



## The Role of Culture in Implicit & Explicit Suicide Ideation

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The Role of Culture in Implicit & Explicit  
Suicide Ideation

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A Thesis in the Field of Clinical Psychology  
for the Degree of Master of Liberal Arts in Extension Studies

Harvard University

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## Abstract

This study investigated the role of culture on suicidal thoughts and behaviors by examining (i) differences in explicit reporting of suicidal thoughts and behaviors, (ii) differences in implicit association of suicidal thoughts (iii) correlation of implicit-explicit reporting of suicidal thoughts and behaviors (iv) correlation between religion, religiosity level and reporting of suicidal thoughts between community samples from India and the USA. The study also tested the feasibility of using a measure of cognitive processing (i.e. the Implicit Association Task) as opposed to a self-report measure to identify implicit or hidden associations with suicidal thoughts or behaviors. Given the scarcity of available research on cross-cultural suicidal thoughts and behaviors, this study aims to bridge the current gap and provide evidence on the cultural variability in expression and development of suicidal thoughts and behaviors. The study hypothesized a lower level of explicit reporting of suicidal thoughts and behaviors in the Indian sample (as compared to the USA sample), but equivalent or higher level of implicit association with death/suicide related stimuli. Further, a significant difference in the correlation between religiosity level and suicidal behaviors, moderated by religion, was expected between the two countries. Participants were recruited online using Mechanical Turk to target individuals from India and the USA. A self-report questionnaire format was used to capture information about the participants' explicit reporting of suicidal thoughts and behaviors, associated risk factors, religious affiliations and country of birth. Implicit cognition towards suicide was measured using an online version of the Death/Suicide IAT. The results showed a significantly lower level of explicit reporting in India as

compared to the USA sample but comparable implicit reporting levels. Further, the results also reported a significantly different correlation of religiosity and suicidal thoughts between the two country samples. This study provides initial evidence suggesting a significant role of cultural setting in the reporting and expression of suicidal thoughts and behaviors. This study is also the first to test the feasibility of using the Death/Suicide IAT for measuring implicit suicide related cognition in India.

## Dedication

I dedicate this thesis to my parents Kuldeep and Dr. Sushma Drabu, my husband Prashant Mukherjee, and to Oscar & Googly, for their unconditional support and constant encouragements.

## Acknowledgements

I would like to express the deepest gratitude to my thesis advisor Dr. Matthew Nock, my research advisor Dr. Dante Spetter as well as Dr. Catherine Glenn for their patient guidance and support. I would also like to thank Sara Masland and Kathryn Fox for being the most supportive colleagues and for helping me troubleshoot through every stage of my research project.

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## Chapter I

### Introduction

Suicide is a serious and growing problem across the world (WHO 1996, Nock et al., 2012, Nock et al 2008). It is a leading cause of death worldwide: there is approximately one death by suicide every 40 seconds and 20 times more suicide attempts in the same time frame (WHO, 2008). Alarming, the World Health Organization has reported a 60% increase in global suicide rates over the past 45 years (WHO, 2008). Among individuals who die by suicide, over 90% are reported to have at least one diagnosable mental illness at the time of their death, and many individuals have several psychological disorders such as depression, anxiety disorders, impulse control disorders and personality disorders (Nock et al., 2008).

### Suicidal Thoughts & Behaviors

Although suicide deaths are relatively rare, thoughts about ending one's life (i.e., suicide ideation) and suicide attempts (i.e. nonfatal suicidal behavior) are very common across the world and are the most robust predictors of death by suicide (Joiner et al. 2005, Borges et al. 2010). Among the numerous risk factors for suicide, suicidal ideation is one of the strongest predictors of future suicidal attempts.

The World Health Organization (WHO) has reported the cross-national prevalence of suicide ideation to be approximately 9.2% (WHO World Mental Health Surveys, 2004). A cross-national study reported that most people (60%) who transition from thinking about suicide to acting on their suicidal thoughts will do this within the first year after the onset of their suicide ideation (Nock et al. 2008).

Further, the frequency, intensity and the persistence of suicide ideation have been associated with later risk for suicide behavior (Beck et al. 1979). Currently suicide ideation is most commonly assessed by the use of semi-structured interviews and self-report questionnaires. Reporting of suicidal thoughts can be influenced by various factors such as social and cultural stigma, inability to have insight into one's internal experiences (thoughts or feelings), or the conscious desire to conceal such thoughts. Therefore, a better detection method is needed that can overcome the limitations of self-report tools and potentially help improve the identification and ultimate prevention of suicide attempts (Nock et al 2010), especially across varied cultural settings.

#### Cross-Cultural Differences In Suicidal Thoughts & Behaviors

The World Mental Health (WMH) Surveys conducted by WHO examined the cross-national differences in the prevalence and course of suicidal thoughts and behaviors (World Health Organization World Mental Health Surveys, 2004, Nock et al. 2008, Nock & Borges 2012) across 17 select countries including the Americas, Africa, Asia, Europe and the Middle East. Cross-national studies are an important step forward in understanding potential cultural differences in the prevalence, expression, and course of suicidal thoughts and behaviors. Further, cross-national studies can help provide more information about location and culturally specific risk and preventative factors that can potentially aid in creating culturally specific prevention programs for suicide. This WMH study had a total sample size of 84,850 participants above the age of 18 years. The study was conducted using an interview format to measure suicidal thoughts and behaviors. Results indicated a significant difference in the prevalence rates of suicide ideation, plans, and attempts across the 17 countries. While

prevalence rates differed, specific risk factors for suicide attempts including suicide ideation, female sex, younger age, fewer years of education, unmarried status and the presence of a mental disorder were common predictors of suicide cross-nationally. Although presence of mental disorders was a strong risk factor across countries, there was a difference in the type of disorders that showed strong associations with suicidal thoughts and behaviors. In the developing countries, mood disorders were more strongly associated with suicidal behaviors. However, in developed countries, impulse disorders were a stronger risk factor. (World Health Organization World Mental Health Surveys, 2004, Nock et al. 2008)

Although the World Mental Health surveys covered a large number of countries, with the USA reporting the highest prevalence of suicide ideation at 15.6% and China reporting the lowest at 3.1%, the representation of Asia was limited to China and Japan. There was no representation of South Asian countries, including India. There is not much data available on the prevalence and course of suicidal thoughts and behaviors in India and the surrounding South Asian countries. Given the lack of data on the prevalence of suicidal thoughts and behaviors in Asia, it is important to conduct further research specifically in Asian countries. Researching the prevalence and course of suicidal thoughts and behaviors in Asian countries can help us identify potential ways through which differences in cultural setting may influence the development as well as the expression of suicidal thoughts and behaviors.

Cultural norms can determine whether the concept of suicide is an acceptable way of dealing with crisis situations. The presence of suicidal behaviors as an alternative choice to dealing with personal problems can introduce the idea and hence initiate the process of suicidal thoughts (Kral, 1994). This may contribute to the development of suicidal thoughts in specific cultures. In addition to the development

of suicidal thoughts, the cultural perception of suicide and mental illness in general can influence the expression of suicidal thoughts and behaviors. In cultures that are not accepting or supportive of individuals seeking help for addressing suicidal ideation or attempts, individuals may refrain from expressing their thoughts or seeking help. The act of concealing one's suicidal thoughts and not seeking help can itself further the intensity of the suicidal thoughts over a prolonged time period (Eskin et al. 1995a, 1995b, 1997, Rutter et. al., 2004). Specifically in Asian countries such as India, various aspects of culture (such as the one's mentioned above) can impact the development and reporting of suicidal thoughts.

First, specific aspects of Asian culture can factor into the development of suicidal thoughts. These aspects include the prominence of social shame as well as the acceptance of suicide by the predominant religions in Asia. Loss of face or social shame is a prominently experienced emotion in Asian cultures, especially in individuals from East Asian and South Asian cultures (Zane & Mak, 2003). Such feelings of social shame can result in higher levels of self-criticism that can act as a risk factor for the development of suicidal thoughts, especially in cultural settings that allow suicide to be considered as an alternative to personal difficulties. Further, the prevalent religions of Asia, Hinduism and Buddhism, present a more accepting stand towards suicide than Islam or Christianity (Ineichen 1998, Conrad & Pacquiao 2005). Acceptance of suicide or personal suffering as part of one's fate (as is the case in Hinduism and Buddhism) or as an alternative to deal with personal difficulty can increase the risk of suicidal thoughts as well as reduce help seeking behavior. Hence, this makes individuals less likely to seek help and can potentially increase their risk of acting on their suicidal thoughts. Since India is predominantly Hindu (79.8%, Census

of India 2011) it makes individuals in India highly vulnerable to suicidal thoughts and less likely to seek help.

Second, beyond the development of suicidal thoughts, certain aspects of Asian culture also play a strong role in the expression and reporting of such thoughts. The importance of maintaining group harmony and the lack of showing weakness or asking for help can potentially result in a greater level of concealment of suicidal thoughts or behaviors. Asian cultures strongly value group harmony and conformity to interdependent roles as opposed to the expression of individuality and individual emotions (Oyserman, Coon, & Kemmelmeier, 2002). This can result in a general attitude of suppressing conflict and preventing free expression of feelings. In a study investigating openness of communication in Asian Americans compared to Caucasian Americans, Asian Americans reported greater difficulty in discussing problems and expressing emotions with their families (Rhee, Chang, & Rhee, 2003). This study had a sample size of 189 adolescents with comparable representation of both ethnic groups and ages. The study was conducted using self-report questionnaires.

Further, previous research strongly indicates that individuals from Asian cultures are less likely to seek mental health services (Yeh et. al. 1994, Young 1998, Zhang et. al. 1998). For instance, Zhang et al. (1998) interviewed 148 Asian Americans and 1332 Caucasian Americans living in Los Angeles and gathered data on disclosure of mental health problems and use of mental health services. Although both groups reported comparable levels of mental disorders (e.g., depression, anxiety disorders), Asian Americans were significantly less likely to seek help from either family or friends (only 11.5%) or from mental health professionals (only 3.8%) than Caucasian Americans (25.3% sought help from family or friends and 25.7% sought help from mental health professionals). Taken together, previous research suggests



that individuals from Asian cultures are more likely to hide their feelings and psychological symptoms, including suicidal ideation.

A more recent study on suicide and help-seeking behavior further emphasizes that even when Asian Americans recognize their suicidal ideation or make suicide attempts, they choose not to express them or seek help (Chu et. al 2011). The study hypothesized that the pathway for seeking help can be classified into three main steps – a) recognition/awareness of the problem, b) decision to seek help and c) selecting a source for seeking help. Cultural norms and beliefs can influence help-seeking behavior at each of these steps. The study captured data at each step of this help-seeking pathway by interviewing 2,095 Asian American adults and 2,554 Latino American adults about their past suicidal behavior and attempts to seek help. The researchers classified each individual into three categories – suicide attempters, suicide ideators, and other psychological disorders without suicide history (i.e., non-suicidal). Results indicated that Asian Americans with a past history of a suicide attempt were significantly less likely (64% of the Asian American suicide attempters) to actually make the decision to get help in any form when compared to Latinos (89%) who had previously attempted suicide. Previous studies also showed that Latin Americans were significantly less likely (45% less likely) to seek help after a suicide attempt as compared to Caucasian Americans (Freedenthal, 2007). Overall, the help-seeking behavior was found to be the lowest amongst Asian Americans when compared to Latin Americans or Caucasian Americans. This evidence indicates that Asian Americans tend to have a lower perceived need for help as well as a significantly lower chance of making the decision to get help even when they perceive a need for help. Within the remaining sample of Asian Americans, there was no difference in help-seeking behavior between past suicide ideators and individuals with

other psychological issues without suicide ideation. This indicates that Asian Americans in general perceive their suicide ideation to be less severe and tend to not disclose their suicidal thoughts to others even when they may seek counseling for other psychological issues. This data reinforced the results reported by Morrison & Downey (2000), which reported that even when Asian Americans do seek counseling at a college counseling center, they tend to under report their suicidal thoughts on the intake forms, especially at the time of active ideation.

Despite research indicating that Asian Americans may be reluctant to report their suicidal thoughts and seek treatment, there are a number of important questions that remain largely unanswered. First, most of the research evidence has been derived from studies conducted on individuals of Asian descent living in the USA as opposed to Asians living in different Asian cultural settings (such as India). In order to explore the role of culture in suicide ideation without the influence of potential acculturation from cross-cultural participants having lived in the United States; it is crucial to conduct cross-country research on suicidal thoughts and behaviors. This can help to clarify the effect of culture on suicidal thoughts without the presence of confounding factors such as acculturation and duration of stay in the USA.

Second, the questionnaires used in prior research to assess suicidal thoughts were developed primarily based on theories and evidence collected on the expression of such thoughts in the western culture. Hence, there may be other potential ways through which such thoughts are being experienced, which the existing questionnaires are unable to tap in to. It could be beneficial to assess suicidal thoughts by asking individuals about suicide through multiple questions that could provide information about the way suicidal thoughts are being experienced in different cultures.

Finally, all the available research has been conducted using explicit self-report measures of suicidal thoughts and behaviors. The results of such reporting of suicidal thoughts and behaviors are being affected by reporting biases such as concealment, lack of insight. Further, given the transient nature of such thoughts, explicit measures can be inadequate in measuring such thoughts and behaviors. Recent studies have reported that individuals have a significantly higher risk of suicide immediately after being released from a hospital (Qin & Nordentoft, 2005) and many patients who die by suicide (approximately 78%) have been found to deny having thoughts of suicide in their last patient-doctor communication preceding their death (Busch, Fawcett, & Jacobs, 2003). These studies highlight the importance of testing the implicit suicidal cognitions as opposed to explicit reporting when attempting to identify individuals at risk for suicide. Furthermore, based on previous research on explicit reporting of suicidal thoughts amongst Asian cultures, there is reason to believe that individuals from Asian cultures may be particularly likely to hide or conceal suicidal thoughts. Therefore, in order to examine the presence of these thoughts in this population, it is necessary to use techniques that go beyond self-report and asking people if they are suicidal.

### Measuring Implicit Suicide Cognition

Implicit association refers to an individual's unconscious, or automatic connection between a concept and an attribute of interest – for example, associations between the self and a particular gender, race or political party (Greenwald et al., 2003). The Implicit Association Test (IAT) is a computer-based reaction-time task that measures these automatic associations by asking individuals to classify words representing one of two concepts (such as flower and insect) and one of two attributes

(such as good or bad) into given categories (Greenwald et al., 2003). The effectiveness of the IAT rests on the theory that replicating a behavioral response, such as pressing a key on the computer, should be easier when the concept and attribute combination are strongly linked (therefore resulting in faster reaction times) (Greenwald et al., 2003). Since the IAT measures reaction times to determine attitudes and associations, which are predominantly beyond individuals' conscious control, these tools can potentially minimize the issue of false reporting.

The IAT has previously been used as a valid measure to tap into implicit associations about a vast variety of constructs. Past research has focused on utilizing the IAT as an implicit measure of attitudes toward and/or identification with different races, genders, political groups, and sexual orientations (Rudman, Ashmore, & Gary, 2001, Nosek, Banaji, & Greenwald, 2002). Recently, studies have also started applying the IAT to concepts of ethics, law and policy making (Banaji, Bazerman, & Chugh, 2003, Banaji and Bhaskar 2000, Chugh 2004). Now, the IAT is also being explored as an effective measure for identifying and assessing psychopathology, especially because the IAT can assess attitudes, values as well as symptoms that may be embarrassing or stigmatizing to report (Palfai & Wagner, 2004; Teachman, Gregg, & Woody, 2001). Tests of implicit cognition may be particularly helpful for identifying individuals at risk for suicide by overcoming the shortcomings of the existing interview and self-report measures of successfully identifying suicidal thoughts and behaviors. These shortcomings include deliberate concealment or denial of suicidal thoughts as well as lack of insight at the time of reporting of such thoughts (Nock & Banaji 2007b, Nock, Prinstein & Sterba 2009).

