

## BRIEF REPORT

Examining Potential Iatrogenic Effects of Viewing Suicide  
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The high-stakes nature of self-injurious thoughts and behaviors (SITBs) raises ethical questions and concerns. The authors examined the iatrogenic risk of recently developed behavioral measures such as the suicide or self-injury Implicit Association Tests (IATs), which include repeated and rapid presentation of SITB-related images (e.g., of cut skin) and words (e.g., death, suicide). The impact of these IATs was investigated across a series of 3 studies involving: adult web-based respondents ( $n = 3,304$ ), undergraduate students ( $n = 100$ ), and adolescent psychiatric inpatients ( $n = 89$ ). There was minimal change in self-injurious or suicidal urges detected across all IAT studies. A slight mood decline was detected across the 3 samples, but was isolated to female research participants and 1 type of IAT that presented SITB-related images (vs. words only). Given the increasing use of novel SITB-relevant stimuli in behavioral and neurobiological studies, these findings may help researchers balance clinical sensitivity and clinical science.

*Keywords:* suicide, self-injury, iatrogenic, implicit association, ethics

*Supplemental materials:* <http://dx.doi.org/10.1037/pas0000280.supp>

Self-injurious thoughts and behaviors (SITBs) are dangerous, prevalent, and increasingly researched. SITBs include harmful and potentially life-threatening outcomes such as suicide attempt, suicidal ideation, suicide plan, and nonsuicidal self-injury (NSSI). The high-stakes nature of SITBs demands thoughtful consideration of how researchers and clinicians safely and responsibly assess these outcomes. For instance,

SITB research involves studying vulnerable individuals, most of whom have a current mental disorder and heightened risk of future self-harm (e.g., Klonsky, May, & Glenn, 2013; Nock, Joiner, Gordon, Lloyd-Richardson, & Prinstein, 2006). SITB research also involves the use of measures that contain sensitive and emotionally provocative content, such as questions about one's history of suicidal thoughts or behaviors. These features

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This research was supported by funding from the Norlien Foundation, the John D. and Catherine T. MacArthur Foundation, the Linda and

Timothy O'Neill Foundation, and the Tommy Fuss Fund. We are grateful to Project Implicit Mental Health for help with Study 1; Dr. Irene Belle Skowronek for her help with Study 2; Ms. Tara Augenstein, Ms. Katherine Frost, and Ms. Katie Gallagher for their help with Study 3. Bethany Teachman has a significant financial interest in Project Implicit, Inc., which provided services in support of this project under contract with the University of Virginia.

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of SITB research increase perceived iatrogenic risk, influence decisions of human research ethics committees (Lakeman & FitzGerald, 2009), and call for the empirical study of iatrogenic effects (DuBois et al., 2012). The current study responds to this call by examining the iatrogenic risk of recently developed SITB measures.

Thus far, we know that completing surveys about suicidal thoughts and behaviors does not increase individuals' subjective distress or overall risk of such behaviors (Gould et al., 2005). This result has been replicated in subsequent studies (e.g., Whitlock, Pietrusza, & Purington, 2013) and extended to NSSI-specific survey questions (Muehlenkamp, Swenson, Batejan, & Jarvi, 2015). As another example, there appears to be no difference in emotional impact between reading warning signs for suicide versus reading warning signs for heart attack or diabetes (Rudd et al., 2006).

Newer methods of studying SITBs have gone beyond asking people about these behaviors, and instead measure their behavioral and biological responses to viewing self-harm related words and images. For instance, behavioral measures such as the self-injury or suicide Implicit Association Test (IAT) repeatedly present SITB-related stimuli to research participants, and use their reaction times (RTs) to predict NSSI, suicidal ideation, and suicide attempts (Nock & Banaji, 2007a; Nock & Banaji, 2007b; Nock et al., 2010). SITB-related stimuli consist of words or images pertaining to NSSI and suicide (e.g., the words *cutting* or *death*, images of cut and bleeding skin). Although the use of such SITB-related stimuli has become increasingly widespread, there have not yet been any investigations testing their potential iatrogenic impact. Repeatedly showing dozens of SITB-related words and images in rapid succession may be more distressing than simply asking about these topics.

