Provocative work experiences predict the acquired capability for suicide in physicians

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Abstract

The interpersonal psychological theory of suicidal behavior (IPTS) offers a potential means to explain suicide in physicians. The IPTS posits three necessary and sufficient precursors to death by suicide: thwarted belongingness, perceived burdensomeness, and acquired capability. The present study sought to examine whether provocative work experiences unique to physicians (e.g., placing sutures, withdrawing life support) would predict levels of acquired capability, while controlling for gender and painful and provocative experiences outside the work environment. Data were obtained from 376 of 7723 recruited physicians. Study measures included the Acquired Capability for Suicide Scale, the Interpersonal Needs Questionnaire, the Painful and Provocative Events Scale, and the Life Events Scale—Medical Doctors Version. Painful and provocative events outside of work predicted acquired capability ($\beta=0.23$, $t=3.82$, $p<0.001$, $f^2=0.09$) as did provocative work experiences ($\beta=0.12$, $t=2.05$, $p<0.05$, $f^2=0.07$). This represents the first study assessing the potential impact of unique work experiences on suicidality in physicians. Limitations include over-representation of Caucasian participants, limited representation from various specialties of medicine, and lack of information regarding individual differences.

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1. Introduction

Physicians die by suicide at rates that consistently exceed that of the general population (Schernhammer and Colditz, 2004). Potential explanations for this elevation include job difficulties (Gold et al., 2013), psychological difficulties (Gagne et al., 2011), and ready access to, and scientific knowledge of, lethal means of suicide (Hawton et al., 2000). However, the majority of these hypotheses lack specificity in explaining why some physicians with such risk factors go on to enact a lethal suicide attempt while others do not. Further, this explanatory deficiency leads to a more pressing problem: the inability to predict when physicians are at elevated risk for suicide.

Recently, the Interpersonal Psychological Theory of Suicidal Behavior (IPTS; Joiner, 2005) has been suggested as a useful means of explaining and predicting why people die by suicide. The IPTS posits three necessary and sufficient precursors to death by suicide: thwarted belongingness, perceived burdensomeness, and acquired capability. Thwarted belongingness represents a profound sense of isolation from others while perceived burdensomeness is described as a miscalculation made by an individual, in which the person feels that their death would be of more benefit to others than their life. Thwarted belongingness and perceived burdensomeness are hypothesized to be similar, but conceptually different constructs. More specifically, the IPTS delineates an array of distal risk factors for suicide (e.g., domestic violence) that increase suicide risk through their impact on thwarted belongingness or perceived burdensomeness. The desire for suicide is thought to arise via a combination of thwarted belongingness and perceived burdensomeness, paired with a feeling of hopelessness about these two states (Van Orden et al., 2010).

Acquired capability is described as the physical capacity to inflict serious self-injury, and is hypothesized to result from continued exposure to painful (e.g., chronic pain) or provocative (e.g., witnessing violence) events. Prolonged engagement with such experiences is theorized to cause habituation to situations that previously resulted in fear. In this way, individuals may eventually react fearlessly to death—even the idea of their own death. Importantly, acquired capability is distinct from thwarted belongingness and perceived burdensomeness: the theory hypothesizes that only when all three factors are present is one at serious risk for suicide (Joiner, 2005).

Recently, the IPTS has been applied to physician suicides, both theoretically and empirically. Cornette and colleagues (2009) suggested that the theory offers a potentially valuable means of explaining suicide in physicians and medical residents, highlighting numerous work variables that may contribute to

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elevations on all three theory components. More recently, Fink-Miller (2015) collected data from currently licensed physicians regarding all three components of the theory. Results indicated that perceived burdensomeness predicted current suicidal ideation, while thwarted belongingness predicted past suicide attempts. Contrary to hypotheses, acquired capability did not predict past attempts.