The Suicide IAT (S-IAT) is an adaptation of the general IAT that measures an individual's implicit association between death/suicide and the self (Nock et al 2010).

Previous studies have used the S-IAT to predict past and future self-injurious behaviors, suicidal thoughts as well as suicide attempts (Nock et al 2010, Nock & Banaji 2007a, Nock and Banaji 2007b). These studies have examined the use of the S-IAT in populations ranging from community samples to inpatient populations (Nock et. al., 2010, Randall et. al., 2013, Nock & Banaji 2007a, Nock & Banaji 2007b). The studies reported that the S-IAT was able to strongly predict past as well as future suicidal attempts. Further, the test was also successful in differentiating between different levels of severity and recency of suicidal thoughts and behaviors (i.e. suicide ideators, suicide attempters and non suicidal individuals who have been experiencing suicidal thoughts in the recent past as opposed to at some point in their life). The study reported a significantly higher S-IAT score for individuals with past year suicide attempts as compared to past year suicide ideation. It also showed that the S-IAT score of individuals with past year suicidal behaviors (ideation or attempt) was higher than the S-IAT score of individuals with only lifetime suicide attempt or ideation. These findings suggest that the S-IAT can be used to capture the incremental levels of severity as well as recency in the presence of implicit suicidal cognitions. Further, this measure was also effective in improving the incremental predictability of a model, including common risk factors such as presence of mood disorders, substance use, a prior history of suicide ideation and attempts, and baseline level of self-reported suicide ideation. This measure has been established as a valid predictor of suicidal ideation and attempts in studies conducted in the USA (Nock et. al., 2010), Canada (Randall et. al., 2013) and Australia (Harrison et. al., 2014), suggesting a potential cross-cultural validity of the S-IAT in assessing suicidal thoughts and behaviors.

Despite the potential benefits of using the S-IAT, there are no cross-national studies that have used the S-IAT to measure suicidal ideation and behaviors in Asian cultures. Further, there are only two studies, which have utilized a version of the IAT to measure intergroup bias and self-esteem in community populations of Hong Kong and Japan (Lam et al., 2007, Szeto et al., 2009) and none that have used the S-IAT. Although these validate the effectiveness of the IAT in Asian cultures, the specific versions used to measure suicidal behavior or thoughts have not yet been used in Asian countries. Given the lack of research on suicide ideation and behaviors in different cultures, along with cultural variability in reporting or expressing such thoughts, using the IAT to measure associations between suicide and the self shall help provide a more accurate and objective understanding of suicidal thoughts and behaviors across cultures. Hence, for this cross-cultural study on suicide ideation, an adaptation of the IAT that has been reported to predict suicide ideation and attempts will be used.

### Study Aims & Hypotheses

This study aims to address current gaps in the research on cross-cultural suicidal thoughts and behaviors, specifically between India and the USA, by focusing on the following main aims:

#### Aim 1

This study aims to examine the differences in explicit reporting of suicidal thoughts and behaviors between the USA and India. Given the limitation of existing research on international suicide rates especially in Asian countries as well as the cultural variability in expression of suicidal thoughts that shows lower explicit reporting in

Asian Americans, I predicted greater explicit reporting of suicidal thoughts and behaviors in the USA as compared to India.

#### Aim 2

This study aims to investigate the differences in implicit association of suicidal thoughts via the Death/Suicide IAT (S-IAT) between the USA and India. Based on existing literature that suggests underreporting of mental health symptoms, including suicidal thoughts and attempts, among Asian Americans in the USA, I hypothesized that the implicit reports of suicide ideation would be comparable between India and the USA.

#### Aim 3

This study aims to compare the strength of the association between the explicit and implicit reports of suicide ideation between the USA and India. Given the hypothesized divergence between the implicit and explicit reports of suicidal thoughts in India (but not in the USA), I predicted that explicit and implicit reports of suicide ideation would show a stronger association in the USA sample than the association in the sample from India.

Further, in order to explore the factors contributing to any significant cultural differences in explicit reporting of suicidal thoughts, but not implicit reporting, I examined the relationship between the degree of religiosity with explicit and implicit suicidal thoughts as a potential explanation for the discrepancies between the implicit and explicit reporting between India and the USA. Based on previous research on religious differences in the outlook towards suicide as an alternative to dealing with one's difficulties, it was hypothesized that the degree of religiosity would be

positively correlated with implicit as well as explicit suicide ideation in the Indian sample that endorses Hinduism. However, it was expected to be negatively correlated with implicit and explicit suicide ideation in the USA sample endorsing Christianity, Judaism and Islam. In other words, I expected to see an increase in suicide ideation with rise in religiosity in the Indian Hindu sample and a decrease in suicide ideation with rise in religiosity in the USA non-Hindu sample.

#### Aim 4

This study aims to test the feasibility of using the Death/Suicide IAT (S-IAT) in India as a measure of implicit suicidal associations. I hypothesized that the S-IAT should be a feasible measure for assessing implicit suicide-related cognition across different cultural settings, including India. This shall be done by investigating whether the S-IAT scores are able to successfully differentiate between individuals with a high level of recent suicide ideation i.e. past year suicide attempters and individuals with low or no recent suicide ideation i.e. non-attempters.

#### Significance of Study

Cross-national studies examining the role of culture on reporting of suicidal thoughts and behaviors are very limited. Within the limited research, there are even fewer studies representing different Asian and South East Asian countries (Nock et al., 2008, Eskin 2011). This study aims to bridge the current gap in cross-cultural analysis of suicidal thoughts and behaviors. The results of this study can potentially aid in understanding reporting patterns of suicidal thoughts and behaviors across cultures. Hence, they can help in identifying better ways of detecting individuals at risk for suicide across cultural settings. If there is a divergence in these reports,



whereby individuals do not explicitly report suicidal thoughts but the implicit measures indicate greater self-identification with death and suicide, then this would support the need for alternative methods for identifying suicidal thoughts. This could improve the ability to detect individuals at suicidal risk in South Asian countries. This study would also help to improve the understanding of factors influenced by culture that may impact the detection of suicidal thoughts in different parts of the world. Hence, it would assist in early identification and ultimately prevention of suicidal behaviors across cultural boundaries. If the data does not support my hypotheses (i.e., cultural setting does not moderate the explicit reporting of suicide ideation), it would support the universality of a standard method for identifying suicidal thoughts and potential behaviors. Finally, this study may provide preliminary support for the use of implicit measures of suicide cognition, such as the S-IAT, in India.

Of note, the current study assessed individuals born and living in significantly different cultural settings i.e. India and USA. This study can potentially test the association between culture and suicide ideation without the influence of potential acculturation from cross-cultural participants having lived in the United States of America. Therefore, a strength of the current study design is that it may provide a clearer picture of the effect of culture on suicidal thoughts without the presence of confounding factors such as acculturation and duration of stay in the United States.

## Chapter II

### Method

The study was conducted using an online study format that included questionnaires (explicit measures) as well as a computer-based reaction-time task (implicit measure) administered via Qualtrics for the survey components and Inquisit 4 Web for the computer task. The target sample was 500 participants, 250 participants from each country, with an equal representation of males and females. Participants were recruited through Amazon Mechanical Turk, by specifically targeting individuals born and currently located in India and USA (see inclusion criteria below).

### Participants

A total of 520 participants completed the study, with 259 (50.2% Female) from the USA and 256 (42.2% Female) from India. Inclusion criterion for participation were: 18 years of age or older, fluent in English, and birth country of either India or the United States of America. Participants were excluded if they had any vision impairment or physical handicap that could interfere with their completion of a computer-based task, a history of serious head injury, or if they did not have Internet or computer access for 25 minutes or more,. In order to maintain racially homogenous samples, non-Asian participants were excluded from the Indian sample and non-Caucasian participants were excluded from the USA sample. Participants were screened with respect to the inclusion and exclusion criterion using an eligibility screener, that was presented after consent but before any measures were administered.

Further, once data collection was complete, data was cleaned to exclude any participants who did not meet the inclusion criteria. In addition, the data set was screened for inconsistent or fake responding patterns (described below) and these participants were excluded.

From the enrolled sample, a total of 139 participants were excluded.

Participants were excluded for the following reasons: non-Caucasian USA participants (30.9%), non-Asian Indian participants (7.9%) non-usable data on the behavioral task [invalid IAT scores (36%)], duplicate entries (1.4%), inconsistent responses across measures (18.7%), and responses completed in less than 30% of the median completion time (5%). The excluded sample consisted of 49.6% females and 50.4% males. 58.2% of the excluded participants were from the USA while 41.8% were from India. The average age of the excluded sample was 30.20 of age ( $SD = 9.28$ ), while the average age of the included sample was 34.82 ( $SD = 11.07$ ). There were no gender differences between included and excluded participants ( $\chi^2 [1,520] = 1.15, p = .29$ , Cramer's  $V = .05$ ). However, the excluded sample was slightly younger than the included sample ( $t [518] = 3.23, p = .001$ , Cohen's  $d = .28$ ).

## Measures

The study protocol included various measures to capture explicit and implicit suicide ideation as well as various risk factors associated with suicidal thoughts and behaviors.

### Explicit Measures of Suicidal Thoughts and Behaviors

*Self-Injurious Thoughts & Behaviors Interview*: Explicit suicidal thoughts and behaviors were measured using specific sections of the Self Injurious Thoughts &

Behaviors Interview (SITBI; Nock, Holmberg, Photos, & Michel 2007) in a self-report questionnaire format. The SITBI was originally designed as a structured clinical interview to assess presence, frequency, and severity of self-injurious thoughts and behaviors. In previous research, the SITBI has been found to have good psychometric properties, including strong inter-rater reliability ( $\kappa = 0.99$ ), test-retest reliability ( $\kappa = 0.70$ ), and robust construct validity for suicide ideation and suicide attempts ( $\kappa = 0.65$ ,  $\kappa = 0.54$ ). Previous studies have used specific sections of the SITBI in questionnaire format and reported good psychometric properties (Latimer, Meade, & Tennant 2013, Harrison et al., 2014). The SITBI has been validated as a strong measure within clinical and non-clinical samples across different demographics in the USA (Nock, Holmberg, Photos, & Michel 2007, Harrison et al., 2014). In the current study, lifetime and past-year suicidal thoughts and behaviors were coded as dichotomous Yes/No.

*Multi-Level Suicide Ideation:* In addition to the SITBI, explicit suicide ideation was also measured using a multi-level questionnaire that asks about lifetime and past-year presence of gradations of suicidal thoughts ranging from passive ideation such as “I wish I could disappear” to strongly active ideation such as “I should kill myself”. The multi-level suicide ideation series of questions was used to explore how individuals from different cultures may express suicidal thoughts and behaviors. This questionnaire was utilized to examine whether individuals from India tend to express a passive ideation at a greater frequency instead of expressing active thoughts of suicide ideation.

*Explicit association with Death vs. Life:* Participants were asked how strongly they associate themselves with death vs. life on a 9 point Likert-type scale ranging from -4 = “very strongly associate with death” to 4 = “very strongly associate with life”. This

measure was used to quantify the participants' explicit association with death vs. life for comparison with their implicit associations as measured by the S-IAT.

### Implicit Measure of Suicidal Ideation

Implicit associations with death and suicide were measured using the Death/Suicide Implicit Association Task (S-IAT; Nock et al. 2010). The S-IAT is a computer-based task that assesses an individual's self-identification with death and suicide by measuring individuals' reaction times for classifying word stimuli representing life vs. death/suicide. For the current study, the S-IAT was administered as an online computer task. Participants sorted word stimuli that represented one of two concepts "Death" (such as dead, suicide, die, lifeless, deceased) and "Life" (live, survive, thrive, alive, breathing) or one of two attributes of "Me" (such as I, myself, mine, my, self) and "Not Me" (such as they, them, their, theirs, other). The main dependent measure in the S-IAT is the difference, or D-score, that was computed by using the response latencies recorded in the critical blocks (i.e., blocks that consisted of trials where "Death" and "Me" were paired together vs. trials where "Life" and "Me" were paired together). Positive D-scores were obtained when individuals responded faster on the "death/me" critical blocks as compared to the "life/me" critical blocks, indicating a stronger implicit association between suicide/death and the self. Conversely, negative D-scores were obtained when individuals responded faster on the "life/me" blocks as compared to the "death/me" blocks, indicating a stronger association between life and the self. The S-IAT was administered and scored in accordance with the standard procedures for IATs (Greenwald et al., 2003) and in line with previous research using the S-IAT (Nock et al., 2010). Consistent with scoring guidelines for IATs (Nock et al 2010, Greenwald et al. 2003),

participants' S-IAT data was excluded if: (a) more than 10% of reaction times were less than 300ms across all critical blocks, (b) more than 25% responses of trials in any individual critical block (i.e., blocks that consisted of trials where "Death" and "Me" were paired together vs. trials where "Life" and "Me" were paired together) less than 300 ms, (c) more than 30% overall error rate, or (d) more than a 40% error rate in any individual critical block. The computer task was coded using a script from Inquisit Software based on the specification given in Nock et al. (2010). This version of the IAT has been shown to have internal validity as well as high sensitivity to clinical change (Nock et al 2010).

#### Risk Factors for Suicidal Thoughts & Behaviors

*Depressive Symptoms:* The Center of Epidemiologic Studies – Depression (CES-D) Scale was used to measure depressive symptoms. This scale is a short self-report questionnaire, which has been shown to have strong internal consistency, test-retest reliability, and construct validity across general samples of adults (Radloff 1977). The CES-D presents a list of statements and asks individuals to respond by choosing how often they have felt each statement in the past week.

*Presence of Psychopathology:* General psychopathology was measured using the Brief Symptom Inventory-18 Questionnaire (BSI-18; Derogatis, 2001). This self-report questionnaire presents the respondents with 18 descriptions of physical or emotional complaints and then asks them to rate the extent to which each complaint troubles them. The BSI-18 measures psychopathology across three dimensions – anxiety, somatization, and depression. The BSI-18 has shown high internal consistency and construct validity in community samples in culturally diverse populations (Prelow et al., 2005, Harrison et al., 2014).

*Self-Criticism:* Self-criticism was measured using the Self-Rating Scale (SRS; Hooley et al., 2002). This is an 8-item scale that measures how critically individuals view themselves. The questionnaire presents statements such as “sometimes I feel completely worthless” to the respondent and asks them to respond on a 7-point scale. The 7-point scale ranges from 1 that denotes “strongly disagree” and 7 for “strongly agree”. This scale has reported good internal consistency in past studies (Cronbach’s  $\alpha = 0.88$ , Glassman et al., 2007).

*Parenting Behaviors:* Perceptions of key parenting behaviors were measured using the Measurement of Parental Style (MOPS; Parker et al., 1997). This is a 15-item questionnaire that measures participants’ perceptions of their parents’ behaviors towards them before the age of 16 years. The MOPS assesses parenting behaviors in three domains (subscales): parental indifference, abuse and over control. A Likert-type scale is used for each item ranging from 0 (not true at all) to 3 (extremely true). Higher MOPS scores indicate higher levels of negative parenting, while lower MOPS scores indicate lower levels of negative parenting. This measure has been reported to have an acceptable test-retest reliability and internal validity. For all of the scales, Cronbach's  $\alpha$  was above .60, indicating that they had acceptable internal validity; alphas for the combined subscales were found to range from 0.72 to 0.90, hence showing a good level of internal validity (Parker et al., 1997).

*Parental Criticism:* Perceived parental criticism was measured using the Perceived Criticism Scale (PCS, Hooley & Teasdale 1989). This is a 4-item scale with questions regarding the perception of criticism from a specific individual (e.g., “How critical do you think your mother is of you?”, “When your mother criticizes you, how upset do you get”). Each question is measured on a 10-point scale, with 0 denoting “not at all critical” and 10 denoting “extremely critical” This scale evaluates the level of

perceived parental criticism as well as its effect on the individual. This measure has reported good internal consistency and reliability in past studies (Cronbach's  $\alpha = 0.74$ , Glassman et al., 2007).

