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Sexting and mental health: A study of Indian and Australian young adults

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Abstract

The objective of this study was to examine engagement in sexting by young adults in India and Australia, and depression, anxiety and stress as risk factors for sending sexts. A total of 298 young Australian adults ($M_{age} = 19.98$ years, 75.50% female) and 300 young Indian adults ($M_{age} = 18.08$ years, 56.33% female) completed a survey (online and hardcopy) assessing sending and receiving of sexts, and mental health. Australian males were more likely to have sent sexts than Indian males, whilst Australian females were more likely to have both sent and received sexts than Indian females. Indian males were more likely than Indian females to have sent and received sext messages. Higher levels of stress were associated with sending sexts for participants overall, and for Indian respondents, but not Australians when analysed separately. For males overall, higher levels of stress and lower levels of depression were associated with sending sexts, whilst for females, there were no associations with mental health variables, but higher age was associated with sending sexts. Sexting behaviours may be associated with cultural values and vary by gender in more traditional contexts. Further investigation into associations between psychological distress and the probability of sending a sext are warranted.

Keywords: Sexting; depression; anxiety; stress; India; Australia

Introduction

The behavioural phenomenon of sending sexually explicit content via technology is commonly referred to as 'sexting' and has become one of the most common methods of online sexual interactions (Law Council of Australia, 2013). Sexting can be defined as the "sending, receiving or forwarding of sexually explicit messages, images or photos to others through electronic means, primarily between cellular phones" (Klettke, Hallford, & Mellor, 2014, p. 45). A recent systematic review of the literature concluded that the mean prevalence rates for sending of sexts was 53.31%, ranging from 20.5% to 75%, based on the 12 studies focusing on individuals aged 18 and over (Klettke et al., 2014). This suggests that sexting is a wide-spread behaviour which is increasingly normative (Levine, 2013), and part of the repertoire of interpersonal sexual communication for young adults.

Sexting has gained widespread media attention and concern due to the damaging potential emotional, social, and legal implications of sexting raised by a range of researchers. Studies have addressed negative impacts on social and emotional health (Dake, Price, Maziarz, & Ward, 2012), reputation, and relationships (Salter, 2016). Other researchers have noted that sexting can be considered as a form of sexual violence (Henry & Powell, 2015; Krieger, 2017). Additionally, explicit messages that have been sent and received can remain part of one's digital foot-print indefinitely (Drouin, Ross, & Tobin, 2015). These images and messages have the potential to resurface at any time, and may be propagated and published to unintended parties (Walker & Sleath, 2017). As a result, the images could be made available to potential employers, academic institutions, and family members (Mitchell, Finkelhor, Jones,

& Wolak, 2011). Consequently, there are significant negative consequences which may arise due to sexting behaviours.

While much of the research into sexting has focused on the legal implications and consequences, researchers have also explored correlations between sexting and exposure to risk behaviours or negative health outcomes (Lippman & Campbell, 2014). Studies have linked sexting behaviours with a range of high-risk behaviours, for example, increased alcohol use (Dir, Cyders, & Coskunpinar, 2013) and unsafe sexual relations (Crimmins & Seigfried-Spellar, 2014) and negative mental health symptoms, including suicidal ideation and attempts and feeling sad or hopeless (Dake et al., 2012; Frankel, Bass, Dai, & Brown, 2018). Given such associations between sexting and high risk behaviours, it is important to further explore the factors that may influence this behaviour.

Of particular interest is the relationship between mental health and sexting. Given the widespread prevalence of sexting behaviours (as noted above, with sending of sexts ranging from 20.5% to 75%, for young adults; Klettke et al., 2014), and with reported prevalence rates of mental health disorders in young adults of 26% (Australian Bureau of Statistics [ABS], 2007), it is likely that there is a significant overlap between those engaged in sexting and those experiencing mental health disorders. Given the potential negative mental health implications of sexting identified in other studies (Dake et al., 2012; Frankel et al., 2018), it is important to continue research on this relationship (Klettke et al., 2014). Such research will assist health professionals to understand the circumstances around sexting and psychological wellbeing, and allow them to better identify and support individuals experiencing negative mental health symptoms (Temple, Van Den Berg, Ling, Paul, & Temple, 2014). In this study we investigated three aspects of mental health: depression, anxiety, and stress, which represent some of the most common forms of mental illness in young adult population (ABS, 2007) and in relation to which prior studies have found a connection with sexting.