The current article investigates potential iatrogenic effects of viewing SITB-related stimuli. The first aim was to examine effects of viewing SITB-related stimuli among all research participants. This was done by measuring changes in people's self-injurious urges, suicidal urges, and mood before and after IAT completion. The second aim was to isolate other characteristics that may heighten iatrogenic risk. For instance, male and female research participants may be differentially affected. Prior work has shown that male suicide attempters are more likely to believe that talking about suicide would increase likelihood of attempt (Shaffer et al., 1990). Gender differences have also been observed by Bryan, Dhillon-Davis, and Dhillon-Davis (2009), showing that previously suicidal and nonsuicidal women reported reduced negative affect after viewing suicide-related content; this same finding extended to nonsuicidal men but not suicidal men. Beyond testing iatrogenic effects between male and female participants, in the present study we also compared those with versus those without SITB history. Finally, we examined whether a particular set of stimuli (e.g., images vs. words) heightens iatrogenic risk.

These aims were addressed across three studies. This collection of studies, described below, offered the chance to yield robust, generalizable findings about the iatrogenic risk of innovative SITB research. Study 1 featured web-based respondents who completed a SITB-related IAT. This first study helped address the increasing implementation of online data collection methods, and yielded a large sample size ( $n = 3,304$ ). This sample size provided sufficient statistical power to detect even the smallest iatrogenic effects and

to inform subsequent studies. Studies 2 and 3 examined in-person IAT administration in nonclinical and clinical settings: with undergraduate students ( $n = 100$ ), and with adolescent psychiatric inpatients ( $n = 89$ ), respectively.

## Method

Sample and critical measure descriptions are provided below. See Supplemental Materials for additional method and sample information.

### Samples and Measures

**Study 1.** Data for Study 1 were from a large-scale web-based IAT study aimed at testing group differences between self-injurious and noninjurious adults. Participants were 3,304 adults ( $M = 28.4$  years,  $SD = 11.3$ ; 67.1% female) from 105 countries (64.2% U.S. residents) who voluntarily visited the Project Implicit Mental Health (PIMH) web site ([www.ImplicitMentalHealth.com](http://www.ImplicitMentalHealth.com)) and completed a brief SITB-related IAT.

At the beginning of the IAT, each respondent was first presented with a screen on which *target-attribute* category pairs were shown in the upper left and right corners. Category pairs presented in the first block (e.g., *cutting-me, not cutting-not me*) would then be switched in the second block (e.g., *cutting-not me, not cutting-me*), in random order. The specific category labels depended on the type of IAT administered. For this study, each respondent completed one of three possible SITB-related IATs:<sup>1</sup> (a) *cutting/no cutting* target images with *me/not me* attribute words, (b) *death/life* target words with *me/not me* attribute words, and (c) *suicide/life* target words with *me/not me* attribute words. Once the trials began, words or images appeared in the middle of the screen, one at a time. The respondent was instructed to sort these words or images into the appropriate category by pressing the left or right key as fast as s/he could while making as few mistakes as possible. If the respondent categorized correctly, the next trial began. If the respondent categorized incorrectly, a red "X" appeared and s/he was asked to try again. The IAT is designed such that respondents' speed of classifying stimuli into correct categories helps determine the associative strength between category pairs. IAT data were not directly used in analyses.

In order to test for iatrogenic effects, a set of three self-report items was given to each participant before and after each IAT that assessed: (a) desire to self-injure (*How much do you want to hurt yourself right now?*); (b) desire to die (*How much do you want to die right now?*); and (c) mood (*How would you rate your mood right now?*). The first two questions were rated on a 5-point scale ranging from 0 (*not at all*) to 4 (*extremely*). In the description of results below, reports of *increased* desire to self-injure or desire to die indicate that post-IAT desire to self-injure/die was stronger than pre-IAT desire to self-injure/die (and vice versa). Also, mood

<sup>1</sup> Participants were randomly assigned to one of three possible IATs described. Study 1 was the only study where participants completed only one (vs. entire battery) of the IATs. Study 1 participants completing the different IATs did not vary across demographic factors or SITB history,  $ps = .06-.95$ , nor did they differ on baseline ratings of desire to self-injure, desire to die, or mood,  $ps = .40-.97$ . Responses across the three groups were collapsed to increase statistical power to detect potential iatrogenic effects.

was rated on a 7-point scale ranging from  $-3$  (*extremely positive*) to  $+3$  (*extremely negative*); these items were reverse-coded to maintain consistency of presentation throughout this article, so that  $-3$  represented negative mood and  $+3$  represented positive mood. Reports of *mood decline* indicate that post-IAT mood was relatively less positive than pre-IAT mood, and reports of *mood improvement* indicate that post-IAT mood was relatively more positive than pre-IAT mood.