## Procedure

The study was conducted using three main protocols – data collection protocol, study protocol and the data cleaning protocol.

### Data Collection

Data was collected from the online user population on Amazon Mechanical Turk (Mturk) — an online crowdsourcing platform that allows registered online workers to complete short computerized tasks and surveys in return for small sums of money. “Requesters” looking to hire Mturk workers can post a short description that includes the duration, payment amount, eligibility requirements and other details about the task. Along with being a low cost and time efficient platform for conducting research, Mturk provides researchers with access to a large participant pool. This makes it an extremely attractive platform to conduct online social and psychological research.

Demographic studies on the Mturk workforce suggest that Mturk has approximately 500,000 registered workers across 190 countries. A majority of this population is based in the USA and India, with approximately 47% of the workforce located in the USA, 34% located in India and the remaining 19% distributed across the rest of the world (Paolacci et al 2010, Ross et al., 2010, Paolacci & Chandler 2014). The demographic break down of Mturkers shows that majority (70%) of Indian Mturkers are male, whereas majority in the USA (65%) are female. The age break



down shows that there is an overrepresentation of younger workers in both India and USA, with majority of the workers falling between the ages of 25 to 35 years.

A comparison of Mturk participants to other online study samples and college participant pools suggests that Mturk participants are more demographically diverse, with a greater representation of non-White participants (36%), and a marginally greater representation of females (55%; Paolacci & Chandler 2014, Buhrmester et al., 2011, Gosling et al., 2004). Research examining personality differences between Mturk workers and general community samples shows similarities to the differences between frequent Internet and non-internet users. Mturk workers have been reported to be less extroverted, more socially anxious and less emotionally stable (Goodman, Cryder, & Cheema, 2013; Kosara & Ziemkiewicz, 2010; Shapiro et al., 2013, Goodman et al., 2013) but have similar levels of clinically significant emotional dysregulation as reported in general community populations (Shapiro et al., 2013).

Evidence suggests that Mturk can be used as a reliable and valid platform to conduct a wide range of studies including survey studies, studies including various behavioral tasks such as the Stroop task (Crump et al, 2013, Buhrmester et al., 2011), as well as behavioral linguistic assessments (Jasmin et al., 2012, Schnoebelen et al., 2010). Several studies have tested the reliability and validity of the data collected using Mturk, suggesting high test-retest reliability ( $r_s = 0.80-0.94$ ) over a two-week time period, high validity (Cronbach's  $\alpha$  ranging from 0.73 - 0.93) as well as good internal consistency (Burhmester et al 2011, Behrend et al., 2011).

In addition to providing a fast and low cost platform for data collection, Mturk provides a significantly high level of anonymity to its workers and gives requesters the chance to recruit individuals with specific characteristics. This makes Mturk an extremely useful tool for collecting information about sensitive and stigmatized

behaviors and symptoms. Previous research examining clinical symptoms using Mturk have also confirmed high data quality by reporting high reliability and consistency of responses on clinical symptom measures including BDI ( $\alpha = 0.9$ ,  $r = 0.87$ ), BAI ( $\alpha = 0.93$ ), LSAS ( $\alpha = 0.97$ , Kessler, Chiu, Demler, & Walters, 2005). The analysis of the clinical symptom reporting showed that the level of clinical depression (approximately 5%) and generalized anxiety (approximately 2.9%) reported by the Mturk sample was comparable to the prevalence rates found in the general USA population (7% for depression and 3.1% for anxiety; Kessler, Chiu, Demler, & Walters, 2005).

#### Study Protocol

Interested participants were provided with an online link to the survey through Mturk. Participants first gave consent through an online consent form, which informed the individuals about the general purpose of the study, the tasks they would complete in the survey, the total duration of the survey, and the confidentiality of their responses. Following consent, participants were forwarded to the eligibility screener (i.e., English proficiency, age, country of birth, access to computer, absence of vision impairment or any other physical/medical condition that could interfere with the completion of the study survey). All participants who qualified for the study were then redirected to complete a demographic and background questionnaire, assessing age, gender, ethnicity, country of birth, country of citizenship, current country of residence as well as the duration of residence in the current location, educational level, socioeconomic status, marital status, religion, and degree of religiousness (i.e., religiosity). Next, participants completed an online version of the S-IAT. Participants were redirected to Qualtrics where they completed the remaining self-report measures

(see Measures section). After completing all study measures, participants were directed to a debriefing page that provided them information about the study objectives as well as a list of referrals and resources in case they were having thoughts of suicide (including online forums, helpline numbers as well as medical centers that they could visit in their specific country). Each participant took approximately 25 minutes to complete the study protocol and was paid \$2 (USD) via Mturk.

#### Data Cleaning Protocol

After data collection was complete, the following procedures were followed for cleaning the data. First, based on the inclusion/exclusion criteria, participants were excluded if they were not born in India or the USA. Within the Indian sample, all non-Asian individuals were excluded and within the USA sample all non-Caucasian individuals were excluded. All data from participants with invalid IAT scores (consistent with the scoring algorithm described in Greenwald et al. 2003, see Methods section) were excluded from the analyses. Next, any duplicate data entries and any responses where the total completion time was less than 1/3 of the median completion time (i.e., less than 3 minutes) were excluded. Finally, in order to check for inconsistent and invalid responses on the self-report measures, I checked for consistency of responses across the different questionnaires that were completed by each individual and excluded any participant data that showed inconsistency in responses across measures. This included inconsistency in reporting age, suicide ideation, and suicide attempts across two different measures. These data cleaning procedures were in accordance with usual methods used for cleaning data collected through online surveys sites such as Mturk (Paolacci et al., 2010).

## Data Analysis

Data Analysis was conducted separately for each study aim, followed by any exploratory analysis necessary.

### Aim 1

In order to investigate the differences in explicit reporting of suicidal thoughts and behaviors between the Indian sample and the USA sample, a series of Pearson's chi-squared tests were used to examine differences in the prevalence of reported suicidal thoughts and behaviors in the two countries.

### Aim 2

A 2 (India, USA) x 3 (control, ideator, attempter) ANOVA was conducted to compare implicit self-identification with death/suicide across the two countries as a function of suicide history. This analysis examined group differences between the two countries for each subgroup of explicit suicidal reporting as well as the group differences in mean IAT scores between the 3 groups of suicide reporting (i.e. controls, ideators and attempters).

### Aim 3

To compare the strength of the association between the explicit and implicit suicidal thinking, Spearman's rank correlations were used to examine the convergence between explicit measures of suicidal thoughts and behaviors (i.e., death-life association score, frequency of suicide ideation in lifetime, frequency of suicide ideation in the past year, frequency of suicide attempts in lifetime and frequency of suicide attempts in past year), and the implicit measure of suicidal thinking (i.e., S-

IAT score for both countries). Since the explicit measures as well as the S-IAT scores were not normally distributed, a non-parametric measure of correlation (Spearman's rank) was utilized instead of a Pearson's correlation coefficient.

An exploratory analysis was performed to examine one potential explanation for the implicit-explicit reporting differences between India and the USA – relationship between dominant religions in each country, religiosity level, and suicide ideation. A 2(India, USA) X 3 (control, ideator, attempter) ANOVA was conducted to compare differences in religiosity level. Further a 2-way ANOVA was conducted to compare differences in implicit self-identification with suicide/death across the two countries as a function of religiosity level. This analysis was conducted between a subgroup of individuals who endorsed Hinduism in India and a subgroup of individuals endorsing religions other than Hinduism & Buddhism i.e. Christianity, Judaism, or Islam in the USA. This demarcation was based on the basis of the difference in ideology of these religions with respect to suicide.

#### Aim 4

In order to test the feasibility of using the S-IAT for assessing the implicit associations with suicide in India, I examined the results of the 2-way ANOVA analysis (conducted to test Aim 2) to compare the mean group differences in the IAT scores between the control group, the ideator group and the attempter group that were obtained from the 2 way ANOVA conducted earlier. Further since the IAT captures recency as well as severity of suicide ideation, I also compared the mean IAT scores between the past year suicide ideators, past year attempters and non-suicidal controls in the Indian sample.

## Chapter III

### Results

The final sample included in this study consisted of 381 participants: 181 individuals from USA and 200 from India. The demographic details of the sample are shown in Table 1. The two countries showed comparable gender ratios ( $\chi^2 [1, N = 381] = 1.39, p = 0.238$ , Cramer's  $V = .06$ ) while the USA sample showed a higher mean age than the Indian sample ( $t [379] = 4.15, p = 0.001$ , Cohen's  $d = 0.43$ ). Consistent with the inclusion criterion, all participants from the USA sample identified as White Caucasian and all Indian participants identified as Asian.

**Table 1**

#### *Demographic Analysis*

Variables	Total	USA	India	
Sample Size	381	181 (47.5%)	200 (52.5%)	
Age: Mean (SD)	34.82 (11.07)	37.24(11.85)	32.63(9.83)	
Gender: Female (%)	169 (44.4%)	86 (47.5%)	83 (41.5%)	
Religion	Christianity	87 (22.8%)	61 (33.7%)	26 (13.0%)
	Hinduism	148 (38.8%)	1 (0.6%)	147 (73.5%)
	Agnostic/Atheist	49 (12.9%)	46 (25.4%)	3 (1.5%)
	Buddhism/Jainism	9 (2.4%)	7 (3.9%)	2 (1.0%)
	Judaism	2 (0.5%)	2 (1.1%)	0 (0%)
	Islam	16 (4.2%)	2 (1.1%)	14 (7.0%)
	Other	12 (3.1%)	8 (4.4%)	4 (2.0%)
	NA	57 (14.9%)	53 (29.2%)	4 (2.0%)
Sexual Orientation	Heterosexual	331 (86.9%)	161 (88.9%)	170 (85.0%)
	Homosexual	13 (3.4%)	9 (4.9%)	4 (2.0%)
	Bisexual	28 (7.3%)	11 (6.1%)	17 (8.5%)
	Prefer not to answer	9 (2.3%)	0 (0%)	9 (4.5%)

*Note:* This table presents the demographic break down of the Indian and the USA sample.

## Suicide Related Risk Factors

Table 2 provides some descriptive analysis showing the presence of some common risk factors related to suicide ideation. The Indian and USA samples did not show any significant gender differences ( $p = .238$ ), but were significantly different in the prevalence of NSSI ( $p = .004$ ), level of depression symptomology ( $p = .050$ ), as well as presence of general psychopathology ( $p = .002$ ). India reported higher levels of depression as well as level of psychopathology, but lower presence of reported NSSI. Differences in presence of psychopathology were also significantly different between the two countries, when examined in the suicide ideator ( $p = .001$ ) and attempter groups separately ( $p = .069$ ), with the level of psychopathology being consistently higher in the Indian sample.

## Explicit Reporting of Suicidal Thoughts and Behaviors

Table 3 displays the detailed differences in explicit reporting of suicidal thoughts and behaviors between the USA and India. A chi-squared analysis indicated that the Indian sample had a significantly lower prevalence rate of both lifetime suicide ideation ( $p = .001$ ) as well as past year suicide ideation ( $p = .001$ ). In the USA sample, 49% of participants reported lifetime suicide ideation and 27% reported suicide ideation in the past year. In comparison, the Indian sample reported significantly lower prevalence of both lifetime suicide ideation (24%) and past year suicide ideation (15%). In addition to explicit suicide ideation, the range of passive (such as “I wish I could disappear or not exist” or “I wish I was never born”) and active suicidal thoughts (such as “Maybe I should kill myself” or “I should kill myself”) reported using the Multi-level suicide ideation questionnaire were reported

**Table 2*****Risk Factors Related To Suicide Ideation & Attempts***

<b>Total Sample</b>					
<b>Known Risk Factors</b>	<b>USA</b>	<b>India</b>	<b>Statistical Test</b>	<b><i>p</i></b>	<b>Effect size*</b>
Gender – Female	47.5%	41.5%	$\chi^2$ (1, N = 381) = 1.39	.238	.06
Presence of Non-suicidal Self-Injury	24.3%	13.0%	$\chi^2$ (1, N = 381) = 8.10	.004	.15
Depression (CESD)	12.17 (11.44)	14.50 (11.62)	$t$ (376.33) = 1.97	.050	.20
Psychopathology (BSI)	9.97 (11.69)	14.53 (16.14)	$t$ (379) = 3.12	.002	.32
Self Criticism (SRS)	23.20 (11.56)	21.37 (11.49)	$t$ (374.2) = 1.55	.123	.16
Mother’s Parenting Style (MOPS)	9.05 (9.17)	7.70 (7.29)	$t$ (379) = 1.6	.110	.16
Father’s Parenting Style (MOPS)	10.12 (10.29)	7.39 (7.76)	$t$ (379) = 2.94	.004	.30
Perceived Criticism - Mother	4.84 (2.86)	4.02 (2.99)	$t$ (377.92) = 2.73	.007	.28
Perceived Criticism - Father	4.71 (2.99)	3.91 (2.72)	$t$ (365.35) = 2.71	.007	.28
<b>Lifetime Suicide Ideators</b>					
<b>Known Risk Factors</b>	<b>USA</b>	<b>India</b>	<b>Test</b>	<b><i>p</i></b>	<b>Effect size</b>
Gender – Female	44.8%	48.6%	$\chi^2$ (1, N = 102) = .13	.715	.03
Presence of Non-suicidal Self-Injury	32.8%	25.7%	$\chi^2$ (1, N = 102) = .55	.458	.07
Depression (CESD)	16.36 (12.17)	21.89 (11.23)	$t$ (74.15) = 2.29	.025	.53
Psychopathology (BSI)	14.13 (11.72)	25.00 (18.11)	$t$ (100) = 3.66	.001	.73
Self Criticism (SRS)	29.00 (11.10)	29.77 (10.66)	$t$ (71.62) = .34	.733	.08
Mother’s Parenting Style (MOPS)	10.90 (10.33)	11.57 (8.23)	$t$ (83.77) = .36	.720	.08
Father’s Parenting Style (MOPS)	11.78 (10.84)	11.29 (8.81)	$t$ (82.5) = .25	.806	.05
Perceived Criticism - Mother	5.10 (2.94)	5.17 (2.68)	$t$ (74.93) = .29	.908	.07
Perceived Criticism - Father	4.68 (3.04)	5.09 (2.50)	$t$ (81.58) = .71	.480	.16
<b>Lifetime Suicide Attempters</b>					
<b>Known Risk Factors</b>	<b>USA</b>	<b>India</b>	<b>Test</b>	<b><i>p</i></b>	<b>Effect size</b>
Gender – Female	63.6%	57.1%	$\chi^2$ (1, N = 36) = .15	.697	.07
Presence of Non-suicidal Self-Injury	50%	50%	$\chi^2$ (1, N = 36) = .00	1.00	.00
Depression (CESD)	21.50 (13.29)	27.71 (15.63)	$t$ (24.50) = 1.23	.210	.50