Depression

Researchers have proposed that being depressed may be a risk factor associated with sexting. Depression is the presence of symptoms that include feelings of worthlessness, low mood and loss of interest or pleasure, and can include suicidal ideation or attempts (Black & Grant, 2014). The reasons why an individual with depression might engage in sexting behaviour are unclear. It has been suggested that depressive mood states impair an individual's decision-making processes; therefore a person may be more inclined to send a sext without considering the potential consequences (Van Ouytsel, Van Gool, Ponnet, & Walrave, 2014). Several studies have found a positive relationship between depression and sexting (e.g., Dake et al., 2012; Drouin et al., 2015; Frankel et al., 2018; Medrano, Rosales, & Gamez-Guadix, 2018; Ševčíková, 2016; Van Ouytsel et al., 2014; Walker & Moak, 2010; Ybarra & Mitchell, 2014), whilst other studies found no significant association (Englander, 2012; Gordon-Messer, Bauermeister, Grodzinski, & Zimmerman, 2012; Morelli, Bianchi, Baiocco, Pezzuti, & Chirumbolo, 2016; Temple et al., 2014). These inconsistencies may be due to limitations of the studies including inadequate validity and reliability of the measures, but they suggest the need for further research.

Van Ouytsel et al. (2014) found that adolescents who showed higher levels of depression were significantly more likely to have engaged in sexting than those with lower levels of depression. Similarly, Dake et al. (2012) found that adolescent sexters were more likely to report negative health issues compared to non-sexters. Specifically, Dake et al. (2012) found that of those who reported to have engaged in sexting, 52% had attempted suicide in the past year, 50% had contemplated suicide and 29% of respondents had reported feelings of hopelessness and sadness for two weeks in the past year. Dake et al. (2012) proposed that individuals who are depressed may be sending sexts as an attempt to feel wanted by someone. It is important to note that this study was cross-sectional in nature and only examined correlations between variables, thus the exact nature and causal relationship remains unclear. It cannot be established which behaviour took precedence. Crucially, this study only contained two items as indicators of depression, and therefore was limited in its assessment.

Despite the aforementioned studies being correlational, one study does suggest a causal relationship between involuntary sext distribution and depression. Walker and Moak (2010) found that once a sext was distributed beyond the initial intended recipient, it had the potential to result in subsequent harm, sometimes to the point of suicide. Walker and Moak's (2010) findings suggest that it may not be the sexting itself causing negative health

symptoms; instead it is the propagation to unintended audiences that can cause depressive symptoms, and is of particular concern.

Anxiety

Another mental health factor that may influence sexting behaviour is anxiety. Anxiety is a state characterised by excessive anxiety and worry, with anxiety disorders sharing features of excessive fear and anxiety and related behavioural disturbances (American Psychiatric Association, 2013). At a clinical level, anxiety disorders are the most common mental health concern for Australians of all ages (ABS, 2007). Three studies have found a significant link between anxiety and sexting (Drouin et al., 2015; Englander, 2012; Weisskirch & Delevi, 2011). Drouin et al. (2015) found that people who display symptoms of anxiety are more likely to engage in sexting. The relationship found between sexting and anxiety included sexting coercion, indicating that people high in anxiety are perhaps more likely to be pressured into sending a sexual image.

Weisskirch and Delevi (2011) posited that individuals who have high anxiety may be sending sexual messages because they anticipate that it will improve their current or potential relationships. Therefore, people displaying symptoms of anxiety may be sexting because they believe that it will please their current intimate partner. According to Reid and Reid (2007), people with anxiety prefer texting to voice calls as a means for intimate contact. Therefore, it could be speculated that people who are anxious prefer sexting as a means for sexual interaction as it offers an avenue for sexual communication in the absence of immediate contact. In other words, electronic interaction may offer people suffering from anxiety a way of making social contact, as the fear of rejection and disapproval is lessened. However, two studies have failed to find a connection (Gorder-Messer et al., 2012; Temple et al., 2014).