History of SITB was measured using an abbreviated self-report version of the Self-Injurious Thoughts and Behaviors Interview (SITBI; Nock, Holmberg, Photos, & Michel, 2007). This version of the SITBI assessed NSSI, suicide ideation, suicide plan, and suicide attempt.

**Study 2.** Data for Study 2 were from a laboratory-based study testing nine different SITB-related IATs, such as the IATs used in Study 1 and those assessing related constructs (e.g., *despair*, *escape*) and alternative formats (e.g., single-category vs. double-category IATs). Participants for Study 2 were 100 consenting students ( $M = 20.1$  years,  $SD = 2.8$ ; 63.0% female) enrolled in an undergraduate psychology course at a university in the Northeast. The wording of pre- and post-IAT questions was identical to Study 1, but the rating scales were different. Participants responded to questions about desire to self-injure and die along a 10-point scale (1 = *not at all*, 5 = *somewhat*, 10 = *very much*), and about mood along a similar 10-point scale (1 = *negative*, 5 = *neutral*, 10 = *positive*).

**Study 3.** Data for Study 3 were from a hospital-based study using a battery of seven IATs to examine self-injurious and non-injurious hospitalized youth. Study 3 participants were 89 adolescents ( $M = 14.8$  years,  $SD = 1.5$ ; 68.2% female) from a psychiatric inpatient unit at a metropolitan children's hospital. The pre-/post-IAT questions for Study 3 were identical to those used in Study 2.

## Data Analyses

Studies 1–3 featured similar analyses to examine potential iatrogenic effects. Paired sample  $t$  tests first tested changes in desire to self-injure, desire to die, and mood among the entire sample, using pooled  $SD$  to estimate effect size. Alpha was set at .05 for two-tailed significance tests. Repeated measures ANOVA then

tested whether ratings changed as a function of respondent gender or SITB status (past history vs. no history). An additional repeated measures ANOVA using Study 1 data determined whether ratings changed as a function of IAT type (cutting/self-injury, death, suicide IATs).

## Results

### Examining Potential Iatrogenic Effects

Participants for Studies 1–3 revealed minimal variation in desire to self-injure and desire to die (see Table 1). Two out of the three studies reported no significant change in desire to self-injure. Participants in Study 1 showed an increase in desire to self-injure from before to after IAT completion; however, this increase was small ( $d = .02$ ) and not replicated in Studies 2 and 3. Regarding participants' desire to die, two out of the three studies reported a significant, slight decrease in severity. This pattern emerged in Studies 1 and 3, and remained unchanged in Study 2. Desire to self-injure and die remained low across all three samples, both before and after IAT completion.

The largest observed pre- to post-IAT change occurred with participants' reported mood. Specifically, Study 2 revealed a significant mood decline producing a medium effect size. Mood remained unchanged among web-based respondents (Study 1) and adolescent inpatients (Study 3). All three samples reported positive mood both before and after IAT completion, such that Study 1 mood ratings were on average above 0, and Study 2 and 3 mood ratings were on average above 5.

### Identify Characteristics of Participants That Heighten Iatrogenic Risk

Participant gender did not affect changes in desire to hurt oneself or die,  $F_s = 0.00$ – $3.02$ ,  $p = .09$ – $1.00$ ,  $\eta_p^2 = .00$ – $.03$ , but did affect mood change (Figure 1a–c). All three samples produced significant Gender  $\times$  Time interactions,  $F_s = 4.73$ – $15.38$ ,  $p_s = .00$ – $.03$ ,  $\eta_p^2_s = .01$ – $.07$ . There was a slight mood *decline* among female web-based participants (Study 1) and adolescent inpatients (Study 3),  $t_s = 2.06$ – $2.69$ ,  $p_s = .01$ – $.04$ ,  $d_s = .02$ – $.16$ , and a