Psychopathology (BSI)	19.36 (16.91)	31.93 (20.71)	$t(23.72) = 1.90$	.069	.78
Self Criticism (SRS)	30.50 (13.29)	32.07 (13.71)	$t(27.2) = .34$	.737	.13
Mother's Parenting Style (MOPS)	13.14 (9.79)	11.57 (8.95)	$t(29.7) = .49$	.626	.18
Father's Parenting Style (MOPS)	15.36 (10.33)	9.36 (11.02)	$t(26.5) = 1.63$	.114	.63
Perceived Criticism - Mother	5.32 (3.24)	4.71 (3.15)	$t(28.45) = .55$	.584	.21
Perceived Criticism - Father	5.72 (3.13)	3.57 (2.50)	$t(32.11) = 2.28$	.029	.80
<b>Past Year Suicide Ideators</b>					
<b>Known Risk Factors</b>	<b>USA</b>	<b>India</b>	<b>Test</b>	<b>p</b>	<b>Effect size</b>
Gender – Female	40.9%	40.9%	$\chi^2(1, N = 66) = .00$	1.00	.00
Presence of Non-suicidal Self-Injury	36.4%	36.4%	$\chi^2(1, N = 66) = .00$	1.00	.00
Depression (CESD)	23.05 (11.32)	26.59 (11.10)	$t(42.86) = 1.22$	.231	.37
Psychopathology (BSI)	19.275(11.53)	27.23 (14.63)	$t(34.45) = 2.10$	.044	.72
Self Criticism (SRS)	34.55 (10.87)	33.58 (9.99)	$t(45.43) = .32$	.749	.09
Mother's Parenting Style (MOPS)	10.77 (8.69)	11.45 (8.75)	$t(41.82) = .29$	.766	.09
Father's Parenting Style (MOPS)	16.64 (11.60)	12.00 (8.92)	$t(53.03) = 1.80$	.078	.49
Perceived Criticism - Mother	5.05 (3.20)	5.18 (2.87)	$t(46.4) = .18$	.862	.05
Perceived Criticism - Father	5.25 (3.27)	4.59 (2.81)	$t(48.35) = .85$	.399	.24
<b>Past Year Suicide Attempters</b>					
<b>Known Risk Factors</b>	<b>USA</b>	<b>India</b>	<b>Test</b>	<b>p</b>	<b>Effect size</b>
Gender – Female	40.0%	85.7%	$\chi^2(1, N = 12) = 2.74$	.098	.48
Presence of Non-suicidal Self-Injury	80.0%	71.4%	$\chi^2(1, N = 12) = .11$	.735	.09
Depression (CESD)	30.0 (14.02)	25.0 (17.14)	$t(9.7) = .55$	.592	.35
Psychopathology (BSI)	34.60 (24.84)	36.57 (24.15)	$t(8.8) = .14$	.896	.09
Self Criticism (SRS)	38.60 (8.91)	30.29 (13.04)	$t(9.9) = 1.31$	.219	.83
Mother's Parenting Style (MOPS)	15.60 (14.36)	11.57 (9.85)	$t(6.64) = .54$	.605	.42
Father's Parenting Style (MOPS)	11.40 (8.96)	10.29 (12.85)	$t(9.9) = .18$	.863	.11
Perceived Criticism - Mother	5.8 (4.02)	3.86 (2.34)	$t(5.93) = .97$	.370	.80
Perceived Criticism - Father	4.2 (1.64)	3.71 (2.06)	$t(9.79) = .45$	.660	.29

*Note:* This table displays the mean scores for the country samples for various risk factors of suicidal behaviors. Effect size is calculated using Cohen's *d*, for two sample *t* tests, Eta-squared for ANOVA analysis and Cramer's *V* for chi-squared analysis.

at a significantly higher rates in the USA sample as compared to the India sample (see Table 3). An additional question that had been added in order to capture a culturally different way of expressing suicidal thoughts (i.e. "My existence is a burden/shame to my family") also showed higher rates of reporting in the USA sample as compared to the India sample.

In addition to explicit suicidal thoughts, explicit reporting of suicidal and non-suicidal self-injurious behaviors were also endorsed at higher rates in the USA than in India. More individuals in the USA reported a lifetime suicide attempt (12.2%) as compared to the Indian sample (7.0%), but these differences did not reach the threshold for statistical significance ( $p = .086$ ). Lifetime NSSI and past-year NSSI were reported at higher rates in the USA sample than the Indian sample ( $p = .004$  and  $= .011$ , respectively).

An additional analysis was conducted to examine differences in suicide ideation reporting specifically among past year suicide attempters in the two countries. The details of the reporting differences in the chi-squared analysis for each level of the Multi-Level Suicide Ideation Questionnaire are summarized in Table 4. Although all the statements were endorsed at a lower rate in the suicide attempter subgroup of the Indian sample, the only suicidal thought that showed a significant difference in reporting levels was "I wish I was dead" ( $p = .008$ ). Only 71.4% of the suicide attempters in the Indian sample reported thinking "I wish I was dead" as compared to a 100% of the suicide attempters in the USA sample.

**Table 3**

***Explicit Reporting of Suicidal Thoughts & Behaviors***

<b>Reported Suicide Thoughts: Lifetime</b>						
	<b>Total</b>	<b>USA</b>	<b>India</b>	<b>Statistical Test</b>	<b>p</b>	<b>Effect Size*</b>
“Have you ever had thoughts of killing yourself (SITBI)”	36.2%	49.2%	24.5%	$\chi^2(1,381) = 25.03$	.001	.26
“I wish I could disappear or not exist”	47.5%	56.4%	39.5%	$\chi^2(1,381) = 10.82$	.001	.17
“I wish I was never born”	36.0%	41.4%	31.0%	$\chi^2(1,381) = 4.49$	.034	.11
“My life is not worth living”	39.9%	46.4%	34.0%	$\chi^2(1,381) = 6.10$	.014	.13
“My existence is a burden/shame”	25.7%	33.1%	19.0%	$\chi^2(1,381) = 9.96$	.002	.16
“I wish I was dead”	42.5%	51.9%	34.0%	$\chi^2(1,381) = 12.50$	.000	.18
“Maybe I should kill myself”	31.5%	41.4%	22.5%	$\chi^2(1,381) = 15.79$	.000	.20
“I should kill myself”	28.1%	35.4%	21.5%	$\chi^2(1,381) = 9.04$	.003	.15
Death vs. Life Assoc.: Mean (SD)	1.50 (2.15)	1.76 (1.93)	1.27 (2.33)	$U(381)=16273$ .5, $z = -1.75$	.081	$r = -.09$
<b>Reported Suicidal Thoughts: Past Year</b>						
	<b>Total (%)</b>	<b>USA (%)</b>	<b>India (%)</b>	<b>Statistical Test</b>	<b>p</b>	<b>Effect Size</b>
“Have you had thoughts of killing yourself in the past year (SITBI)”	20.5	27.1	14.5	$\chi^2(1,381) = 9.22$	.002	.16
Past Year- “I wish I could disappear”	29.9	34.8	25.5	$\chi^2(1,381) = 3.93$	.048	.10
Past Year- “I wish I was never born”	21	21	21	$\chi^2(1,381) = .00$	.999	.00
Past Year- “My life is not worth living”	25.2	27.1	23.5	$\chi^2(1,381) = .64$	.423	.04
Past Year- “My existence is a shame”	17.8	22.1	14.0	$\chi^2(1,381) = 4.25$	.039	.07
Past Year- “I wish I was dead”	26.2	30.4	22.5	$\chi^2(1,381) = 3.05$	.081	.09
Past Year- “Maybe I should kill myself”	18.6	22.7	15.0	$\chi^2(1,381) = 3.67$	.055	.10
Past Year- “I should kill myself”	16.3	17.7	15.0	$\chi^2(1,381) = .50$	.479	.04
<b>Reported Suicide Attempts</b>						
	<b>Total (%)</b>	<b>USA (%)</b>	<b>India (%)</b>	<b>Statistical Test</b>	<b>p</b>	<b>Effect Size</b>
Lifetime Suicide Attempters	9.4	12.2	7.0	$\chi^2(1,381) = 2.95$	.086	.09

Past Year Suicide Attempters	3.1	2.8	3.5	$\chi^2(1, 381) = .17$	.681	.02
<b>Reported Non-Suicidal Self-Injury</b>						
	<b>Total (%)</b>	<b>USA (%)</b>	<b>India (%)</b>	<b>Statistical Test</b>	<b>p</b>	<b>Effect Size</b>
Lifetime Non-Suicidal Self-Injury	18.4	24.3	13.0	$\chi^2(1, 381) = 8.10$	.004	.15
Past Year Non-Suicidal Self-Injury	9.2	11.0	7.5	$\chi^2(1, 381) = 9.02$	.011	.15

*Note:* This table reports the levels of explicit reporting of suicidal thoughts and behaviors between the India and the USA sample using the SITBI as well as the multi-level suicidal thoughts questionnaire. (\* The effect size is calculated using Cramer’s V for chi-squared analysis.)

**Table 4**

***Multi-Level Suicide Ideation Reporting Among Lifetime Attempters***

<b>Lifetime Multi-Level SI reported by Lifetime Suicide Attempters</b>					
	<b>USA (%)</b>	<b>India (%)</b>	<b>Test</b>	<b>p</b>	<b>Effect Size*</b>
“I wish I could disappear or not exist”	90.9	71.4	$\chi^2(1,36) = 2.34$	.126	.26
“I wish I was never born”	81.8	78.6	$\chi^2(1,36) = .06$	.810	.04
“My life is not worth living”	90.9	71.4	$\chi^2(1,36) = 2.34$	.126	.25
“My existence is a burden/shame”	81.8	57.1	$\chi^2(1,36) = 2.59$	.107	.27
“I wish I was dead”	100	71.4	$\chi^2(1,36) = 7.07$	.008	.44
“Maybe I should kill myself”	90.9	85.7	$\chi^2(1,36) = .23$	.629	.63
“I should kill myself”	95.5	92.9	$\chi^2(1,36) = .11$	.740	.06
<b>Past Year Multi-Level SI reported by Lifetime Suicide Attempters</b>					
“I wish I could disappear or not exist”	68.2	42.9	$\chi^2(1,36) = 2.26$	.133	.25
“I wish I was never born”	59.1	64.3	$\chi^2(1, 36) = .10$	.755	.05
“My life is not worth living”	68.2	50.0	$\chi^2(1, 36) = .119$	.275	.18
“My existence is a burden/shame”	59.1	28.6	$\chi^2(1,36) = 3.20$	.074	.30
“I wish I was dead”	72.7	42.9	$\chi^2(1, 36) = 3.21$	.073	.30
“Maybe I should kill myself”	72.7	50.0	$\chi^2(1,36) = 1.92$	.166	.23
“I should kill myself”	59.1	57.1	$\chi^2(1,36) = .01$	.908	.02

*Note:* This table focuses on the individuals who have reported at least one lifetime suicide attempt, and displays the percentage that endorsed various levels of suicidal thoughts within that sample for each country. (\* The effect size is calculated using Cramer’s V for chi-squared analysis)

## Cross-National Differences In Implicit Self-Identification With Death/Suicide

Implicit self-identification with death/suicide between the two countries was compared using D-scores on the S-IAT for each country sample. Differences between the India ( $M = -0.48$ ,  $SD = 0.43$ ) and USA ( $M = -0.46$ ,  $SD = 0.36$ ) samples were not statistically significant (Mann Whitney  $U [N = 381] = 17496$ ,  $p = 0.57$ , Cohen's  $d = 0.029$ ). Further, I also examined gender differences in implicit suicide-related cognition across countries. Results from a 2 (USA, India) x 2 (male, female) ANOVA indicated no significant gender differences in S-IAT scores in either country ( $F [1,381] = 1.170$ ,  $p = 0.28$ ,  $\eta^2 = .003$ ).

A 2 (USA, India) X 3 (non-suicidal controls, suicide ideators, suicide attempters) ANOVA analysis was conducted to examine differences in mean implicit suicide-related cognition as a function of explicitly reported suicidal thoughts and attempts in lifetime. Although the analysis indicated no significant differences in mean implicit scores across groups ( $F [2,381] = .69$ ,  $p = 0.502$ ,  $\eta^2 = .004$ ; see Figure 1), the mean implicit scores for the Indian sample suicide attempters ( $M = -0.34$ ,  $SD = 0.45$ ) showed a stronger self-identification with suicide and death than the USA sample attempters ( $M = -.49$ ,  $SD = 0.41$ ).

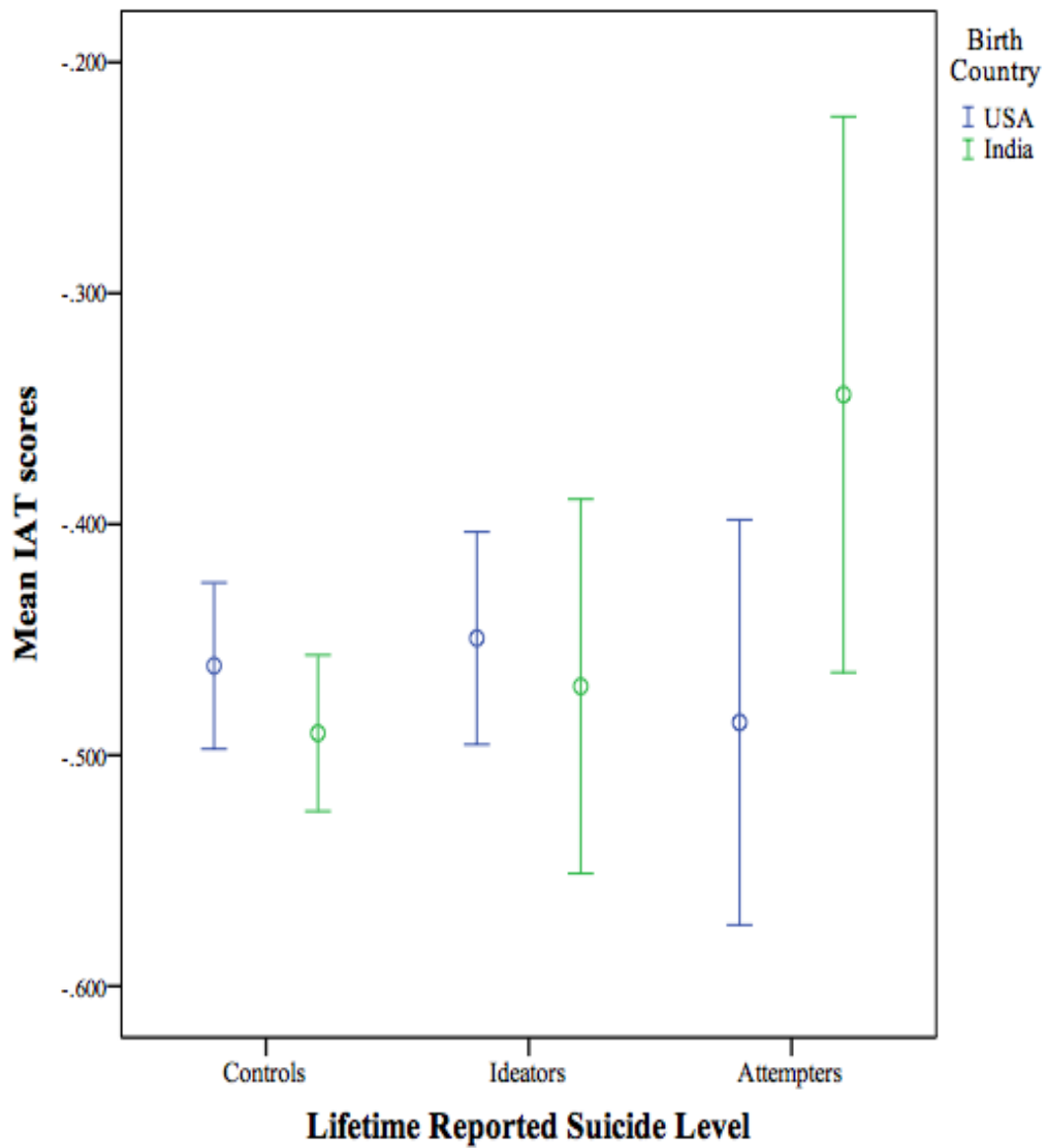
A 2 (USA, India) X 3 (non-suicidal controls, suicide ideators, suicide attempters) ANOVA analysis was conducted to examine differences in mean implicit suicide-related cognition as a function of explicitly reported suicidal thoughts and attempts within the past year. Although this analysis showed no significant differences in mean implicit scores across groups ( $F [2,381] = .304$ ,  $p = .738$ ,  $\eta^2 = .002$ ; see Figure 2), the S-IAT scores indicated stronger self-identification with death/suicide among past-year suicide attempters in India ( $M = -0.17$ ,  $SD = 0.52$ ) as

compared to the past year attempters in the USA sample ( $M = -0.34, SD = 0.45$ ). However, the difference was not statistically significant.

