by the interacting factors might vary depending on the person and the particular situation in which learning occurs (Gibson, 2004). SCT also supports the idea that the human capacity for collective change occurs through interaction with the environment and personal capacity (Bandura, 1997). Self-regulation of individuals is the partial mechanism of change in clinical practice skills, and self-efficacy plays an important role in self-regulated skill (Bandura, 1977, 1986, 1997).

By definition, self-efficacy is an individual's belief in his or her capability to establish and perform an action required to deal with prospective situations (Bandura, 1977). Therefore, self-efficacy, as conceptualized in the SCT framework, should be a strong predictor of the acquisition of clinical practice skills (Bandura, 1997; Ozer & Bandura, 1990) and a mediator of the application of knowledge to skills (Maibach & Murphy, 1995). Within the SCT framework, self-efficacy is expected to predict clinical practice skills among behavioral health professionals. Another individual factor thought to be a predictor of changes in clinical practice skills is the professional's attitudes toward suicide prevention (Gibb, Beautrais, & Surgenor, 2010; Perkins et al., 2007; Valente, 2002; Valente & Saunders, 2004). In addition, other individual characteristics (e.g., gender, age) and environmental characteristics (e.g., caseload in practice setting) are expected to predict changes in clinical practice skills. Figure 1 depicts a social cognitive behavioral model that describes the relationships between clinical practice skills and predictive factors. The research hypothesis tested in the current study was that among behavioral

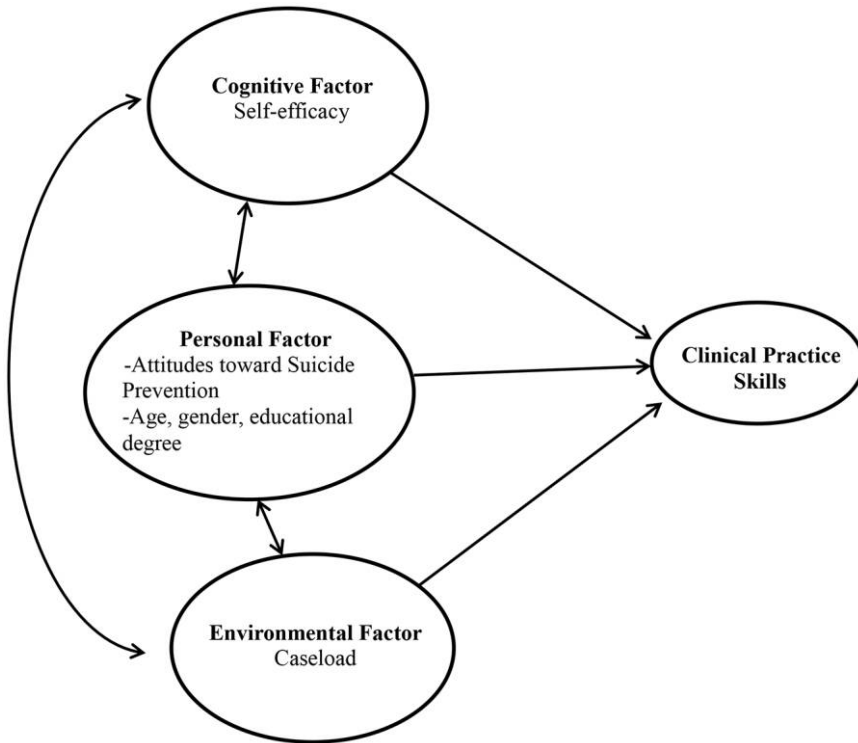


Figure 1. Social cognitive model of clinical practice behavior.

health professionals, self-efficacy and attitudes toward suicide prevention are significant predictors of changes in clinical practice skills. In addition, after controlling for self-efficacy and attitudes, the researchers examined whether personal factors (age, gender, and educational degree) and environmental factors (caseload) predicted changes in clinical practice skills over time.

Method

Participants and Data Source

This study used a secondary dataset from an evaluation of the RRSR training conducted by Jacobson et al. (2012). Approximately 70% ($n = 452$) of the registered attendees ($N = 632$) agreed to participate in the research study (Jacobson et al., 2012). The original study was conducted using a mixed-model repeated-measures design. Targets of the training were improvements in professionals' attitudes toward suicide prevention, self-efficacy, suicide risk assessment skills, and immediate risk management skills, which were measured at three time points: pre-intervention

(T1), immediately following the intervention (T2), and 4 months post intervention (T3). Posttest (T2) data were collected from 322 study participants (71%), and T3 data were collected from 194 study participants (42%). Participants ($n = 314$) with at least one observation on clinical practice skills among three assessments were included in the current multilevel modeling (MLM) analysis. This study was approved by the Institutional Review Board at the researchers' university.