Table 1  
Mean Pre-/Post-IAT Ratings Across Three Samples (Studies 1–3)

|                                       | Desire to self-injure |              |       |      | Desire to die |              |          |      | Mood         |              |          |      |
|---------------------------------------|-----------------------|--------------|-------|------|---------------|--------------|----------|------|--------------|--------------|----------|------|
|                                       | Pre                   |              | Post  |      | Pre           |              | Post     |      | Pre          |              | Post     |      |
|                                       | $M$ ( $SD$ )          | $M$ ( $SD$ ) | $t$   | $d$  | $M$ ( $SD$ )  | $M$ ( $SD$ ) | $t$      | $d$  | $M$ ( $SD$ ) | $M$ ( $SD$ ) | $t$      | $d$  |
| 1. Web-based respondents              | 0.35 (0.74)           | 0.37 (0.76)  | 2.19* | .02  | 0.47 (0.87)   | 0.43 (0.83)  | -7.48*** | -.06 | 0.32 (1.45)  | 0.32 (1.41)  | 0.27     | .00  |
| 2. College students <sup>a</sup>      | 1.16 (0.60)           | 1.14 (0.53)  | -0.28 | -.04 | 1.05 (0.26)   | 1.05 (0.33)  | 0.00     | .00  | 6.84 (1.58)  | 6.23 (1.61)  | -4.32*** | -.38 |
| 3. Adolescent inpatients <sup>a</sup> | 2.49 (2.41)           | 2.37 (2.20)  | -1.12 | -.05 | 2.44 (2.56)   | 2.29 (2.29)  | -2.10*   | -.06 | 6.18 (2.59)  | 5.96 (2.55)  | -1.77    | -.09 |

Note. IAT = Implicit Association Test;  $M$  = Mean;  $SD$  = Standard Deviation. Study 1 ratings for desire to self-injure and desire to die were along a different scale (0 thru 4) than Studies 2 and 3 (1 thru 10). Study 1 ratings for mood were along a different scale ( $-3$  thru  $+3$ ) than Studies 2 and 3 (1 thru 10).

<sup>a</sup> Nonparametric tests were run for Studies 2 and 3, due to violation of the assumption of normality, and produced identical results as parametric tests. Statistics from parametric tests are reported for consistency/comparison across all three studies (including Study 1).

\*  $p < .05$ . \*\*\*  $p < .001$ .

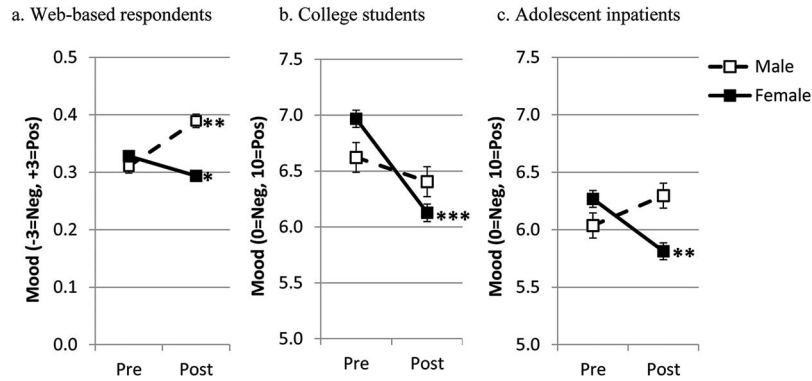


Figure 1. Pre-/post-IAT mood, by gender (Studies 1–3). a. Web-based respondents b. College students c. Adolescent inpatients. Note: IAT = Implicit Association Test. Error bars represent standard error. \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$  for within-group differences.

moderate mood decline among female college students (Study 2),  $t(62) = 5.41$ ,  $p < .001$ ,  $d = .54$ . Male participants generally did not experience a change in mood, except for a slight mood improvement detected among web-based male respondents,  $t(1075) = 3.37$ ,  $p = .001$ ,  $d = .05$ .