Stress

Another mental health factor that may be associated with sexting is stress. Stress is both a physical and psychological response to the demands of life (Cosby, 2012). It can be defined as feelings of worry, strain and nervousness (Australian Psychological Society, 2012). Unlike depression and anxiety, there has been no research exploring the link between stress and sexting behaviour. However, previous studies (Hulland et al., 2014) have found that higher stress levels are associated with greater sexual risk-taking behaviours, particularly reduced condom use. Specifically, this reduction in condom use was attributed to the impact of heightened interpersonal stress on sexual decision making. It has already been established that people who sext are more likely to engage in risky sexual behaviours, demonstrating that sexual risk-taking and sexting are linked (Ybarra & Mitchell, 2014). Further, research suggests that psychosocial stressors may be constructs that underlie sexual risk-taking behaviours (Ethier et al., 2006). It then follows that the same may apply to sexting; that is, people who experience recurrent stress may be more likely to sext.

Sexting and Culture

While it has been found that, typically, boys are more likely than girls to use the internet to satisfy their sexual interests (Peter & Valkenburg, 2011), gender differences in regards to sexting are less conclusive. In relation to gender differences amongst adults, two studies indicated that females were more likely to send a sext, noting that being female increased the odds of sending a nude or semi-nude picture or video by over five times (Reyns, Henson, & Fisher, 2014; Strohmaier, Murphy, & DeMatteo, 2014). In contrast, two studies found that males were more likely to participate in sexting behaviours (Delevi & Weisskirch, 2013; Garcia et al., 2016), while two studies found no gender differences in the participation of sexting behaviours (Burke Winkelman, Vail Smith, Brinkley, & Knox, 2014; Hudson & Fetro, 2015). These findings are similar to those of Klettke et al. (2014), whose review also indicated mixed results. A review of the literature shows that even though sexting is a relatively recent phenomenon, there is a considerable amount of research on the subject. However, most of this research has been based in Western cultures (Jerome & Srinivasan, 2014), solely considering individual characteristics as predicative factors. Despite a growing interest, not much is known about both individual and cultural differences in the behaviour, even though there is evidence to suggest that social contexts in which children grow up have a significant influence on their behaviour (Bronfenbrenner, 1979; Igra & Irwin, 1996).

In a large cross cultural study, Baumgartner, Sumter, Peter, Valkenburg, and Livingstone (2014), investigated cultural factors in regards to the prevalence of sexting behaviours of adolescents in 20 European countries ($N = 14,946$). The study focused on the cultural value of traditionalism, defined as: “respect, commitment and acceptance of the customs and ideas that traditional culture or religion provide” (Schwartz, 1994), to define the intracontinental differences of the population. It was predicted that since traditional countries are characterised by conservative worldviews, unequal gender roles, and restrictive sexual attitudes (Boehnke, 2011; Wood & Eagly, 2010), there would be country based characteristics that predict sexting, and that individual predictors would vary across countries. Although country-based characteristics had no direct effect on sexting, the variable of traditionalism significantly predicted gender differences in the behaviour, with countries classified as more traditional (such as Cyprus, Slovenia, and Greece) being more likely to show stronger gender differences, with more males typically engaging in sexting behaviours than females. In contrast, in countries classified as being less traditional (such as Norway, Denmark, and Sweden) fewer gender differences were found (Baumgartner et al., 2014).