As stated above, acquired capability is theorized to result from habituation after continual engagement in painful or provocative situations. Such experiences have been measured in prior research, and do appear to predict increases in acquired capability. For example, Bender and colleagues (2011) examined correlates of the Painful and Provocative Events Scale (PPES) in a series of studies. This scale assesses the degree to which respondents participate in a variety of physically painful or provocative events throughout a given time period, and includes experiences such as discharging a firearm, getting a tattoo or piercing, playing contact sports, or physical altercations. Higher scores on the PPES have predicted higher scores on acquired capability in several studies (Van Orden et al., 2008; Bender et al., 2011).

In addition to the experiences described above, exposure to death has also been found to correlate with acquired capability. For example, in a study examining veterinarian exposure to euthanasia, Witte and colleagues (2013) found that experiences with euthanasia of companion animals were negatively associated with feelings of distress regarding euthanasia. Additionally, distress regarding euthanasia was negatively associated with fearlessness of death—a facet of acquired capability. Given that medical doctors frequently witness pain and suffering in patients, and often encounter serious injury, blood, and even patient death, findings among physicians may parallel those of veterinarians. This possibility has been suggested by Cornette and colleagues (2009)—but such relationships have yet to be directly investigated in physicians.

Prior research—while not directly assessing work experiences or acquired capability—provides preliminary support for the possibility that medical doctors habituate to fearlessness surrounding death. For example, Sundin et al. (1979) compared attitudes toward death, and fear of death, in medical students and dental students. Results suggested that dental students reported greater fear of death as compared to medical students, and these findings included fear of one’s own death. More recently, Charlton et al. (1994) assessed medical students on emotional reactivity to death prior to experience with cadaver dissection, as well as at three month follow-up after the dissection. Results suggested that even after one dissection experience, the students’ emotional reactivity to death decreased significantly. Interestingly, men reported significantly decreased emotional reactivity as compared to women. Similarly, acquired capability has been shown to vary according to gender, in that men generally evidence higher scores on the construct (Witte, et al., 2012; Ribeiro et al., 2014).

While medical doctors as a group appear to display elevated acquired capability (Fink-Miller, 2015), it is less clear whether acquired capability varies by medical specialty. Prior research demonstrates differing rates of death by suicide by medical specialty. Rich and Pitts (1980) determined that psychiatrists displayed an elevated risk for suicide as compared to physicians in other medical specialties. Similarly, Carpenter et al. (1997) reported more suicides in female anesthetists than reported in other medical fields. Hawton et al., 2001 corroborated both of these findings in reporting that those who practiced within the specialties of anesthesiology, psychiatry, community health, and general practice were more likely to die by suicide than those in other specialties. The authors suggest two pathways by which physicians in these specialties may evidence an increased risk for suicide: work stressors, and individual characteristics (e.g., personality variables) that not only predispose one to suicide, but also influence the individual to choose employment within one of these specialty areas. However, Cornette et al. (2009) caution that differences in acquired capability likely contribute to the differential risk observed among medical specialty.

In sum, research thus far has failed to directly measure the impact of work experiences in physicians on variables related to suicidality. To remedy these shortcomings, the current study seeks to directly measure lifetime experience with certain painful and provocative situations experienced by medical doctors, while also utilizing scores on such a measure to predict one’s level of acquired capability. We hypothesize that frequency of engagement in provocative medical experiences will predict scores on acquired capability. In order to examine the specificity of the impact of work experiences on acquired capability, painful and provocative experiences outside of the work environment will be utilized as a covariate. Given past research showing differential suicide rates by medical specialty, we also sought to determine whether provocative work experiences and scores on acquired capability differed by medical specialty.

2. Methods

An electronic survey was built using LimeSurvey software (Carsten Schmitz, Germany) and was sent to 7723 currently licensed physicians in the state of Pennsylvania. The Center for Survey Research (CSR) at the author’s institution coordinated all aspects of developing, maintaining, and disseminating the electronic survey. Analyzable data was obtained from 376 physicians, yielding a response rate of 4.8%. In late February 2014, a pre-notification email was sent by the CSR, indicating that respondents would receive the study questionnaires electronically in the near future. Surveys were sent on March 6, 2014 and data was collected from March 6 to March 31, 2014. Two reminder emails were sent during this period. In an attempt to enhance the response rate, participants could choose to enter a raffle to win one of three $100 Visa gift cards. At the conclusion of the study, raw data were transformed into SPSS version 21.0 (Armonk, New York, United States) and transferred from the CSR to the principal investigator.