Participants' SITB status had little to no effect on desire to hurt oneself, desire to die, or mood across all three studies. SITB Group  $\times$  Time interactions were nonsignificant for desire to hurt oneself,  $F_s = 0.04$ – $2.70$ ,  $p_s = .10$ – $.85$ ,  $\eta_p^2_s = 0.00$  and for mood,  $F_s = 0.21$ – $1.77$ ,  $p_s = .19$ – $.65$ ,  $\eta_p^2_s = 0.00$ – $0.02$ . This Group  $\times$  Time interaction was also nonsignificant for desire to die in Studies 2 and 3,  $F_s = 0.74$ – $0.82$ ,  $p_s = .37$ – $.39$ ,  $\eta_p^2_s = 0.01$ . It was, however, significant for Study 1,  $F(1, 3270) = 5.88$ ,  $p = .02$ ,  $\eta_p^2 = 0.00$ , such that there was a small but significant decrease in desire to die among participants with SITB history,  $t(2824) = 7.45$ ,  $p < .001$ ,  $d = .06$ , and no change in desire to die among participants without SITB history,  $t(446) = 1.07$ ,  $p = .29$ ,  $d = .03$ .

### Identify Characteristics of Measures That Heighten Iatrogenic Risk

Finally, patterns of mood change also varied across the three types of IAT,  $F(2, 3301) = 5.76$ ,  $p = .003$ ,  $\eta_p^2 = .003$  (see Figure 2). Specifically, in Study 1 there was a slight but significant mood

decline for the Self-Injury IAT,  $t(1096) = 2.40$ ,  $p = .02$ ,  $d = .04$ , but not the Suicide or Death IATs,  $t_s = 1.38$ – $1.84$ ,  $p_s = .07$ – $.17$ ,  $d_s = .02$ – $.03$ .

### Discussion

There are several key findings from this series of studies. First, research participants who were repeatedly presented with SITB-related stimuli did not show any reliable increase in their desire to self-injure or desire to die. Second, there was a moderate mood decline specific to female research participants and the presentation of images (vs. words). Third, findings remained consistent between participants with and without SITB history. These findings are discussed in greater detail below.

Importantly, there was no evidence that SITB-related stimuli have a large impact on participants' desire to self-injure and desire to die. The degree of change in these ratings remained small in magnitude across Studies 1 thru 3. The small effect size is critical to interpret especially in Study 1, where  $p$  values are less informative due to the exceptionally large sample size. Because increased desire to self-injure from Study 1 was not significant at a more conservative  $p$  value nor replicated across Studies 2 and 3, this finding likely emerged as a function of large sample size rather than a meaningful and concerning change. A consistent finding

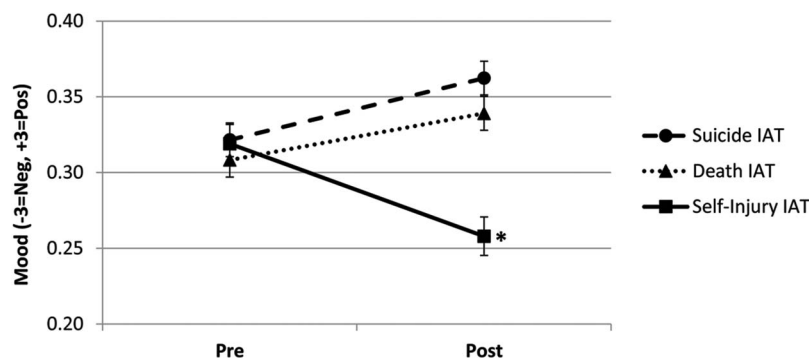


Figure 2. Pre-/post-IAT mood, by IAT type (Study 1 only). Note: IAT = Implicit Association Test. Error bars represent standard error. \*  $p < .05$  for within-group differences.

across Studies 1 and 3 was participants' decreased desire to die; but this change was small in magnitude as well ( $ds = .00-.07$ ). Given the size of these changes, the most balanced conclusion is that the SITB-related stimuli tested here do not produce clinically significant or robust increases in self-injurious or suicidal urges. This counters the common assumption that the mere mention of suicide or self-injury increases its likelihood of occurrence (Stoppe, Sandholzer, Huppertz, Duwe, & Staedt, 1999).

Another consistent pattern was participants' generally positive mood both before and after the IATs. Even the significant mood decline detected in Study 2 featured students shifting from a markedly positive pre-IAT mood to post-IAT *less positive* (i.e., not negative) mood, and likely reflected regression to the mean. No other systematic change in mood was replicated or even moderate in magnitude ( $d < .05$ ) when all research participants were considered. This confirms prior work that suggests no increased distress from SITB-related interview questions or warning signs (Gould et al., 2005; Muehlenkamp et al., 2015; Rudd et al., 2006).