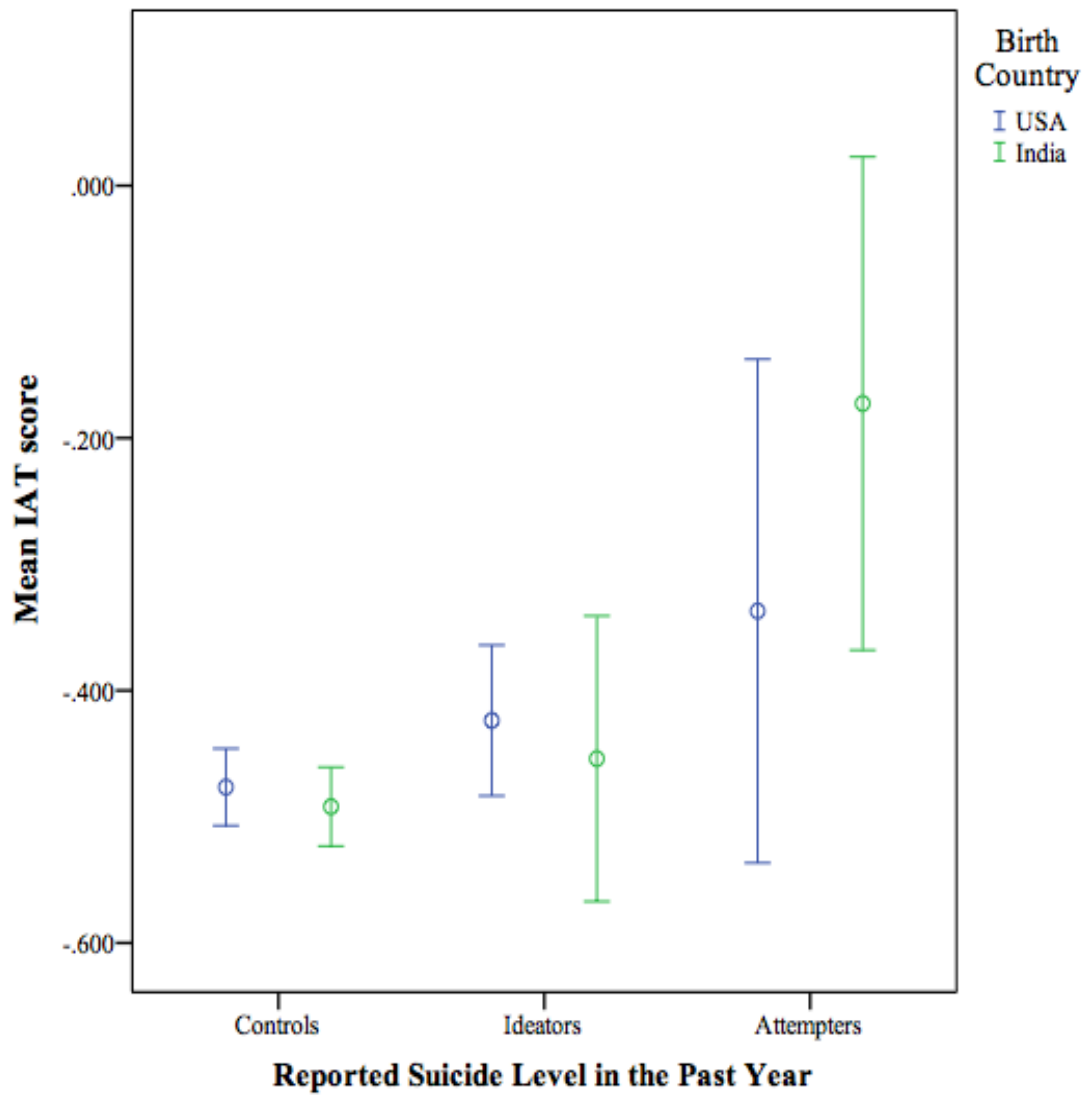
Next, the scatter plots of the S-IAT scores were inspected to more closely examine the full distribution of the implicit suicide-related cognition across the two countries (see Fig 3,4,5,6). These scatter plots were used to observe any individual differences in the participants whose scores showed higher implicit suicide-related cognition. The scatter plot showed the Indian sample had a greater number of individuals who showed implicit self-identification with suicide with no explicit reports of lifetime ideation as compared to the distribution in the USA sample. The data points of the Indian sample were also spread across a greater range as compared to the USA sample.

#### Association Between Implicit And Explicit Measures Of Suicide Ideation

Spearman's correlations were used to examine the association between implicit suicidal cognition and explicit reporting of suicidal thoughts and behaviors. Table 5 displays the correlation between the implicit reporting (S-IAT scores) and explicit reporting of suicide histories (i.e., death-life association measure, number of days of ideation in the lifetime, number of ideation days in the past year, number of lifetime suicide attempts, and number of suicide attempts in the past year). Figure 7 displays a scatter plot of the correlation between the explicit and implicit suicide measures. A trend level correlation between explicit death life association and the implicit S-IAT score was observed in the USA sample ( $r = -0.13, p = .091$ ). While the Indian sample showed a weaker correlation between the explicit death life association and S-IAT scores, this correlation was not significant ( $r = -0.04, p = .568$ ). The other correlations between explicit and implicit measures across both country samples were weak and not significant.

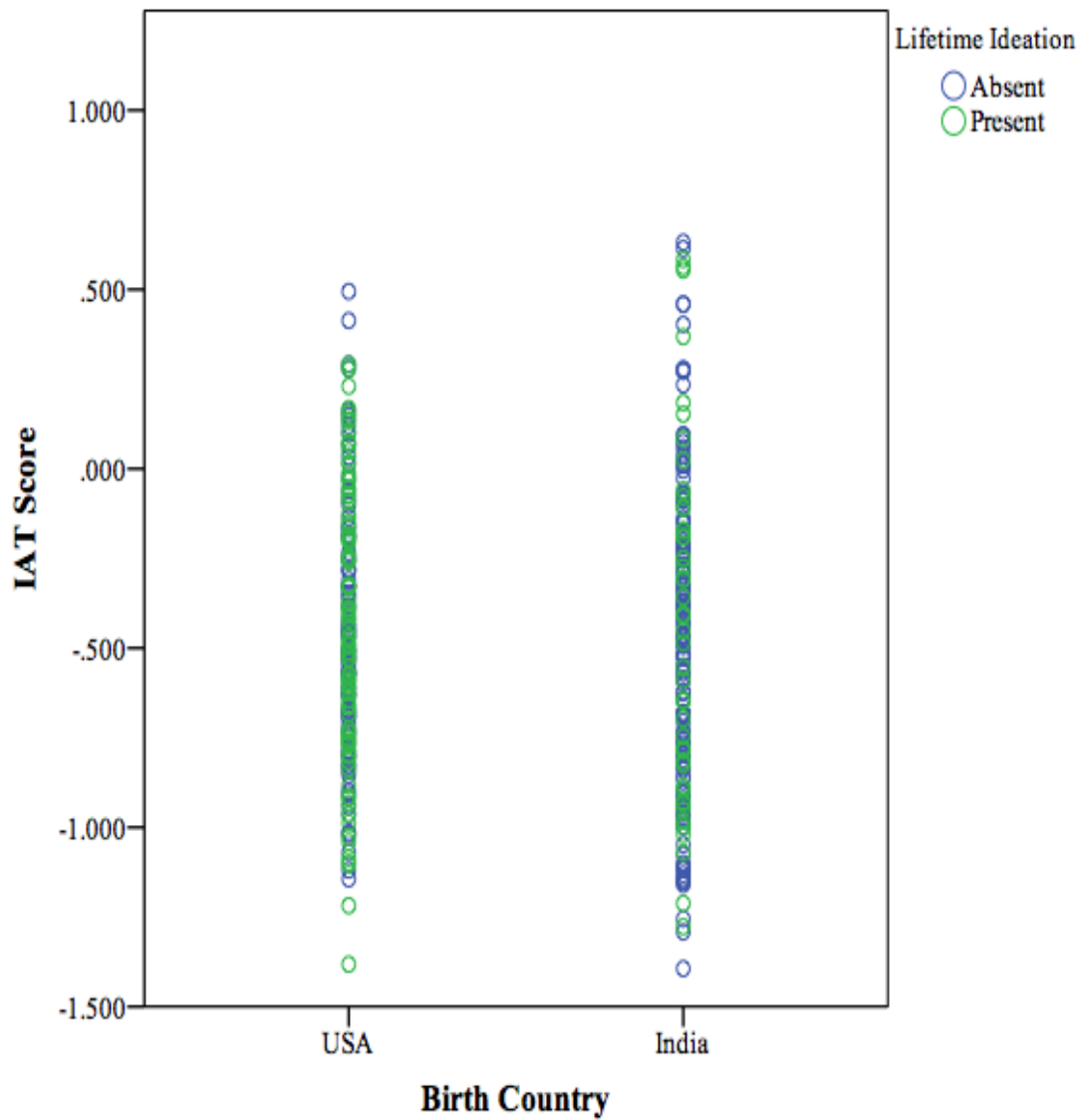


**Figure 1:** Mean S-IAT Scores In India & The USA For Lifetime Suicide Attempters, Ideators, & Non-Suicidal Controls. This figure displays the difference in mean IAT scores between the different levels of lifetime reporting of suicidal thoughts within each country.

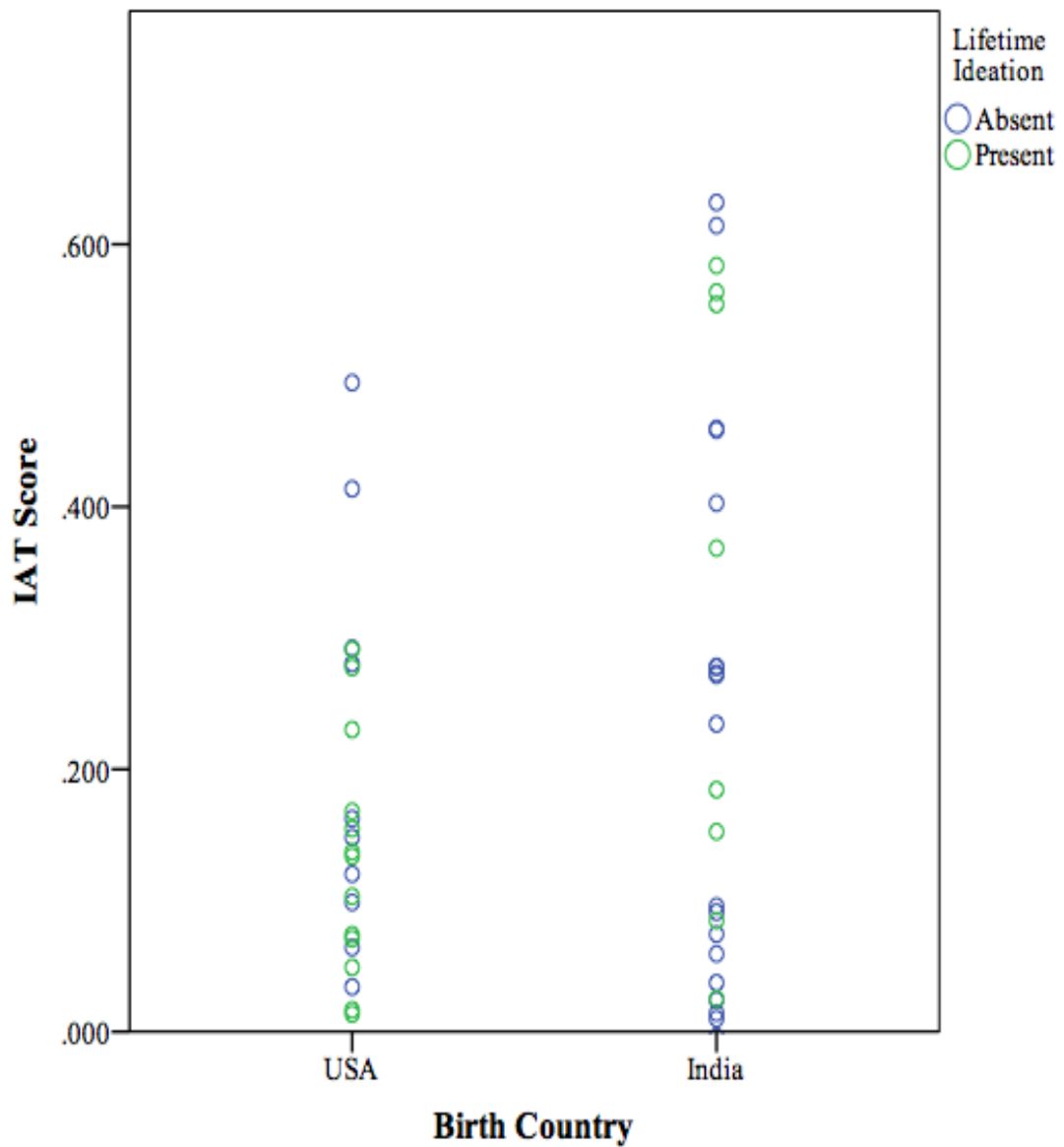


**Figure 2:** Mean S-IAT Scores In India & The USA For Past Year Suicide Attempters, Ideators, & Non-Suicidal Controls. This figure displays the difference in mean IAT scores between the past year reported ideators, attempters and controls within each country.

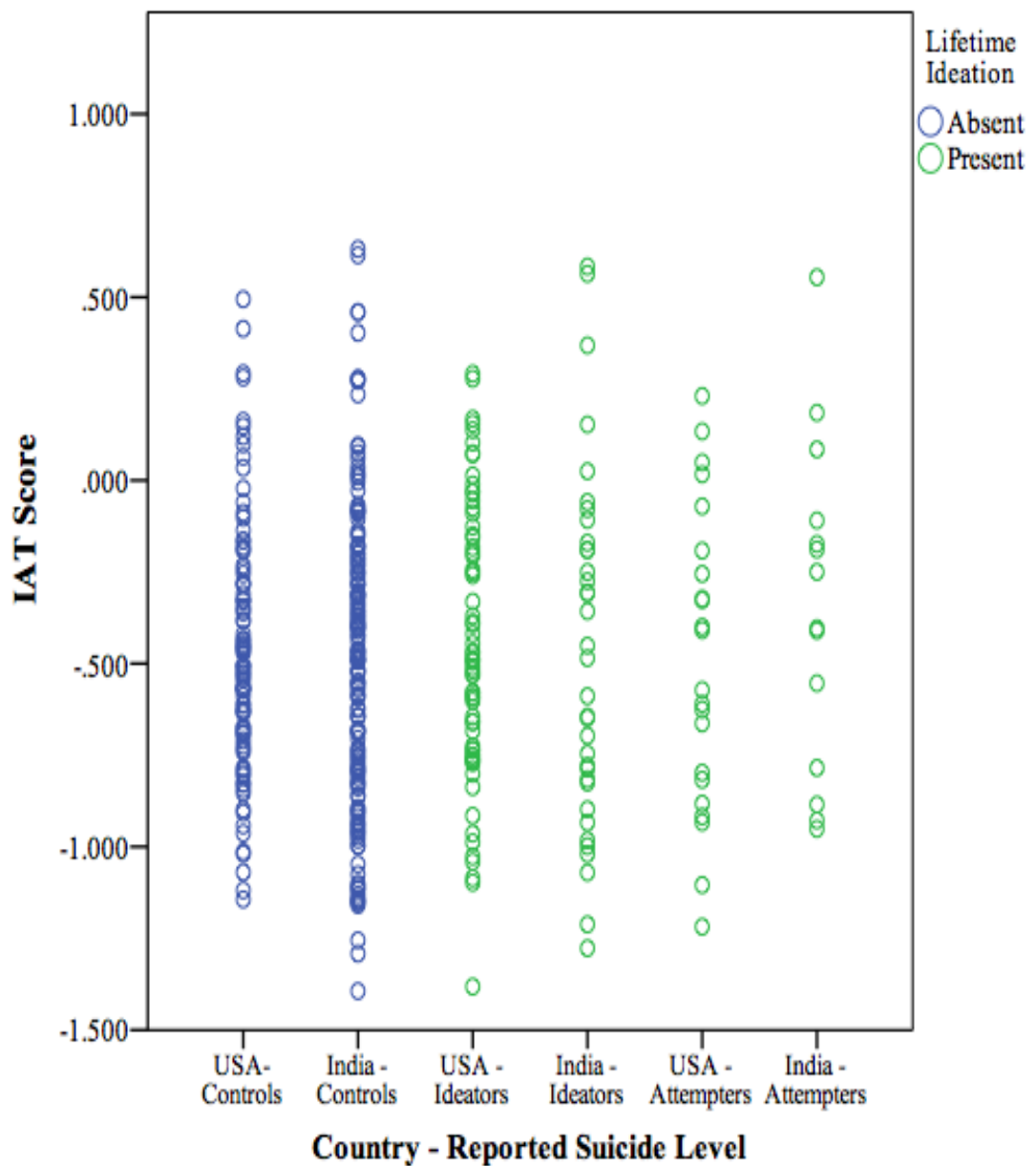




**Figure 3:** Scatter Plot Of IAT Scores Between The Countries. This scatterplot displays the spread of the IAT scores for each country sample categorizing them on the basis of explicitly reported presence or absence of lifetime suicide ideation.