2.1. Subjects

Four hundred fifty two physicians began the survey, with 76 completing only one or two measures before termination. Those who terminated the study prematurely did not differ demographically from those who proceeded. Sixty four percent of respondents were male, with the majority of participants identifying as Caucasian (88.8%), Asian (5.9%), African American (1.9%), American Indian (0.5%), and Native Hawaiian/Pacific Islander (0.3%). A wide range of medical specialties were reported, including pediatrics (22.6%), orthopedic surgery (11.4%), anesthesiology (9.8%), internal medicine (9.6%), emergency medicine (7.7%), psychiatry/neurology (7.2%), surgery/vascular surgery (4.8%), family medicine (3.5%), obstetrics/gynecology (3.5%), urology (2.7%), cardiology (2.4%), ophthalmology (2.1%) as well as allergy/immunology, dermatology, neurological surgery, otorhinolaryngology, pathology, physical medicine/rehabilitation, plastic surgery, and radiology, (2% or fewer for each). Participants’ ages ranged from 30 to 86 (M=53.76, SD=10.67), with years of practice ranging from 1 to 57 (M=24.43, SD=11.31).

2.2. Measures

Measures were self-reported utilizing the LimeSurvey software program. Physicians began by completing demographic data,
including age, race, gender, years of practice, and medical specialty.

2.2.1. Acquired capability for Suicide Scale

The Acquired Capability for Suicide Scale (ACSS; Van Orden et al., 2008) was designed to assess the physical capacity to inflict serious physical harm on oneself. For the sake of brevity, a shortened, 5-item version of the form was used. The original ACSS included 20 items. The ACSS includes items such as “I am not at all afraid to die,” and utilizes a Likert-type scale. Shortened forms of the ACSS have previously demonstrated adequate reliability and validity (e.g., Bender et al., 2011). The reliability in the current sample was adequate ($\alpha = 0.60$). This 5-item version of the scale has been used frequently in past research, demonstrating reliability ranging from 0.67 to 0.71 (Van Orden et al., 2008; Bryan et al., 2010a, 2010b; Bryan and Cukrowicz, 2011).

2.2.2. Interpersonal Needs Questionnaire

The Interpersonal Needs Questionnaire (INQ; Van Orden et al., 2008) is a 12-item measure designed to assess perceived burdensomeness and thwarted belongingness. Respondents indicate their level of agreement with statements utilizing a 7-point Likert-type scale. The INQ has been widely used and has previously demonstrated acceptable reliability and validity (Freedenthal et al., 2011). Reliability in the current study was adequate for both subscales (perceived burdensomeness [$\alpha = 0.83$]; thwarted belongingness [$\alpha = 0.81$]).

2.2.3. Painful and Provocative Events scale

The Painful and Provocative Events Scale (PPES; Van Orden et al., 2008) is a 25-item measure designed to assess a respondent’s frequency of engagement in certain painful and provocative activities. Participants utilize a 5-point Likert-type scale, with “1” indicating never having experienced the event, and “5” indicating regularly experiencing the event. Items included on the scale represent those that are either physically painful (e.g., did you get a tattoo?) or physically and/or emotionally provocative (e.g., have you gone skydiving?). The PPES has previously demonstrated reliability and validity (e.g., Selby et al., 2010). The PPES displayed adequate reliability in the current study ($\alpha = 0.73$).