At the same time, evidence of any mood decline, even that of minimal concern, warrants further investigation. Across studies, we tested *who* is most vulnerable to mood decline, and which *stimuli type* drives such decline. Regarding *who* is most vulnerable, female participants consistently reported greater mood decline. Male participants reported no such change. This runs contrary to prior gender-specific findings in the SITB literature (Bryan, Dhillon-Davis, & Dhillon-Davis, 2009), but this finding is less surprising in light of basic psychological science revealing stronger emotional reactivity of women compared with men (Canli, Desmond, Zhao, & Gabrieli, 2002; Lang, Greenwald, Bradley, & Hamm, 1993). Regarding *stimuli type*, Study 1 revealed that the NSSI-related stimuli from the self-injury IAT yielded mood decline, whereas stimuli in the death/suicide IATs did not. It remains unclear exactly why the self-injury IAT would have this effect. One of the unique characteristics of the self-injury IAT is its specific focus on NSSI. It remains possible that the topic of NSSI is more emotionally provocative than suicide or death. But recent evidence demonstrating *decreased* distress from answering NSSI-specific questions renders this explanation unlikely (Muehlenkamp et al., 2015). The unique use of images (vs. words) as stimuli in the self-injury IAT may point toward a more plausible explanation: that images related to self-injury and suicide may be more emotionally provocative than words. The image-driven explanation is also more congruent with cognitive and affective neuroscience, which suggests differential neurobiological processing of emotionally valenced pictures versus words (Kensinger & Schacter, 2006).

Finally, participants with a history of SITB were no more likely to experience changes in mood or desire to hurt themselves relative to those without SITB history. This lack of iatrogenic effect by group status is consistent with prior findings comparing high-versus low-risk groups (e.g., Gould et al., 2005). Across the three studies, desire to die also remained largely unchanged between participants with and without SITB history. The one exception was in Study 1 which revealed differential patterns such that participants with SITB history experienced *decreased* desire to hurt themselves after IAT completion, whereas those without SITB history did not. While it is possible that the IATs somehow have a beneficial impact on suicidal participants, this pattern may simply suggest regression to the mean. Further exploration of this finding is encouraged.

There are several limitations to note. First, Studies 1–3 did not include a non-SITB-related stimuli control condition, and so it is not possible to draw inferences about whether SITB-related stimuli exposure caused such observed changes. This omission is relatively minor given the implausible assumption that self-harm and suicidal urges would increase spontaneously for those exposed to no stimuli or non-SITB-related stimuli. Moreover, this observed mood decline likely does not represent natural change over time given the systematic changes observed in Study 1 (i.e., mood decline specifically for image IATs, not word-only IATs). These systematic changes would be difficult to explain if this first possible limitation held true.

Second, these findings are based on self-reported responses to SITB-related stimuli. The authors relied on this single-item assessment method for feasibility and convenience, but the cost of this method is the potential inaccuracy of self-report (Tourangeau & Yan, 2007). Future research efforts to explore alternative measures of emotions, self-injurious urges, and suicidal urges are recommended. Reliance on more objective outcomes, such as behavioral performance, physiological arousal, or actual SITB outcomes may yield more accurate findings.

Third, the longer-term impact of SITB-related behavioral measures remains unknown. The authors can draw conclusions regarding short-term iatrogenic effects, and merely speculate that these would generalize to a broader time frame. Prior work suggests that asking SITB-related questions does not increase future likelihood of SITBs, with effects ranging from three weeks to two years (Muehlenkamp et al., 2015). Prospective examination of longer-term iatrogenic effects of behavioral measures is strongly encouraged.

Despite these limitations, the present findings provide replicated evidence that SITB-related stimuli used in newer behavioral and neurobiological studies do not increase people's self-injurious or suicidal urges, and have a minimal impact on mood. This pattern of findings is remarkably consistent across web-based, laboratory-based, and clinical settings. In light of these findings, the authors encourage both researchers and practitioners to take on a balanced perspective of these increasingly diverse and innovative SITB assessments.

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Received September 6, 2015

Revision received December 9, 2015

Accepted December 9, 2015 ■