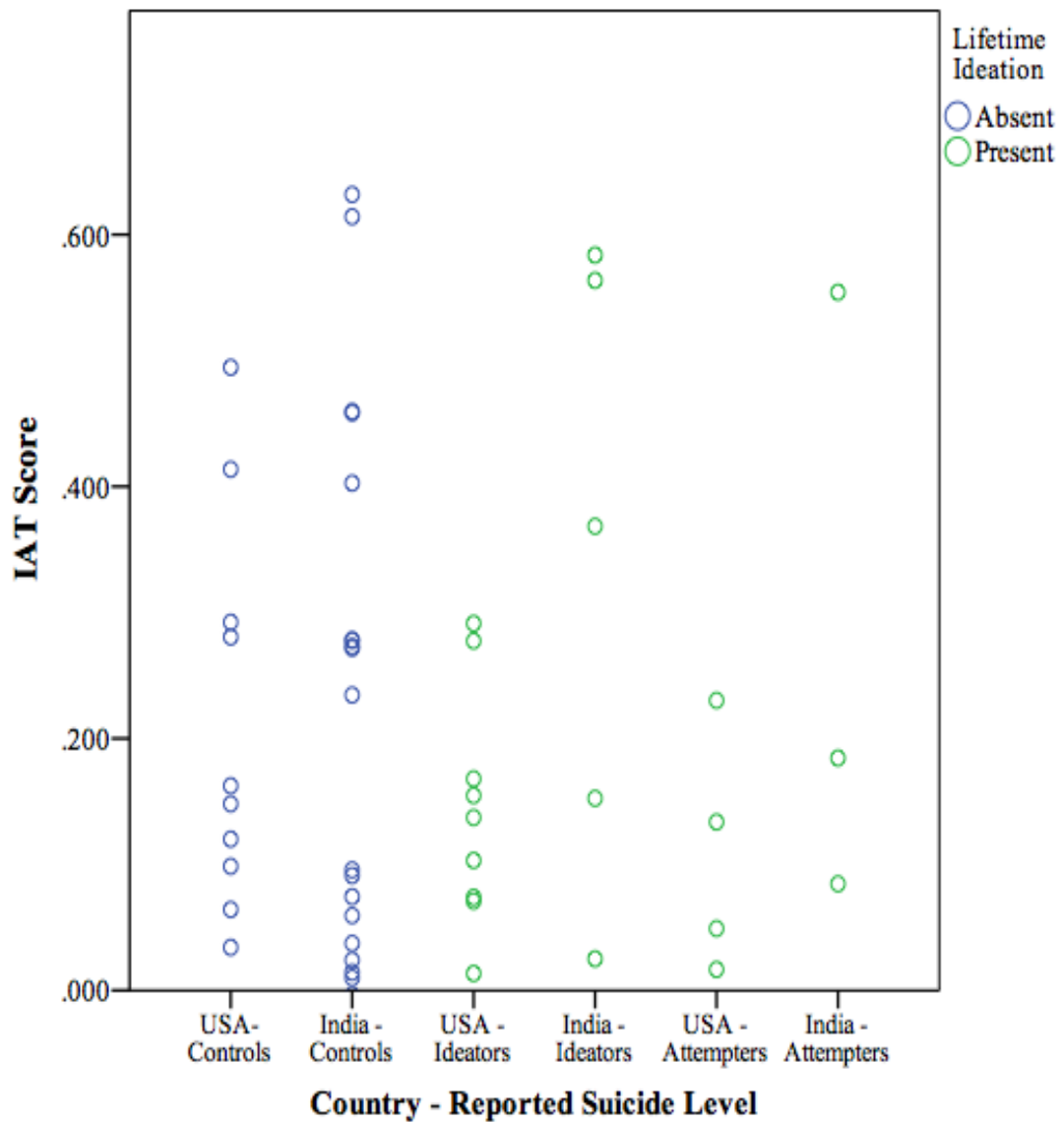


**Figure 4:** Scatter Plot Of Sample With S-IAT Scores Above 0. This scatterplot displays the spread of the IAT scores above the threshold of “0” for each country sample categorizing them on the basis of explicitly reported presence or absence of lifetime suicide ideation.



**Figure 5:** Scatter Plot Clustered By Explicit Suicide Reporting For Each Country.

This scatterplot displays the spread of the IAT scores for each country sample categorizing them on the basis of explicitly reported presence or absence of lifetime suicide ideation and further grouped into explicit reporting level of suicidal behavior.



**Figure 6:** Scatter Plot Clustered By Explicit Suicide Reporting For Each Country & S-IAT Scores >0. This scatterplot displays the spread of the IAT scores above the threshold of “0” for each country sample categorizing them on the basis of explicitly reported presence or absence of lifetime suicide ideation and further grouped into explicit reporting level of suicidal behavior.

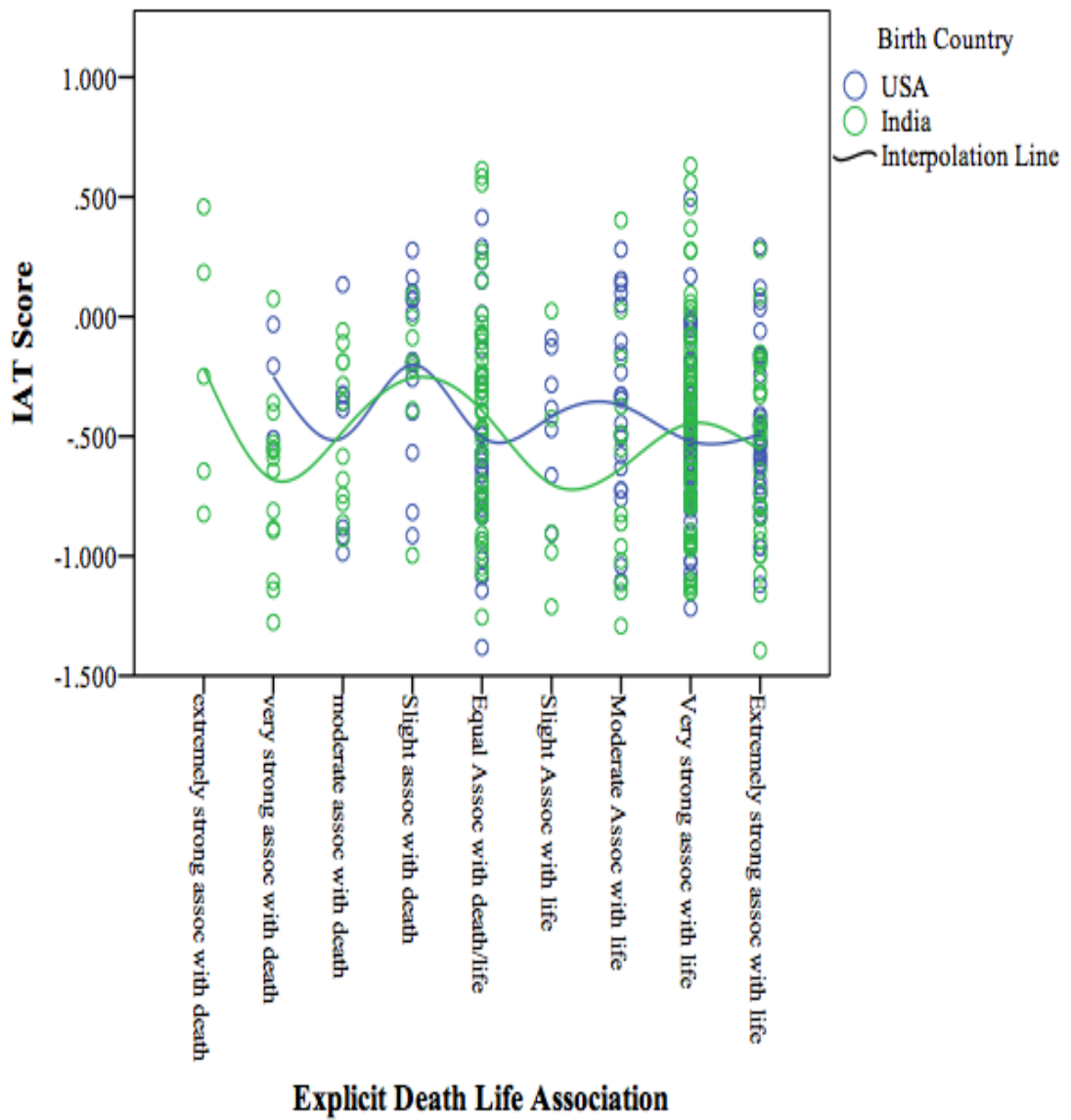
**Table 5*****Correlation Between Explicit And Implicit Indicators Of Suicidal Behaviors  
Between USA & India***

Spearman's $\rho$	USA S-IAT Score			India S-IAT Score		
	$\rho$	$p$	N	$\rho$	$p$	N
Explicit Death/Life Association	-.13	.091	181	-.04	.568	200
Number of Days of Ideation - Lifetime	.09	.360	89	-.15	.298	49
Number of Days of Ideation: Past Year	.13	.242	89	.06	.703	49
Number of Attempts in Lifetime	.11	.628	22	.09	.756	14
Number of Attempts in Past Year	.21	.355	22	.36	.208	14

*Note:* This table displays the correlation of multiple measures of explicit reporting of suicidal behaviors with the implicit measure of suicide related cognition i.e. S-IAT score.

#### Relationship Between Religion, Degree Of Religiosity & Suicidal Thoughts

In order to explore the differences between religiosity levels across different religions as a potential explanation for the discrepancies in the implicit and explicit reporting of suicidal thoughts, I examined differences in religiosity level in the USA non-Hindu sample and Indian Hindu sample in relation to implicit and explicit reporting of suicidal thoughts. I examined differences in mean religiosity within the USA sample (including only Christianity, Judaism and Islam and excluding Hinduism, Buddhism as well as Atheism) as well as the Indian sample (including only individuals who reported their religious identification as Hinduism). The USA sample included in the analysis on religiosity was limited to Christianity, Judaism and Islam as each of these religions has a similar approach against the concept of suicide. Their

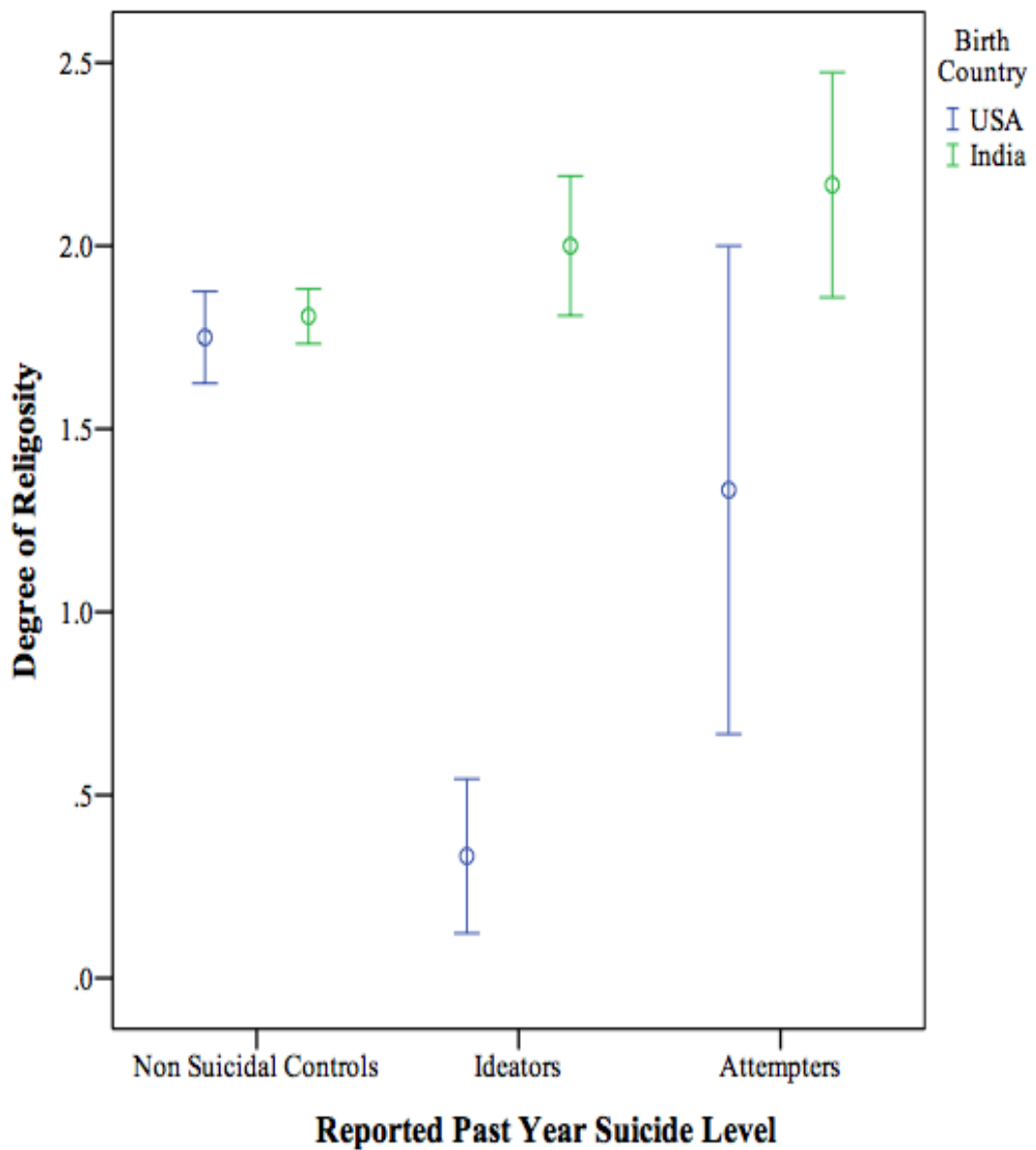


**Figure 7:** Scatter Plot of The Correlation Between Explicit & Implicit Measures Of Suicidal Thoughts. This scatterplot displays the correlation between the IAT scores and the Explicit Death-Life Association Scores for each country sample.

approach is unlike Hinduism and Buddhism, which consider it as an option of dealing with ones' hardships. Atheism was excluded from all samples for the religiosity analysis. The 2 (India-Hindu, USA-Non Hindu) X 3 (non-suicidal controls, suicide ideators, suicide attempters) ANOVA indicated a significant country by religion interaction ( $F(2, 212) = 6.64, p = .002, \eta^2 = 0.06$ , see Fig 8). It also reported a significant difference ( $F[2,65] = 6.55, p = 0.003, \eta^2 = 0.18$ ) in means between the three groups: the non-suicidal controls ( $M = 1.75, SD = 0.94$ ), the suicide ideators ( $M = 0.33, SD = 0.52$ ), and the suicide attempters ( $M = 1.33, SD = 1.33$ ) within the USA sample. Bonferroni's post hoc analysis showed a significant difference between non-suicidal controls and ideators ( $p = 0.002$ ), but not between suicide attempters and suicide ideators ( $p = 0.281$ ). There were no significant differences in mean religiosity levels between groups within the India sample ( $p = .471$ ).