Measures

Clinical practice skills. Professionals' clinical practice skills were defined as the ability to assess and respond to suicide risk as measured by vignettes that were developed from actual legal cases involving suicide. Although direct observation of engagement in clinical practice skills is ideal for evaluation, in some circumstances direct observation is not possible; as an alternative, vignettes have been used to evaluate learning outcomes of a suicide prevention training (Kalafat & Gagliano, 1996; Oordt et al., 2009; Samuelsson & Asberg, 2002). As part of the training, vignettes developed from client cases were used at each time point to measure the participants' ability to assess and respond to client suicide risk (Jacobson et al., 2012). For example, Vignette 1 involved a 54-year-old man who had been referred for treatment by his wife because he had been depressed and anxious. The vignette described the man's suicide risk factors, which included a history of bipolar disorder and mood swings, substance abuse, financial distress, insomnia, suicidal ideation, and a family history of mental illness (see Jacobson et al., 2012 for additional information about vignettes).

The clinical practice skills of the participating behavioral health professionals were assessed as their ability to assess and to respond to suicide risk. This assessment was assessed based on three criteria: (a) identification of suicide risk factors (chronic and acute) and protective factors; (b) formulation of the client's risk level for suicide; and (c) provision of recommendations for case disposition and the need for possible medication consultation (Jacobson et al., 2012). Participants' responses were scored by three researchers who worked independently. Responses were compared with a correct response matrix developed by the research team and clinical experts from the American Association of Suicidology. Correct responses (one point for each response) were summed for a total score (Jacobson et al., 2012). Vignettes 1 and 3 had a potential maximum score of 18 points, and Vignette 2 had a potential maximum of 17 points. Percentages of correct responses were calculated by dividing the correctly received points for each vignette by the total possible points for each vignette; percentage scores were then used to compare scores across time points (Jacobson et al., 2012). Interrater reliability was high for all three vignettes (Vignette 1 & 3; $r = .99, p < .001$, Vignette 2; $r = .97, p < .001$).

Self-efficacy. In this study, self-efficacy was operationalized as the self-reported competency to assess and respond to suicide risk (Cerel, Padgett, Robbins, & Kaminer, 2012; Conner, Wood, Pisani, & Kemp, 2013). Participants' self-efficacy was assessed using a measure created by Jacobson et al. (2012) that combined 14 items specific to outcomes from the RRSR training and three items modified from the evaluation of the STORM skills-based training (Gask et al., 2006). A sample item stated, "I am confident that I could differentiate a mild depression from suicide risk" (Jacobson et al., 2012, p. 475). All items used a 4-point response format ranging from *strongly disagree* (1 point) to *strongly agree* (4 points). Items were summed for a total scale score, with higher scores indicating greater self-efficacy (Jacobson et al., 2012). Cronbach's alpha = .92 was observed in the original study (Jacobson et al., 2012). This study used participants' baseline measure of self-efficacy.

Attitudes toward suicide prevention. Baseline scores for the Attitudes Toward Suicide Prevention Scale (ASP; Herron, Ticehurst, Appleby, Perry, & Cordingley, 2001) were used in the current study. The ASP is a standardized measure consisting of 14 items such as "Suicide prevention is not my responsibility" (Herron et al., 2001, p. 347). The rating scale is *strongly agree* (1 point) to *strongly disagree* (5 points). A total score was computed as the sum of 14 items, and higher scores indicated more negative attitudes toward suicide intervention (Jacobson et al., 2012; Herron et al., 2001). Cronbach's alpha was .77 (reported) and .69 (observed).

Demographic variables. Individual characteristics (age, gender, highest educational degree) were assessed as time invariant variables. Age was treated as a continuous variable. Women were the reference group for gender. Highest educational degree was categorized into three groups (i.e., bachelor's degree or less, master's degree, and doctoral/medical degree). The groups were dummy-coded for MLM analyses, with master's degree used as the reference group.

Environmental variable. Professionals' caseloads were measured based on the question, "During a regular work week, how many patients/clients do you provide counseling and/or therapy for?" Raw data were used for analyses as a continuous variable.

Data Analysis Procedure

This study built on the earlier evaluation of the RRSR training by using MLM to explore SCT-based hypotheses about predictors of changes in clinical practice skills over time. Descriptive and preliminary analyses were conducted using Statistical Package for the Social Sciences (SPSS) 18.0. MLM using restricted maximum likelihood (MLR) to estimate efficient and unbiased coefficient estimates and standard errors (Bickel, 2007) was conducted using Mplus 7.11 (Muthén & Muthén, 2011). MLM was used to estimate (a) the ability of self-efficacy and attitudes toward suicide prevention to predict changes in clinical practice skills among behavioral health

professionals, and (b) prediction of changes in clinical practice skills over time using personal (age, gender, educational degree) and environmental (caseload) factors after controlling for self-efficacy and attitudes. MLM analyses were chosen based on the method's statistical properties to address autocorrelation of nested data and to model participants' individual and environmental factors associated with changes in clinical practice skills. Moreover, given the capacity of MLM to estimate outcomes with missing data, the use of MLM strengthened the study.

Two nested models were analyzed after using an unconditional model with no predictors to establish the baseline intraclass correlation (ICC). In Model 1, the relationship between self-efficacy and changes in clinical practice skills was estimated controlling for attitudes toward suicide prevention. Model 2 incorporated individual and environmental variables in accordance with the SCT framework. Presented results had Cronbach's alpha was of .10.