2.2.4. Life Events Scale—Medical Doctors

The Life Events Scale—Medical Doctors version (LES-MD) is a self-report, 16-item questionnaire designed by the author for the purposes of the study. The LES-MD is designed to parallel the PPES, accounting for specific work experiences that may commonly occur in medical settings. Additionally, these events were selected due to either the vicarious pain associated with them (e.g., witnessing significant physical pain in a patient) or the provocative nature of the event (e.g., withdrawing life support from a patient). Respondents utilize a 5-point Likert-type scale identical to that of the PPES, with “1” indicating never having experienced the event and “5” indicating frequent experience of the event. The scale was developed in consultation with one physician, and one physician assistant to ensure inclusion of relevant events within the medical field, as well as use of appropriate medical terminology. This scale has not been previously used, and displayed adequate reliability in this study ($\alpha = 0.86$). Given that the scale was not previously used, correlations were explored to determine whether an association existed between LES-MD items and acquired capability for suicide. Observed correlations were in the expected direction, with 9 of the 16 LES-MD items displaying a significant positive correlation with acquired capability. All items on the LES-MD and their correlations with acquired capability are displayed in Table 2.

3. Results

Means, standard deviations, and correlations among study variables are presented in Table 1. Sixty three percent of participants were male. Scores on acquired capability differed significantly by gender ($F = 3.91$, $p < 0.05$), in that males displayed a higher average score ($M = 16.15$) than females ($M = 15.43$). As such, gender was added as a covariate in future analyses. Scores on acquired capability did not differ by age, years of practice, or race.

To examine the first hypothesis, that frequency of participation in provocative medical events would predict scores on acquired capability, a multiple regression equation was constructed. In the first step, gender and scores on the PPES were entered as covariates. In the second step, scores on the LES-MD were added as the predictor variable, with scores on the ACSS representing the dependent variable. Results were significant, in that frequency of provocative medical experiences predicted scores on acquired capability, even while controlling for gender and participation in painful and provocative events outside the work environment ($\beta = 0.12$, $t = 2.05$, $p < 0.05$, $F^2 = 0.07$). Unexpectedly, scores on the PPES also predicted acquired capability ($\beta = 0.23$, $t = 3.82$, $p < 0.001$, $F^2 = 0.09$). Analyses indicated that LES-MD scores

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**Table 1**

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>53.76 (10.67)</td>
<td>0.936**</td>
<td>0.019</td>
<td>-0.019</td>
<td>0.072</td>
</tr>
<tr>
<td>Years of practice</td>
<td>24.43 (11.31)</td>
<td>0.024</td>
<td>-0.002</td>
<td>0.042</td>
<td></td>
</tr>
<tr>
<td>ACSS</td>
<td>15.87 (3.27)</td>
<td>0.187**</td>
<td>0.273**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LEMS</td>
<td>62.63 (10.64)</td>
<td>0.281**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PPES</td>
<td>42.04 (8.26)</td>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>

Note. Means (and standard deviations) are given in bold on the diagonal. Correlations are presented above the diagonal.

* $p < 0.05$. ** $p < 0.01$.

**Table 2**

<table>
<thead>
<tr>
<th>Item</th>
<th>Correlation with ACSS Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Placed sutures or performed other invasive procedures including placing an IV or central line</td>
<td>0.052</td>
</tr>
<tr>
<td>2. Witnessed significant physical pain in a patient</td>
<td>0.097</td>
</tr>
<tr>
<td>3. Performed a surgery</td>
<td>0.191**</td>
</tr>
<tr>
<td>4. Witnessed an unexpected patient death</td>
<td>0.150**</td>
</tr>
<tr>
<td>5. Gave bad news to a family member regarding a patient’s condition</td>
<td>0.061</td>
</tr>
<tr>
<td>6. Witnessed significant physical trauma in a patient (e.g., MVA victims)</td>
<td>0.208**</td>
</tr>
<tr>
<td>7. Witnessed significant emotional distress in a patient</td>
<td>0.055</td>
</tr>
<tr>
<td>8. Treated sexual assault victims</td>
<td>-0.034</td>
</tr>
<tr>
<td>9. Became involved in an argument with a patient</td>
<td>0.029</td>
</tr>
<tr>
<td>10. Talked to a patient’s family member about death or poor clinical outcomes</td>
<td>0.168**</td>
</tr>
<tr>
<td>11. Witnessed an expected patient death</td>
<td>0.181**</td>
</tr>
<tr>
<td>12. Gave someone a life-limiting diagnosis</td>
<td>0.177**</td>
</tr>
<tr>
<td>13. Discussed end of life issues with a patient or family</td>
<td>0.185**</td>
</tr>
<tr>
<td>14. Explained a medical complication that you or a colleague were responsible for</td>
<td>0.125*</td>
</tr>
<tr>
<td>15. Withdrew life support from a patient</td>
<td>0.084</td>
</tr>
<tr>
<td>16. Attempted resuscitation</td>
<td>0.140**</td>
</tr>
</tbody>
</table>