Next, S-IAT scores across religiosity levels were compared between the two countries (see Figure 9). Although differences were not statistically significant, the Indian sample showed a general trend of increasing self-identification with death/suicide at higher levels of religiosity ( $F[3, 147] = 2.43, p = 0.062, \eta^2 = 0.05$ ), whereas the USA sample showed a general trend of decreasing self-identification with death/suicide at higher levels of religiosity ( $F[3, 65] = 1.18, p = 0.334, \eta^2 = 0.06$ ). Correlations between level of religiosity and implicit self-identification with death/suicide are presented in Table 9 and displayed as a scatter plot in Figure 10. The USA sample showed a negative correlation between S-IAT scores and religiosity level (approaching significance  $\rho = -0.22, p = 0.073$ ), whereas the India sample showed a positive correlation between the S-IAT scores and level of religiosity (approaching significance  $\rho = 0.16, p = .061$ ). Moreover, the difference in associations between level of religiosity and S-IAT was significantly different across

the two countries ( $z = -2.53, p = .006$ ).

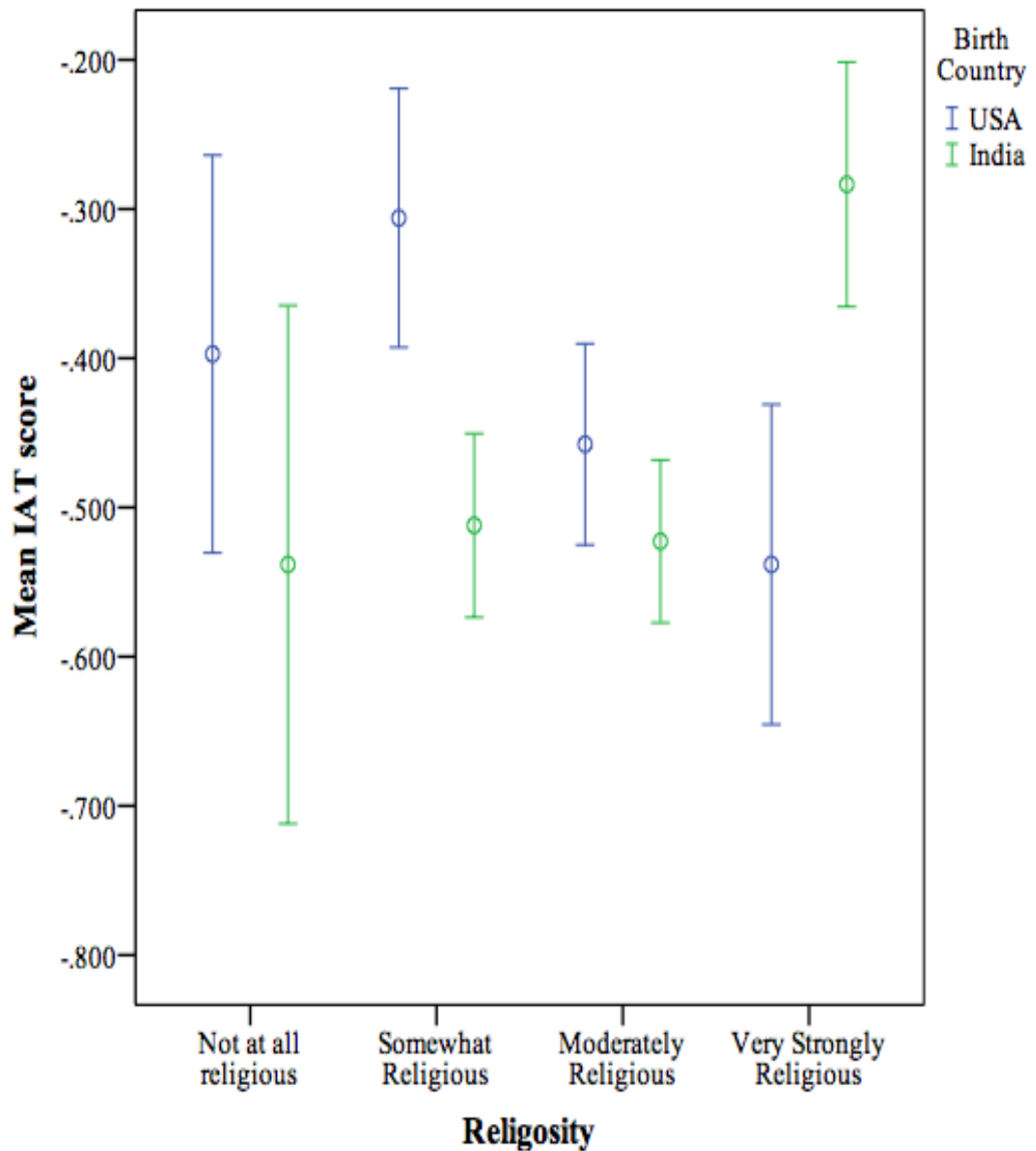


**Figure 8:** Religiosity Levels For Explicit Suicide Reporting In The Past Year. The US sample here consists of all individuals who reported religion as Christianity, Judaism & Islam. And the India sample here consists of only the individuals who reported religion as Hinduism.

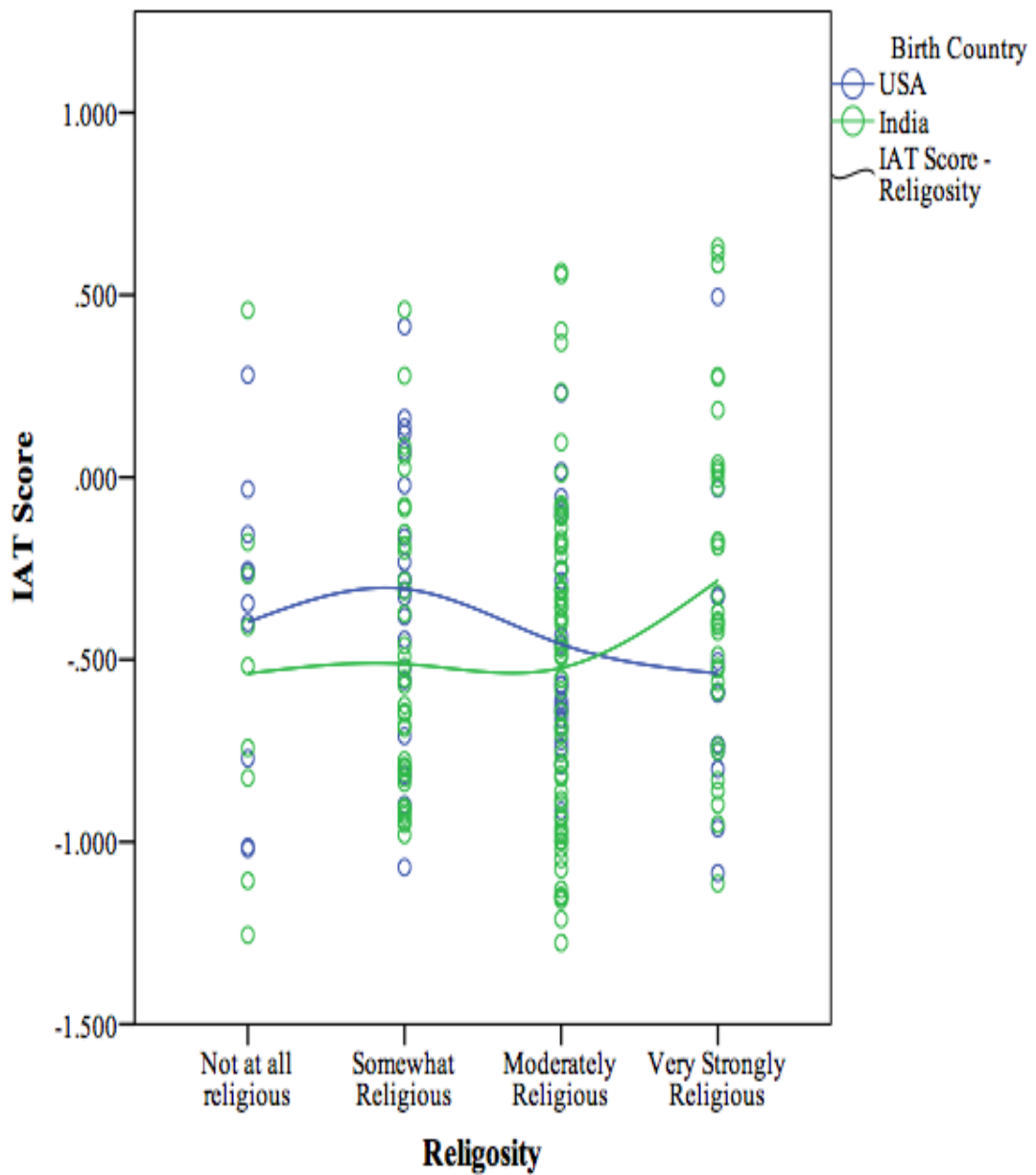


### Feasibility Of Using The S-IAT In India:

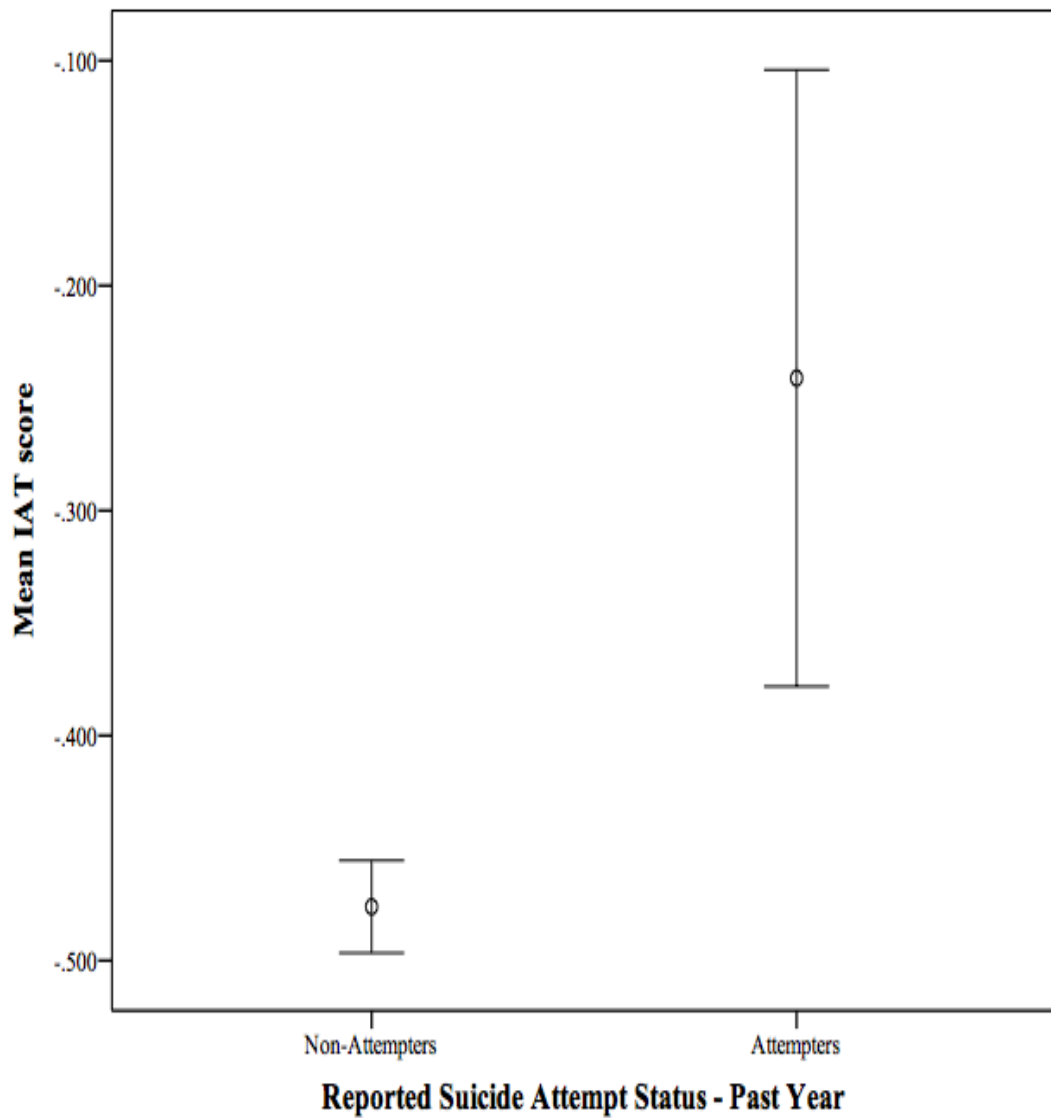
Because, the S-IAT has not been used in India to study suicidal thoughts or behaviors, I examined the feasibility of using the S-IAT in identifying differential levels of suicidal thoughts. Given that previous research has demonstrated that the S-IAT is sensitive to both severity as well as recency of suicidal thoughts, I compared S-IAT scores across past year reported suicide attempt status. Given the small sample size, in order to be able to identify strong differences across groups, analyses were focused on past year suicide attempters vs. non-attempters in the entire sample as well as specifically within the India sample. The ANOVA analyses revealed significant differences in S-IAT scores between past-year attempters and non-attempters ( $F [1,381] = 4.07, p = 0.042, \eta^2 = .01$  for total sample,  $F [1, 200] = 3.69, p = 0.056, \eta^2 = .02$  for only the India sample; see Fig 2; see Fig 4,5). The mean implicit self-identification with suicide/death was significantly higher in the past year suicide attempters vs. non-attempters in the total sample ( $M_{SA} = -0.24, SD = 0.47, M_c = -0.47, SD = 0.39$ ) as well as within the India sample ( $M_{SA} = -0.17, SD = 0.52, M_c = -0.49, SD = 0.42$ ; see Fig 12,13).