Little's MCAR test (Little, 1998) was used to evaluate missing data on clinical practice skills across three measures. Data were confirmed to be missing completely at random [$\chi^2(9) = 14.49; p = .11$]. Because listwise deletion works well when data are missing completely at random (Nakai & Weiming, 2011), listwise deletion was used to handle missing data in this study.

Results

Descriptive Statistics

Descriptive statistics for study participants are provided in Table 1. The majority of participants were women ($n = 252; 81.3\%$) and had a master's degree ($n = 176; 58.1\%$). Participants' mean age was 42.5 years ($SD = 11.45$, range 22–68). The sample consisted of behavioral health professionals representing multiple disciplines, including professional counseling ($n = 108; 34.2\%$), social work ($n = 67; 21.3\%$), psychology ($n = 61; 19.4\%$), and nursing ($n = 41; 13.1\%$). The professionals had an average weekly caseload of 16.55 clients ($SD = 10.1$, range: 0–70). The sample mean score for self-efficacy was high at 49.66 ($SD = 6.79$, range: 34–68), and neutral at 30.61 ($SD = 3.89$, range: 22–43) for attitudes towards suicide prevention. The average scores of clinical practice skills increased over time; 58.7% ($SD = 12.5\%$, range: 17–89%) for Vignette 1 at the baseline, 59.3% ($SD = 11.8\%$, range: 18–97%) for Vignette 2 at posttraining, and 62.4% ($SD = 13.2\%$, range: 19–89%) for Vignette 3 at follow-up.

The results of bivariate correlations are presented in Table 2. Among the variables tested, the strongest relationship was found between the variables *attitudes toward suicide prevention* and *self-efficacy* ($r = -.36, p < .01$); professionals whose attitudes toward suicide prevention were more positive had higher levels of self-efficacy. Variables for *self-efficacy* and *professional degree* were significantly correlated at a moderate level ($r = .30, p < .01$). The variables *clinical practice skills at baseline* also

Table 1
Descriptive Statistics

Sample Characteristics	N (missing)	%		
Gender	310 (4)			
Female	252	81.3		
Male	58	18.7		
Degree	303 (1)			
Bachelor's and less	49	16.2		
Master	176	58.1		
Doctorate or medical	78	24.8		
Discipline	314 (0)			
Counseling	108	34.2		
Social work	67	21.3		
Psychology	61	19.4		
Nursing	41	13.1		
Medicine/psychiatry	6	1.9		
Student/intern	18	5.8		
Other	17	4.3		
	N (missing)	Range	M	SD
Age	234 (80)	22 – 68	42.50	11.45
Caseload	208 (106)	0 – 70	16.55	10.10
Attitudes toward suicide prevention	295 (19)	22 – 43	30.61	3.89
Self-efficacy	294 (20)	34 – 68	49.66	6.79
Time 1 Clinical practice skills	289 (25)	.17 – .89	.587	.12
Time 2 Clinical practice skills	283 (31)	.18 – .97	.593	.12
Time 3 Clinical practice skills	137 (177)	.19 – .89	.624	.13

showed a moderate relationship with *self-efficacy* ($r = .27, p < .01$) and *attitudes toward suicide prevention* ($r = -.26, p < .01$). Professionals' educational degree was more strongly correlated with *clinical practice skills at baseline* ($r = .23, p < .01$) than those at follow-up ($r = .19, p < .05$).

At a small-to-moderate level, the variable *negative attitudes toward suicide prevention* was associated with *clinical practice skills at posttraining* ($r = -.18, p < .01$) and *self-efficacy* was associated with *clinical practice skills at follow-up* ($r = .18, p < .05$). Professionals with advanced degrees saw a greater number of clients per week. ($r = .17, p < .01$). Compared with female professionals, male professionals tended to score lower on clinical practice skills at pretraining ($r = -.13, p < .05$) and posttrainings ($r = -.13, p < .05$), but these associations were not strong. Increasing age was associated with higher levels of self-efficacy ($r = .12, p < .05$) and

Table 2
Correlations

	1	2	3	4	5	6	7	8
1. Age								
2. Gender	-.02							
3. Degree	.03	.06						
4. Caseload	.02	.08	.17**					
5. ATSSP	.04	.04	-.10*	-.005				
6. Self-efficacy	.12*	.08	.30**	.07	-.36**			
7. Time 1	-.12*	-.13*	.23**	.01	-.26**	.27**		
8. Time 2	-.04	-.13*	-.02	.06	-.18**	.09	.29**	
9. Time 3	-.13	-.01	.19*	-.08	-.08	.18*	.32**	.21*

2. Gender (female = 0, male = 1); 3. Degree (bachelor's and under = 1, master's = 2, doctorate or medical = 3); 4. Caseload; 5. Attitudes Toward Suicide and Suicide Prevention; 6. Self-efficacy; 7. Time 1 Clinical practice skills; 8. Time 2 Clinical practice skills; 9. Time 3 Clinical practice skills.

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

lower clinical practice skills at pretraining ($r = -.12$, $p < .05$). The association between attitudes toward suicide prevention and professionals' educational degrees was significant but small ($r = -.10$, $p < .01$); professionals with more positive attitudes toward suicide prevention tended to have advanced degrees.