* $p < 0.05$. ** $p < 0.01$. 
accounted for 3.5% of the variance in acquired capability while PPES scores accounted for 7.4% of the variance in acquired capability.

The second goal of the study, to determine whether scores on acquired capability would differ by medical specialty, was accomplished by utilizing a one-way analysis of variance, with ACSS scores serving as the dependent variable and medical specialty serving as the independent variable. Scores on the ACSS did not differ significantly by medical specialty, although this relationship did approach significance (F = 1.53, p = 0.07). Given this trend toward significance, we also sought to determine whether scores on the PPES and LES-MD varied by medical specialty. Participation in painful and provocative events outside of work—as evidenced by scores on the PPES—differed significantly according to medical specialty (F = 2.16, p = 0.003, η² = 0.12). Scores on the LES-MD paralleled this finding, indicating that provocative work experiences also varied according to specialty (F = 8.54, p < 0.001, η² = 0.35). In order to determine which group means were significantly different, Tukey’s HSD post hoc tests were completed. Results indicated few group differences on painful and provocative events outside of work, with those in emergency medicine (M = 45.92, SD = 8.85) and orthopedic surgery (M = 45.79, SD = 8.64) scoring higher on the PPES than those in pediatric medicine (M = 39.07, SD = 7.06).

In terms of provocative work experiences, those in emergency medicine and surgery/vascular surgery scored higher on the LES-MD than nine of the other specialties of medicine, including anesthesiology, dermatology, obstetrics/gynecology, ophthalmology, orthopedic surgery, pathology, pediatrics, psychiatry/neurology, and radiology. Similarly, those in internal medicine scored significantly higher on the LES-MD than those in the specialties listed above, excluding obstetrics/gynecology and radiology. Physicians in pathology displayed the lowest average score on the LES-MD, and scored lower than those in eight other specialties.

4. Discussion

As hypothesized, frequency of certain work experiences common to physicians predicted scores on acquired capability for suicide. This finding indicates that regular participation in certain events common in medicine—including withdrawing life support, placing sutures, witnessing a patient death, or giving a patient a life-limiting diagnosis—are associated with the increased capacity for self-harm, should one develop a desire to die. Given the previously reported association between other provocative life events—including discharging a firearm, getting a tattoo, or skydiving—and acquired capability (Van Orden et al., 2008; Bender et al., 2011) painful and provocative events were included as a covariate. Unexpectedly, a relationship between such events and acquired capability in physicians was observed. Furthermore, there was a significant correlation between scores on the LES-MD and the PPES in the current sample (r = 0.281, p < 0.001). This positive association suggests that physicians who engage in painful and provocative events more frequently outside of work also take part in provocative experiences at the work place more often.

Given that items on the LES-MD and the PPES are qualitatively distinct, the strong relationship between scores on the scales, as well as the fact that both were associated with acquired capability in the sample, was initially puzzling. However, several plausible explanations for the observed relationships exist. First, it may be that certain personality characteristics not only lead an individual to engage in particular behaviors (e.g., skydiving), but also lead them to make certain vocational choices. For example, sensation seeking is a personality trait that is characterized by the tendency to seek out and take part in novel and varied situations simply for the thrill or excitement of engaging in the experience, and often with disregard for risk (Zuckerman, 1994). In prior research, sensation seeking has been found to account for the relationship between gender and fearlessness regarding death—one facet of acquired capability—suggesting that sensation seeking behaviors are a potent precursor to acquired capability for suicide (Witte et al., 2012). Additionally, recent research exploring acquired capability in monozygotic and dizygotic twins indicated a stronger correlation for acquired capability among monozygotic versus dizygotic twins, suggesting a genetic component to acquired capability (Smith et al., 2012). Although not tested in the current study, the findings may illustrate such a component, in that physicians—influenced by their biology—partake in painful and provocative events as measured by the PPES, but also seek out a certain level of stimulation in the workplace.