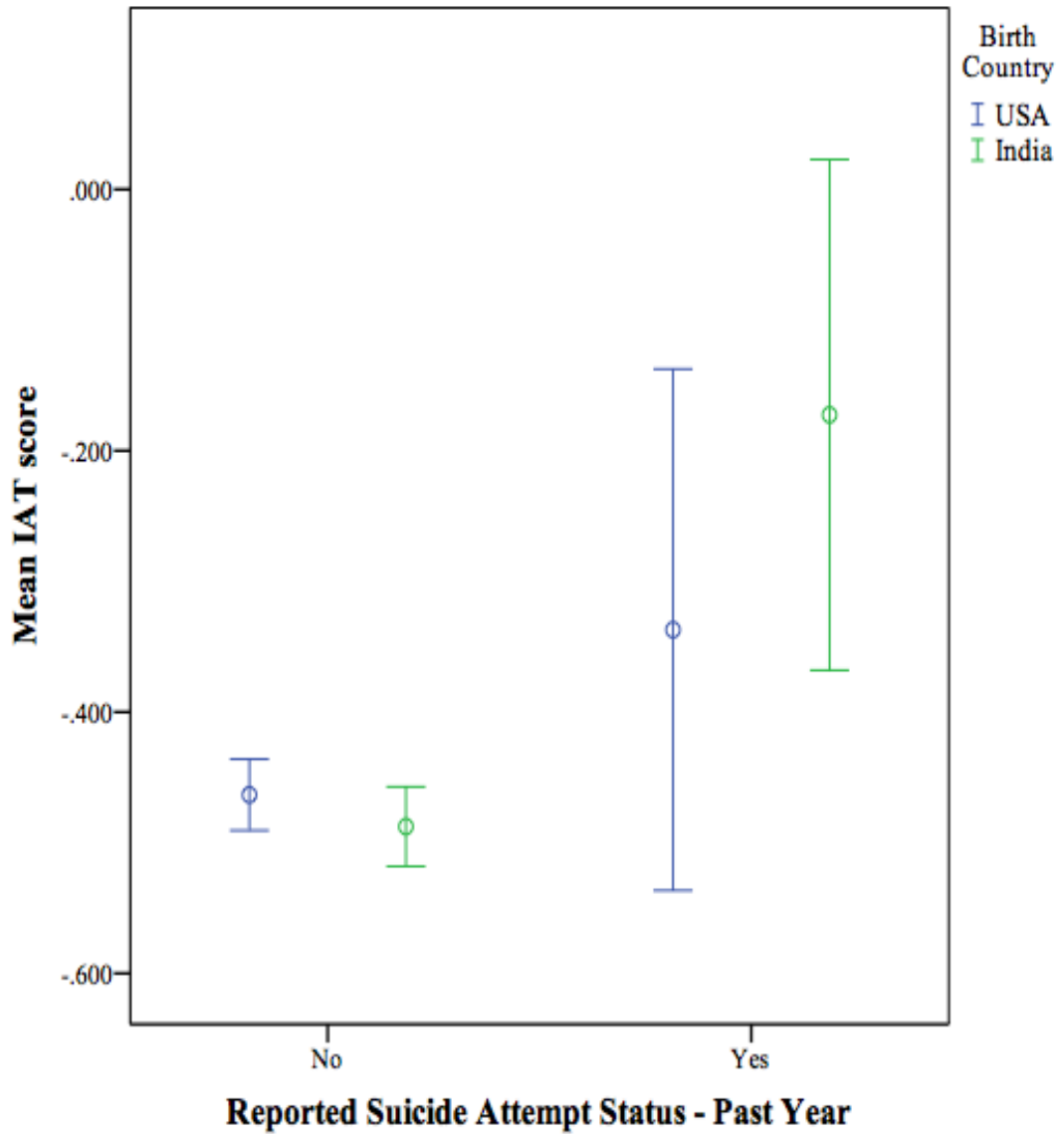
**Figure 9:** Religiosity & Implicit Self-Identification With Death/Suicide. The US sample here consists of all individuals who reported religion as Christianity, Judaism & Islam. And the India sample here consists of only the individuals who reported religion as Hinduism.



**Figure 10:** Scatter Plot Of S-IAT Scores of Religiosity Levels for India & The USA Sample. This scatterplot shows the trending difference in correlation between religiosity and the IAT scores for the two country samples.



**Figure 11:** S-IAT Scores Among Past-Year Suicide Attempters & Non-Attempters In Total Sample. This figure highlights the significant difference in mean IAT scores between the sample of past year suicide attempters and non attempters in the total sample.



**Figure 12:** S-IAT Scores Among Past Year Suicide Attempters & Non-Attempters In The India Sample. This figure highlights the significant difference in mean IAT scores between the sample of past year suicide attempters and non attempters in the two country samples, showing a greater difference the Indian sample as compared to the USA sample.

## Chapter IV

### Discussion

The purpose of this study was to compare the explicit and implicit reporting of suicide ideation between India and the USA. The study first compared the explicit reporting of suicidal thoughts and behaviors between the two countries. This was followed by examining the implicit association towards suicidal thoughts between India and the USA and the correlation between the explicit and implicit measures of suicidal thoughts and behaviors. This study also explored level of religiosity in combination with religion as a potential factor to explain the differences in implicit and explicit reporting. Finally this study aimed to examine the use of the S-IAT as a valid method for assessing suicidal thoughts and behaviors in India. The findings from this study provide initial evidence supporting a differential role of culture in the expression and development of suicidal thoughts, and also support the use of the S-IAT as a measure of implicit association towards thoughts of suicide and death.

The analysis of the explicit reporting of suicidal thoughts and behaviors shows that in comparison to the USA sample, the Indian sample consistently reported significantly lower levels of suicide ideation and attempts – in lifetime as well as past year. Further, the results showed that reporting of all types of suicidal thoughts is significantly less in the Indian sample. Data on explicit reporting of different levels of ideation ranging from passive thoughts of “not being around” to active suicidal thoughts shows that the individuals in the Indian sample are endorsing suicidal thoughts at a level that is significantly lower than the level of endorsement of the USA sample. These results are consistent with our first hypothesis that the explicit

level of suicide ideation and suicide attempts would be lower in India as compared to the USA sample.

Although the explicit reporting levels were lower, the comparison of the implicit level of suicide ideation between the two countries was not significant. The implicit self-identification with suicide and death was slightly stronger in the Indian sample subgroup that reported explicit suicide attempts, but this difference was not statistically significant. One of the reasons for lack of statistical significance in this analysis could be the small sample size of suicide attempters within each country's sample. Consistent with study hypotheses, there were comparable implicit associations with death/suicide in both countries. This thereby indicates a discrepancy between explicit and implicit reporting of suicide ideation across the two countries.

When examining the convergence between the implicit association towards suicide and the explicit reporting of suicidal thoughts i.e. the explicit death-life association, the number of days of suicide ideation in the past year and lifetime, the correlation for both the USA as well as the Indian sample was small. However, the USA sample reported a marginally stronger correlation that approached significance, as opposed to the Indian sample that showed no significant correlation. While this could potentially suggest that the USA sample may have a slightly stronger explicit-implicit relation, the scatter plot showing the correlations in addition to the small effect size of the correlations make this analysis inconclusive. Hence, given the lack of power, the current study findings are insufficient in supporting our third hypothesis and hence are unable to show a significant difference in correlation between implicit and explicit suicide reporting rates between India and the USA.

Finally in order to establish the feasibility of using the S-IAT as a measure of implicit suicide ideation in India, I compared the group differences in the mean

implicit scores between the non-suicidal controls and the past year suicide attempters in the Indian sample as well as the total sample. In accordance with previous research using the S-IAT (Nock et al. 2010), this tool appears to be sensitive to tracking severity along with recency of suicidal behavior. Hence comparing the past year suicide attempters to the non-suicidal controls gives the clearest picture of the potential efficacy of the S-IAT. The analysis showed a significant difference between the non-suicide and past year attempter groups in the total sample as well as the Indian sample. These findings clearly support my hypothesis. Hence, it supports the use of the S-IAT as a measure of implicit suicide ideation in the Indian sample.

The significantly lower explicit reporting of suicidal thoughts and behaviors in India could be explained in multiple ways. One possible explanation is that, it could point to an actual difference in prevalence rates between the two countries. In other words, this finding could indicate a lower level of suicide ideation in India. However, the findings regarding the implicit association towards suicidal thoughts in the two countries suggest that there may not be a difference in the actual prevalence of suicide ideation, even though the explicit reports may suggest otherwise. The discrepancy between the explicit and implicit reporting between the two countries can potentially be explained through multiple theories. First, this could imply greater under-reporting of explicit suicide ideation by the Indian sample as compared to the USA sample. This could be a factor of greater social stigma of expressing thoughts of suicide or any mental illness, a lack of insight into one's subconscious suicidal thoughts, or a perception of the thoughts being less severe and hence unnecessary to report. Second, it could also imply that the questions presented as part of this study were unable to capture the exact pathway through which such suicidal thoughts are being experienced by the Indian sample, thereby resulting in lower explicit reports of



suicidal thoughts. In order to examine the theory of underreporting due to stronger social stigma in the Indian sample, I explored the explicit suicide reporting level of the higher scorers on the implicit association test. I looked at the scatter plots depicting the distribution of the implicit suicide ideation scores across each country sample, and found that the Indian sample had a higher number of individuals who reported no suicide ideation along with a very strong implicit association with suicide. This could suggest a greater level of underreporting of explicit suicidal thoughts and behaviors in the Indian sample. While these results could suggest a greater level of under-reporting in the Indian sample, the reason for the under reporting cannot be determined by the available data.

Finally, another key aspect that could potentially be a factor in the discrepancy between the explicit and implicit suicide ideation is the religious differences in the two samples. In order to understand the relation between religion and explicit and implicit suicide ideation, I focused on the subgroup of individuals endorsing Hinduism in India, and individuals endorsing religious affiliations other than Hinduism and Buddhism in the USA. As Hinduism has a more accepting outlook towards the concept of suicide as compared to Christianity, Judaism and Islam (which consider it a sin), I wanted to see if level of religiosity of these specific religious groups would show an opposite directionality in correlation to implicit and explicit suicide ideation. The results analyzing the degree of religiosity between the non-suicidal control, suicide ideators and suicide attempters group showed that the Indian sample had a comparable level of religiosity across the three levels of suicide reporting, while the USA sample showed a significant decrease in degree of religiosity in the ideator group. This could imply that religiosity is not a factor in the level of explicit reporting in India but is significant in the level of explicit reporting in

the USA sample. Further when comparing differences in religiosity level between countries, the level of religiosity between the two non-suicidal control groups was comparable, but the ideators from the USA group had a significantly lower level of religiosity than the ideators from the Indian group. Similarly I also compared the mean implicit suicide ideation scores across religiosity levels. The data showed a slight reduction in implicit suicide ideation scores with an increase in religiosity in the USA sample, while the India sample showed an increase in mean implicit ideation scores with an increase in religiosity. These differences were not statistically significant, but suggested a trend in the relationship between religiosity level and the implicit suicide ideation in the two country samples. This trend could suggest that automatic thoughts and associations with suicide tend to rise with rising level of religiosity in India, but fall with rising level of religiosity in the US sample. This could imply that Hinduism's approach towards the concept of suicide plays a role in level of religiosity potentially being a risk factor for suicide ideation in the Indian sample. Conversely, other religions' (such as Christianity, Judaism and Islam) strong opposition to allowing access to suicide as an alternative leads to religiosity being a protective factor against implicit as well as explicit suicidal thoughts. Given that the religiosity levels do not change across explicit suicide ideation levels in India, it suggests that religiosity may not be affecting explicit reporting, but that it does play a role in implicit thoughts of suicide. These inferences are further supported by the directional difference (approaching significance) of the correlation analysis of each religion's sample with implicit suicide ideation. The Indian sample showed a positive correlation implying an increase in implicit suicide ideation with increase in religiosity, while the USA sample showed a decrease in implicit suicide ideation with increase in religiosity level. A comparative analysis of the correlation coefficients of

religiosity and implicit suicide ideation between the Indian and USA sample was done. The comparison showed a statistically significant difference in the two correlations further strengthening the evidence establishing the combined role of religion and religiosity in implicit suicide ideation.

### General Discussion

Given the lack of available research on the prevalence and course of suicidal thoughts and behaviors in India, this study provides initial data on the potential differences in the expression of explicit suicidal thoughts and behaviors in India. More broadly, this study suggests that different aspects of culture such as sociocultural norms and religious philosophies can play a role in the development as well as expression of suicidal thoughts and behaviors. In addition to shedding some light on the difference in expression of suicidal thoughts in India vs. the USA, this study also highlights the need for further research on the causes for underreporting in India. It is important to understand the mechanism causing the discrepancy between the implicit and explicit reporting of suicidal thoughts and behaviors in India, as this can help develop a more targeted plan for providing support and help to individuals there, who may be at risk for suicide.

The vast discrepancy in the explicit and implicit reporting in India suggests the need to develop objective/behavioral assessment measures to identify individuals at risk for suicide in Asian countries such as India. Currently in India, the only available method for identifying suicidal thoughts and behavior is self-report questionnaires and interviews. This methodology is extremely unreliable especially in a country such as India, where social stigma is potentially higher than that in the USA. This study provides initial evidence supporting the use of the S-IAT as a

measure of suicidal thoughts and behaviors. The use of a behavioral assessment such as the S-IAT can significantly improve the rate of identification of suicidal thoughts and behaviors and hence potentially improve prevention.

### Limitations And Future Directions

While the findings of this study suggest that culture may play a role in the expression of explicit and implicit suicide ideation, it is important to understand the limitations of these findings. First, since we recruited participants for the entire study by posting advertisements on Mturk, the data collected could be skewed by self-selection bias that may work differently for each country. In other words, the sample that completed the study in each country could have some inherent differences, which may not necessarily be present in the larger population. For example, by looking at the depression and general psychopathology scores between the two country samples, it is clear that the Indian sample showed a significantly greater level of depression and psychopathology as compared to the USA sample. While this could skew the data collected and explain the comparable levels of implicit suicide ideation between the two countries, it could also provide further evidence in support of the theory of underreporting in India. Given that both depression and presence of psychopathology are strongly correlated to explicit as well as implicit suicidal thoughts, this suggests that the Indian sample should have been reporting higher levels of both explicit and implicit suicide ideation and behaviors. However, the findings show lower explicit and comparable implicit scores. Hence this data further supports the presence of a higher level of underreporting in India as compared to the USA. Because we controlled for mean age, gender break up as well as race homogeneity, these factors are not likely to affect the data results. However, the Mturk population is not an

accurate representation of the populations of each country. Hence these results can only be held valid for the Mturk population sample and not the prevalence of suicidal thoughts and behaviors more broadly.

Second, because the study collected data from a general community population, the sample size of suicide attempters, especially recent attempters and ideators was very small. This resulted in a reduced power, limiting the ability of the analysis to detect effects among the attempter group. Conducting a similar study with a more specific sample of suicide attempters could be beneficial in identifying key differences through a statistically stronger analysis. Third, the current study only reports on the relationship between the specific established risk factors. It does not explore the presence of other potential risk factors that may be significant in different cultural settings. Hence it shall not present an all-encompassing picture of suicide thoughts in different cultural settings. Further research is necessary to explore other significant risk factors that may exist in different cultures, which have not been associated to suicide in the western cultural setting. Similarly this study only utilizes existing pathways of expressing and measuring suicide ideation. As this may vary culturally, the results may only depict the difference in the current known forms of expressing suicidal thoughts. In order to explore new pathways through which suicidal thought may be experienced or expressed in culturally diverse settings, it is important to do an exploratory study using open-ended questions to understand how individuals may choose to express their thoughts in different cultural settings.

While this study provides some initial evidence suggesting that cultural setting could play a role in the development of suicide ideation, given the limitations of this study, there is a growing need to closely study the mechanism of action through which culture may play a role in the development of suicidal thoughts and behaviors.

This study was done using a sample from the population of Mturk workers from each country. Demographic studies show that the Mturk samples for both countries over-represent specific socio-economic groups and are more educated than the average sample from these countries. Hence it is necessary to utilize different modes of data collection as well as study administration beyond online survey methodology to get a more widespread and representative understanding of the relationship between culture and suicidal thoughts. Different modes to replicate this study should include the use of interviews as opposed to self-report questionnaires, and the use of in person task administration as opposed to online administration. This study was only accessible to individuals with access to the Internet, which is a significantly smaller proportion of the Indian population. Hence the participant pool may not accurately represent populations where Internet access is not widespread (such as India). Conducting similar studies in lab settings across different cultural settings could help gain access to a more complete picture. In addition to Internet access, since this study was conducted completely in English, it limited the participant pool to people who are fluent in English. Given that English is not the first language for a large proportion of the Indian population, this will limit the generalizability of the results of this study, especially in the context of the Indian population. Hence, it would be very beneficial to conduct further studies in this domain using translated versions of the S-IAT and other self report measures.

Finally, it is essential to point out that all the results obtained from this study only point towards potential correlations between cultural setting, religion, religiosity level and explicit and implicit suicide ideation. They do not infer any form of causation. In order to better understand the mechanism of action of any of these variables along with the true predictive affect of these variables on suicidal behavior, it is important to

conduct longitudinal studies that can capture a wider array of factors over multiple time periods and assess their effect on suicidal thoughts and behaviors.

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