Multilevel Analyses

Assumption of normality for the variable *professionals' clinical practice skills* and the other continuous variables was supported based on skewness and kurtosis. For these variables, the absolute values of skewness were less than 2 and the absolute values of kurtosis were less than 7 (West, Finch, & Curran, 1995). Table 3 presents a summary of the MLM analyses, including parameter estimates and model fit statistics. The unconditional model had an ICC of .299, meaning that 29.9% of variability in professionals' clinical practice skills occurred between individuals whereas the other 70.1% occurred within individuals (across time).

Adding the variables *self-efficacy* and *attitudes toward suicide prevention* to the unconditional model did not substantially change model fit (Loglikelihood: 472.08; ICC: 30%). At Level 1, professionals' clinical practice skills, the percentage of correct responses on vignettes significantly increased by 1% ($p = .01$) over time. At Level 2, the effect of self-efficacy was statistically significant; for one unit increase in self-efficacy at baseline, clinical practice skills as measured with the percentage of correct answers on vignettes increased by 0.3% over time, holding

Table 3
 Multilevel Modeling of Professionals' Practice Skill Change

	Unconditional		Model 1		Model 2	
	Estimate	SE	Estimate	SE	Estimate	SE
Level 1						
Residual			.01***	.001	.01***	.001
Time			.01*	.006	.01 ⁺	.007
Level 2						
Residual			.004***	.001	.003**	.001
Intercept			.60***	.07	.57***	.11
Self-efficacy			.003**	.001	.002*	.001
Attitudes			-.01**	.001	-.001	.002
Gender					-.06**	.02
Age					-.001*	.001
Bachelor's					-.06*	.03
Doctorate/Medical					.03*	.01
Master's (ref. grp)						
Caseload					.001	.001
Model fit						
Loglikelihood	493.29		472.08		275.06	
Akaike (AIC)	-980.57		-932.16		-528.12	
Bayesian (BIC)	-966.88		-905.17		-484.95	
ICC	.299		.30		.273	

Note. AIC = Akaike information criterion. BIC = Bayesian information criterion
 ICC = Intraclass correlation coefficient.

*** $p < .001$, ** $p < .01$, * $p < .05$, ⁺ $p < .10$

baseline scores of attitudes toward suicide prevention constant ($p = .002$). The variable for *positive attitudes toward suicide prevention* was also significantly associated with changes in practice skills; the percentage of correct answers on vignettes increased by 1% over time for every one unit increase in positive attitudes toward suicide intervention at baseline, after controlling for baseline levels of self-efficacy ($p = .001$).

Model 2 added *gender*, *age*, *educational degrees*, and *caseload* as control variables. Model fit was improved compared with model 1 (Loglikelihood: 275.06; ICC: 27.3%). Changes in professionals' clinical practice skills were consistent at level 1 ($b = .01$, $p = .06$), meaning a 1% increase in correct responses on vignettes occurred over time. At Level 2, the effect of self-efficacy remained statistically significant ($b = .002$, $p = .04$), whereas attitudes toward suicide prevention were

no longer statistically significant. For every one unit increase in self-efficacy at baseline, the percentage of correct responses on vignettes increased by 0.2% over time, controlling for the other individual and environmental variables. Variables for *gender*, *age*, and *academic degree* also predicted changes in clinical practice skills. Compared with female participants, male participants were less likely to show improvement in clinical practice skills over time after controlling for the other variables; on average, we found a 6% difference between female and male participants in the percentage of correct responses on vignettes over time ($b = -.06$, $p = .002$), holding all the other variables constant. For one unit increase in age, professionals' clinical practice skills decreased by .1% ($p = .01$) after controlling for the other variables measured at baseline. This finding means that younger professionals were more likely to have higher scores on vignettes after training. In addition, as compared with participants who held a master's degree, participants who had a maximum of a bachelor's degree showed significantly fewer changes in clinical practice skills ($b = -.06$, $p = .02$) whereas professionals who had a doctorate or medical degree demonstrated significantly more changes in clinical practice skills ($b = .03$, $p = .04$). The environmental factor of caseload was not statistically significant ($b = .001$, $p = .85$).

In summary, clinical practice skills of behavioral health professionals in the RRSR training improved across all of the models tested, including Model 2 that controlled for six individual and environmental factors. Self-efficacy was a significant predictor of clinical practice skills in both models, including when controlling for attitudes toward suicide *prevention*, *age*, *gender*, *degree*, and *caseload*. In Model 2, *age*, *gender*, and *educational degree* were significant predictors of clinical practice skills in Model 2.

Discussion

This study tested the hypothesis that self-efficacy and attitudes toward suicide prevention are significant predictors of changes in clinical practice skills of professionals. In addition, the researchers examined whether personal (age, gender, educational degree) and environmental (caseload) factors predicted changes in clinical practice skills over time after controlling for self-efficacy and attitudes.