A second possibility is that physicians engage in painful and provocative events throughout life, and the habituation to these experiences allows for more ready completion of provocative work tasks when such situations present themselves. One could argue that the act of piercing another person’s skin with a needle for the purpose of suturing a wound would be quite provocative to most. However, some physicians readily complete this task on a regular basis, suggesting that they have become inured to the fear inherent in such an activity. Of course, it may likely be a combination of such possibilities—genetics, personality, and prior life experience—that results in the observed level of participation in provocative events, both inside and outside of the workplace. Interestingly, age and years of practice were not correlated with the PPES or the LES-MD, indicating that one’s frequency of experience with these events is not attributable simply to length of one’s life, or of one’s medical career.

Contrary to hypotheses, acquired capability for suicide did not differ according to medical specialty, although this relationship approached significance. In contrast, scores on the PPES and LES-MD did differ according to medical specialty. The idea that work experiences would vary according to one’s particular area of expertise within medicine is not surprising. For example, emergency medicine physicians likely encounter life-and-death situations more often than a family medicine physician practicing in primary care. Results seemed to support this possibility, with those in emergency medicine, surgery/vascular surgery, and internal medicine displaying the highest scores on the LES-MD, while those in pathology displayed significantly lower scores than other groups. Perhaps more surprisingly, scores on the PPES also varied significantly by medical specialty, although there were fewer meaningful group differences. Again, those in emergency medicine scored significantly higher than other groups, as did those in orthopedic surgery. Once again, these findings highlight the possibility that a third variable may contribute to engagement in both painful and provocative events outside of work, as well as medical experiences at work.

Although the findings offer promising insight into understanding physician suicidality, several limitations are noteworthy. First, responses were obtained from physicians in a limited geographic area, and Caucasian participants were over-represented. As such, the generalizability of findings to other populations is limited. Second, although a wide array of medical specialties were represented, this resulted in small sample sizes for some specialties which limited post hoc group comparisons. Given the conservative nature of the post hoc Tukey’s HSD test, as well as the small representation of certain specialty areas, there is a possibility that Type II error may have occurred. Additionally, we did not collect data related to individual differences—such as sensation seeking or other personality traits—that could have further explained observed results. It may be that sensation seeking not only influences individuals to partake in painful or provocative events...
throughout their lifetime, but also impacts their choice of an occupation that is fast-paced, fraught with dangerous situations, and physically taxing. Our data precludes us from providing any results to support this hypothesis. Finally, the reliability of the ACSS was somewhat low (0.60); however, this coefficient is similar to that obtained in other studies utilizing the same 5-item scale (Van Orden et al., 2008; Bryan et al., 2010a, 2010b; Bryan and Cukrowicz, 2011).

Even with the above shortcomings, this work represents, to our knowledge, the first empirical investigation of the relationship between work experiences and acquired capability for suicide in physicians. Given the lack of specificity—and plethora of unsupported suppositions—regarding physician death by suicide, the results offer promising insight into unique work experiences that may contribute to a physician’s ability to take his or her own life, should suicidal desire arise. Additionally, this work suggests the possibility that physicians may possess certain characteristics that render them more likely to engage in painful and provocative experiences, both inside and outside of the work environment. Future research should seek to clarify such potential variables, including personality differences that may account for these tendencies. With increased theory-based knowledge regarding characteristics that are associated with physician suicidality comes the ability to better understand, predict, and prevent needless deaths in this population.

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