Self-Efficacy and Attitudes

Professionals' self-efficacy and attitudes toward suicide prevention were found to be significant predictors of clinical practice skills. Self-efficacy continued to be a statistically significant predictor when individual characteristics and caseload size were controlled for, whereas attitudes toward suicide prevention did not significantly predict clinical practice skills, accounting for those factors. Results were consistent with SCT that underscores self-efficacy as a strong predictor of skill (Bandura, 1997; Ozer & Bandura, 1990; Shoji et al., 2014). Shoji et al. (2014)

suggested that education programs can benefit health and behavioral health providers by enhancing their self-efficacy. Likewise, this study's findings support a curriculum that enhances behavioral health professionals' self-efficacy to work with clients at risk for suicide.

Inconsistent results of the predictive value of attitudes toward suicide prevention leave additional questions about this construct. Although statistically significant when controlling for self-efficacy, predictive ability disappeared with the inclusion of individual and environmental factors. Potential explanations include that the association between clinical practice skills and attitudes differs based on these characteristics, and there may be an interaction effect requiring additional exploration. Alternatively, these results might be a function of the measure itself that needs additional psychometric evaluation.

Individual and Environmental Factors

Age, gender, and educational degree significantly predicted professionals' clinical practice skills, whereas caseload did not. These results might be useful for developing and designing trainings for improving behavioral health professionals' clinical practice skills. For example, one interpretation of the negative relationship between age and changes in clinical practice skills suggests older professionals are less likely to change clinical practice skills because they rely on their years of experience (Kennedy, Rodrigue, Gunning-Dixon, & Raz, 2009). Identifying and targeting resistance or barriers to change have been explored in other training outcome domains but not with suicide prevention, and therefore warrant consideration in future studies.

Changes in clinical practice skills also varied as a function of academic degree. Those with master's degrees demonstrated greater changes in clinical practice skills than those with bachelor or lesser degrees, but fewer changes compared with those with a doctorate or medical degrees. One possible explanation is that master's degrees in the mental health field are geared towards professional, practice-based jobs, unlike undergraduate degrees that are more generalized, or Ph.D. programs that typically have a greater focus on research than practice. The majority of clients at risk for suicide are seen in community, outpatient mental health settings by master's-level professionals working in emergency and brief-treatment settings (Herschell, Kolko, Baumann, & Davis, 2010). Thus, if the suicide prevention trainings adjusted the level of training content based on participants' level of education, these tailored trainings might yield more positive outcomes.

Limitations and Strengths

Overall, as more variables were included in the MLM models, the results of fit statistics improved whereas the ICC did not change much. It is possible that the

model was not fully specified, as there are unidentified or unmeasured potential predictors that were not included in the model. Bandura (1998) suggested measuring full sets of determinants posited by SCT, especially when comparing the predictive value of theoretical models. According to SCT, the environment and situation in which professionals work might help to explain their use of certain clinical practice skills (Parraga, 1990). Organizational opportunities and barriers could negatively affect professionals' abilities to access training on suicide and their abilities to apply skills learned during training within their routine practice settings (Glisson et al., 2008; Karlin et al., 2010; Moore, Cigularov, Chen, Martinez, & Hindman, 2011). In terms of interpreting the results of predictors, it should be acknowledged that the effect sizes for the predictors tested were small. This may suggest that the magnitude of the impact of each factor on clinical practice skills could be small. However, a small effect does not mean it is unimportant (Prentice & Miller, 1992), and variance-accounted-for effect sizes can become smaller than they actually are in terms of their substantive significance (Kline, n.d.). Given the level of measurement of clinical practice skills (ratio) and the ranges of the predictors (e.g., self-efficacy; 34–68), the small effects might have an effect if the predictors increase significantly and support meaningful and practical interpretations.

Additional limitations of this study should be noted when interpreting the results. First, the study participants were not randomly selected, which limits generalizability of the study results. Second, although this study strengthened the methodology to evaluate changes in professionals' clinical practice skills over time as a function of individual and environmental factors, the absence of a comparison group limits any claims of causality. The internal consistency reliability of the ASP scale ($\alpha = .69$) was at the lower-bound level of acceptable internal consistency (Huey et al., 2004), and therefore findings based on the ASP should be interpreted with caution. Last, the vignettes used to assess clinical practice skills have not been validated across multiple samples. Although the use of vignettes to assess clinical skills is supported because direct observation of clinical practice with clients is difficult as a result of ethical and confidentiality concerns (Kalafat & Gagliano, 1996; Oordt et al., 2009; Samuelsson & Asberg, 2002), and it is unknown if demonstration of improved skills on the vignettes translated to use of these skills in practice.

Despite these limitations, this study suggests the utility of SCT as a framework for designing, implementing, and evaluating suicide prevention trainings. MLM analyses allowed for additional evaluation of the RRSR training when controlling for individual characteristics. The use of the MLM analytic strategy helped minimize the effect of missing data and nonequal time points for data collection (Bickel, 2007; Kwok et al., 2008). Whereas missing data reduced the analytic sample in the original study (Jacobson et al., 2012) to 230 participants, the current

study was able to use data from 314 participants. In addition, the current study was able to simultaneously estimate changes in clinical practice skills over time and the factors potentially associated with those changes (Bickel, 2007).

Conclusion

Researchers need to identify the critical elements of training that support best practices, with a concerted focus on those elements that transcend settings and populations (Osteen et al., 2014). Overall, the professionals who participated in the RRSR training showed improved clinical practice skills over time, a result that is consistent with previous studies evaluating suicide prevention training for professionals (Fenwick et al., 2004; Jacobson et al., 2012; McNeil et al., 2008). Findings from the analyses suggest that individual characteristics, different levels of self-efficacy, and attitudes of professionals should be taken into account when designing training or an intervention for professionals to prevent suicide. Trainees' diverse backgrounds may require customized training approaches (Blake & Butcher-Green, 2009) to improve professionals' practice skill and reduce training expenses.

Implications for Research

Priorities in future research should be the use of randomized trials and cross-validation studies with diverse populations. The integration of all four training constructs (knowledge, attitudes, self-efficacy, and skills) into one study will increase our understanding of direct and indirect relationships. In addition, the small effect sizes for the predictors tested require more research to confirm the relationships between clinical practice skills and the identified factors. To do so, future research could evaluate more complex models with more theoretically determined predictors such as outcome expectation, self-regulation, and work environmental determinants assessed with validated measures. Studies could utilize a longitudinal path analysis of latent growth models that incorporate time-varying covariates. For example, only baseline scores for self-efficacy and attitudes were included in this study, and a more thorough analysis of the trajectory of change over time could incorporate how attitudes and self-efficacy themselves change over time.

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References

- American Association of Suicidology. (n.d.). *Detailed curriculum*. Retrieved from http://www.suicidology.org/Portals/14/docs/Training/RRSR_Curriculum.pdf
- Bandura, A. (1977). *Social learning theory*. Englewood Cliffs, NJ: Prentice Hall.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice Hall.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York, NY: Freeman.
- Bandura, A. (1998). Health promotion from the perspective of social cognitive theory. *Psychology and Health*, 13, 623–649. Retrieved from <http://exordio.qfb.umich.mx/archivos%20pdf%20de%20trabajo%20umnh/afilosofia/2007/NEUROPSICOLOGIA/BanHealthPro.pdf>
- Bickel, R. (2007). *Multilevel analysis for applied research*. New York, NY: The Guilford Press.
- Blake, M. B., & Butcher-Green, J. D. (2009). Agent-customized training for human learning performance enhancement. *Computer and Education*, 53(3), 966–976. <http://dx.doi.org/10.1016/j.compedu.2009.05.014>
- Brunero, S., Smith, J., Bates, E., & Fairbrother, G. (2008). Health professionals' attitudes toward suicide prevention initiatives. *Journal of Psychiatric and Mental Health Nursing*, 15(7), 588–594. <http://dx.doi.org/10.1111/j.1365-2850.2008.01278.x>
- Buckelew, S. M., Adams, S. H., Irwin, C. E., Gee, S., & Ozer, E. M. (2008). Increasing clinician self-efficacy for screening and counseling adolescents for risky health skill: Results of an intervention. *Journal of Adolescent Health*, 43, 198–200. <http://dx.doi.org/10.1016/j.jadohealth.2008.01.018>
- Centers for Disease Control and Prevention. (2013). *Fatal injury reports, national and regional, 1999–2013*. Available at http://webappa.cdc.gov/sasweb/ncipc/mortrate10_us.html
- Cerel, J., Padgett, J. H., Robbins, V., & Kaminer, B. (2012). A state's approach to suicide prevention awareness: Gatekeeper training in Kentucky. *Journal of Evidence-Based Social Work*, 9, 283–292. <http://dx.doi.org/10.1080/15433714.2010.498672>
- Conner, K. R., Wood, J., Pisani, A. R., & Kemp, J. (2013). Evaluation of a suicide prevention training curriculum for substance abuse treatment providers based on Treatment Improvement Protocol Number 50. *Journal of Substance Abuse Treatment*, 44, 15–16. <http://dx.doi.org/10.1016/j.jsat.2012.01.008>
- Coppens, E., Van Audenhove, C., Iddi, S., Arensman, E., Gottlebe, K., Koburger, N., . . . Hegerl, U. (2014). Effectiveness of community facilitator training in improving knowledge, attitudes, and confidence in relation to depression and suicidal behavior: Results of the OSPI-Europe intervention in four European countries. *Journal of Affective Disorders*, 165, 142–150. <http://dx.doi.org/10.1016/j.jad.2014.04.052>
- Feldman, B. N., & Freedenthal, S. (2006). Social work education in suicide intervention and prevention: An unmet need? *Suicide and Life-Threatening Behavior*, 36, 467–480. <http://dx.doi.org/10.1521/suli.2006.36.4.467>
- Fenwick, C. D., Vassilas, C. A., Carter, H., & Haque, S. (2004). Training health professionals in the recognition, assessment and management of suicide risk. *International Journal of Psychiatry in Clinical Practice*, 8, 117–121. <http://dx.doi.org/10.1080/13651500410005658>
- Gask, L., Dixon, C., Morriss, R., Appleby, L., & Green, G. (2006). Evaluating STORM skills training for managing people at risk of suicide. *Journal of Advanced Nursing*, 54, 739–750. <http://dx.doi.org/10.1111/j.1365-2648.2006.03875.x>
- Gibb, S. J., Beautrais, A. L., & Surgenor, L. J. (2010). Health-care staff attitudes towards self-harm patients. *Australian and New Zealand Journal of Psychiatry*, 44, 713–720. <http://dx.doi.org/10.3109/00048671003671015>

- Gibson, S. K. (2004). Social learning (cognitive) theory and implications for human resource development. *Advances in Developing Human Resources*, 6(2), 193–210. <http://dx.doi.org/10.1177/1523422304263429>
- Glisson, C., Landsverk, J., Schoenwald, S., Kkelleher, K., Hoagwood, K. E., Mayberg, S., Green, P., & The Research Network on Youth Mental Health. (2008). Assessing the organizational social context (OSC) of mental health services: Implications for research and practice. *Administration Policy and Mental Health*, 35, 98–113. <http://dx.doi.org/10.1007/s10488-007-0148-5>
- Herron, J., Ticehurst, H., Appleby, L., Perry, A., & Cordingley, L. (2001). Attitudes toward suicide prevention in front-line health staff. *Suicide and Life-Threatening Behavior*, 31, 342–347. <http://dx.doi.org/10.1521/suli.31.3.342.24252>
- Herschell, A. D., Kolko, D. J., Baumann, B. L., & Davis, A. C. (2010). The role of therapist training in the implementation of psychosocial treatments: A review and critique with recommendations. *Clinical Psychology Review*, 30, 448–466. <http://dx.doi.org/10.1016/j.cpr.2010.02.005>
- Huey, S., Henggeler, S. W., Rowland, M. D., Halliday-Boykins, C. A., Cunningham, P. B., Pickrel, S. G., & Edward, J. (2004). Multisystemic therapy effects on attempted suicide by youths presenting psychiatric emergencies. *Psychiatry*, 43, 183–190. <http://dx.doi.org/10.1097/00004583-200402000-00014>
- Jacobson, J. M., Ting, L., Sanders, S., & Harrington, D. (2004). Prevalence of and reactions to fatal and nonfatal client suicidal behavior: A national study of mental health social workers. *OMEGA*, 49(3), 237–248. <http://dx.doi.org/10.2190/hpkq-t700-epqj-58jq>
- Jacobson, J., Osteen, P., Jones, A., & Berman, A. (2012). Evaluation of the Recognizing and Responding to Suicide Risk Training. *Suicide and Life-Threatening Behavior*, 42, 471–485. <http://dx.doi.org/10.1111/j.1943-278x.2012.00105.x>
- Kaniwa, I., Kawanishi, C., Suda, A., & Hirayasu, Y. (2012). Effects of educating local government officers and healthcare and welfare professionals in suicide prevention. *International Journal of Environmental Research and Public Health*, 9(3), 712–721.
- Kalafat, J., & Gagliano, C. (1996). The use of simulations to assess the impact of an adolescent suicide response curriculum. *Suicide and Life-Threatening Behavior*, 26, 359–364.
- Karlin, B. E., Ruzek, J. I., Chard, K. M., Eftekhari, A., Monson, C. M., Hembree, E. A., Resick, P. A., & Foa, E. B. (2010). Dissemination of evidence-based psychological treatments for posttraumatic stress disorder in the Health Administration. *Journal of Traumatic Stress*, 23, 663–673. <http://dx.doi.org/10.1002/jts.20588>
- Kennedy, K. M., Rodrigue, K. M., Head, D., Gunning-Dixon, F., & Raz, N. (2009). Neuroanatomical and cognitive mediators of age-related differences in perceptual priming and learning. *Neuropsychology*, 23(4), 475–491. <http://dx.doi.org/10.1037/a0015377>
- Kline. (n.d.). *Modern approaches: Effect size*. Retrieved from <http://www.unt.edu/rss/class/mike/6810/Modern%20Approaches%20Effect%20Size.ppt>
- Kwok, O. M., Underhill, A. T., Berry, J. W., Luo, W., Elliott, T. R., & Yoon, M. (2008). Analyzing longitudinal data with multilevel models: An example with individuals living with lower extremity intra-articular fractures. *Rehabilitation Psychology*, 53(3), 370–386. <http://dx.doi.org/10.1037/a0012765>
- Little, R. J. A. (1998). A test of missing completely at random for multivariate data with missing values. *Journal of the American Statistical Association*, 83, 1198–1202. <http://dx.doi.org/10.1080/01621459.1988.10478722>
- Maibach, E., & Murphy, D. A. (1995). Self-efficacy in health promotion research and practice: Conceptualization and measurement. *Health Education Research*, 10(1), 37–50. <http://dx.doi.org/10.1093/her/10.1.37>

- McNiel, D. E., Fordwood, S. R., Weaver, C. M., Chamberlain, J. R., Hall, S. E., & Binder, R. L. (2008). Effects of training on suicide risk assessment. *Psychiatric Services*, 59, 1462–1465. <http://dx.doi.org/10.1176/appi.ps.59.12.1462>
- Moore, J. T., Cigularov, K. P., Chen, P. Y., Martinez, J. M., & Hindman, J. (2011). The effects of situational obstacles and social support on suicide-prevention gatekeeper skills. *Crisis*, 32, 264–271. <http://dx.doi.org/10.1027/0227-5910/a000090>
- Muthén, L. K., & Muthén, B. O. (1998–2011). *Mplus user's guide* (6th ed.). Los Angeles, CA: Author.
- Nakai, M., & Weiming, K. (2011). Review of methods of handling missing data in longitudinal data analysis. *International Journal of Mathematical Analysis*, 5(1), 1–13.
- Osteen, P., Frey, J., & Ko, J. (2014). Advancing training to identify, intervene, and follow-up with individuals at risk for suicide through research. *American Journal of Social Work Education*, 50, 349–364.
- Oordt, M. S., Jobes, D. A., Fonseca, V. P., & Schmidt, S. M. (2009). Training mental health professionals to assess and manage suicidal behavior: Can provider confidence and practice skills be altered? *Suicide and Life-Threatening Behavior*, 39, 21–32. <http://dx.doi.org/10.1521/suli.2009.39.1.21>
- Ozer, E. M., & Bandura, A. (1990). Mechanisms governing empowerment effects: A self-efficacy analysis. *Journal of Personality and Social Psychology*, 58(3), 472–486. <http://dx.doi.org/10.1037/0022-3514.58.3.472>
- Parraga, I. M. (1990). Determinants of food consumption. *Journal of American Dietetic Association*, 90(5), 661–663.
- Perkins, M. B., Jensen, P. S., Jaccard, J., Gollwitzer, P., Oettingen, G., Pappadopulos, E., & Hoagwood, K. E. (2007). Applying theory-driven approaches to understanding and modifying clinicians' skill: What do we know? *Psychiatric Services*, 58, 342–348. <http://dx.doi.org/10.1176/appi.ps.58.3.342>
- Pisani, A. R., Cross, W. F., & Gould, M. S. (2011). The assessment and management of suicide risk: State of workshop education. *Suicide and Life-Threatening Behavior*, 41, 255–276. <http://dx.doi.org/10.1111/j.1943-278X.2011.00026.x>
- Pisani, A. R., Cross, W. F., Watts, A., & Conner, K. R. (2012). Evaluation of the Commitment to Living (CTL) curriculum: A 3-hour training for mental health professionals to address suicide risk. *Journal of Crisis Intervention and Suicide Prevention*, 33(1), 30–38. <http://dx.doi.org/10.1027/0227-5910/a000099>
- Pompili, M., Girardi, P., Ruberto, A., Kotzalidis, G. D., & Tatarelli, R. (2005). Emergency staff reactions to suicidal and self-harming patients. *European Journal of Emergency Medicine*, 12(4), 169–178.
- Prentice, D. A., & Miller, D. T. (1992). When small effects are impressive. *Psychological Bulletin*, 112(1), 160–164. <http://dx.doi.org/10.1037/0033-2909.112.1.160>
- Samuelsson, M., & Asberg, M. (2002). Training program in suicide prevention for psychiatric nursing personnel enhance attitudes to attempted suicide patients. *International Journal of Nursing Studies*, 39, 115–121. [http://dx.doi.org/10.1016/S0020-7489\(00\)00110-3](http://dx.doi.org/10.1016/S0020-7489(00)00110-3)
- Schmitz, W. M., Allen, M. H., Feldman, B. N., Gutin, N. J., Jahn, D. R., Kleespies, P. M.,... Simpson, S. (2012). Preventing suicide through improved training in suicide risk assessment and care: An American Association of Suicidology Task Force report addressing serious gaps in U.S. mental health training. *Suicide and Life-Threatening Behavior*, 43, 292–304. <http://dx.doi.org/10.1111/j.1943-278X.2012.00090.x>
- Shoji, K., Bock, J., Cieslak, R., Zukowska, K., Luszczynska, A., & Benight, C. C. (2014). Cultivating secondary traumatic growth among healthcare workers: The role of social

- support and self-efficacy. *Journal of Clinical Psychology*, 70, 831–846. <http://dx.doi.org/10.1002/jclp.22070>
- Smith, A. R., Silva, C., Covington, D. W., & Joiner, T. J. (2014). An assessment of suicide-related knowledge and skills among health professionals. *Health Psychology*, 33(2), 110–119. <http://dx.doi.org/10.1037/a0031062>
- Suicide Prevention Research Center & Suicide Prevention Action Network. (2010). *Charting the future of suicide prevention: A 2010 progress review of the national strategy and recommendations for the decade ahead*. Retrieved from http://www.sprc.org/library/ChartingTheFuture_Fullbook.pdf
- Valente, S. (2002). Overcoming barriers to suicide risk management. *Journal of Psychological Nursing and Mental Health Services*, 40(7), 22–33.
- Valente, S., & Saunders, J. (2004). Barriers to suicide risk management in clinical practice: A national survey of oncology nurses. *Issues in Mental Health Nursing*, 25, 629–648. <http://dx.doi.org/10.1080/01612840490472147>
- West, S. G., Finch, J. F., & Curran, P. J. (1995). Structural equation models with nonnormal variables: Problems and remedies. In Hoyle, R. H. (Ed.), *Structural equation modeling: Concepts, issues and applications* (pp. 56–75). Newbery Park, CA: Sage.

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