Some studies in non-Western countries have also been conducted, largely regarding prevalence of sexting behaviour and some associated personal characteristics. Lee, Moak and Walker (2013), in a study of South Korean youths, found that peer pressure was strongly associated with sexting, as were positive attitudes to sexting and prior delinquent behaviours. Liang and Cheng (2017), in a study of young Chinese adults, found that males were likely to have more positive norms and self-efficacy regarding sexting, and to engage in this behaviour more than females. Similarly, in a study of Peruvian youths (West et al., 2014), males were more likely to engage in sexting behaviours, and to experience less parental barriers or disapproval regarding all forms of sexual activity. However, there is limited cross-cultural research that uses the consistent definitions and methodologies to compare Western and non-western cohorts in relation to sexting behaviours. In their recent editorial, Ngo, Jaishanker, and Agustina (2017) note the dearth of cross-national and cross-cultural investigations of sexting, and recommend this as a key direction for future research.

Current Study

The current study explored mental health in association with sexting, and also assessed gender in relation to sexting. Further, this exploration was conducted in two cultural contexts, Australia and India, to explore differences. Previous research suggests the potential for a significant link between depression, anxiety, and stress in sexting behaviours, but does not cover these considerations at a cross cultural level. Further empirical exploration into sexting and psychological wellbeing across cultures is warranted given the research gap, as noted by Ngo et al. (2017). Specifically, past research has used a range of definitions (including only image-based, or image- and text-based messages), has shown inconsistent findings and has considerable sample biases. Therefore, the present study sought to extend prior research, to investigate possible links between sexting behaviour and mental health, using validated measures of mental health and a consistent definition of sexting across two cultural contexts.

The Australian and Indian contexts offer significant differences in relation to both cultural norms, and access to information and communication technologies (ICT), which offer a relevant contrast for further investigation of sexting behaviours. The World Economic Forum (Baller, Dutta, & Lanvin, 2016), in its comparison of individual ICT usage, ranked Australia 13th and India 120th (out of 139 countries for which data was available), suggesting that Australian individual usage of digital communications was significantly more widespread than Indian utilisation. In India in particular, there is a significant divide between metropolitan hubs with well-connected infrastructure and high digital literacy, and rural hubs where infrastructure is less established and literacy in all forms tends to be lower.

When considering cultural norms, Indian culture tends to hold more traditional cultural values, as defined by Schwartz (1994). For example, these traditional values may encompass more rigid gender norms, which is exemplified by a cultural preference for the male gender. This preference is embedded across the lifespan from female infanticide and neglect and violence against women and girls, through to increased educational and financial prospects for males, who are seen as economically more important to the family (Lindsey, 2013). The WEF Global Gender Gap report (Schwab et al., 2017) provides a global gender gap index, which measures gender-based disparities across time, with a score of 1 representing perfect gender equality. In 2017 (the most recent

available data), Australia was ranked 35th of 144 nations with a global gender gap index of 0.731, whilst India was ranked 108th, with a global gender gap index of 0.669. These results suggest that Indian culture promotes more structured gender roles for males and females, along with more stringent behavioural expectations, often described as traditional cultural norms.

Regarding cross cultural assessment, to the author's knowledge, only one study has been published examining Indian samples in relation to sexting behaviour (Brar, Dworkin, & Jang, 2018). This study of young tertiary-educated adults focused on parental attitudes to a range of sexual behaviours. Brar et al. (2018) found that having received a sexually explicit image was more common (31% of male and 34% of female college students) than having sent one (23% of male and 18% of female college students), but gender differences were not significant. Jerome and Srinivasan (2014) conducted a study of victimisation of young girls through mobile phone usage, including receiving and sending sexually explicit images and messages. Both Brar et al. (2018) and Jerome and Srinivasan (2014) note that most research on sexting has been conducted in western countries. Jerome and Srinivasan (2014) found that roughly 73% of Indians possess a mobile phone capable of sending and receiving sexts (Jerome & Srinivasan, 2014), as compared with 93% mobile phone ownership for Australian adults (Poushter, 2016). These figures, and the scarcity of empirical research, suggest significant scope for further study across these populations to determine their engaging in sexting behaviours and the impact on their mental health.

Based on the previous findings, it was hypothesised that:

H1. A gender difference in engagement in sexting behaviours will be observed in a more traditional cultural context (India) with males being more likely to engage in both sending and receiving of sexts than females, while no such difference will be observed in a less traditional cultural context (Australia).

H2. There will be significant positive associations between sending sexually explicit images and increased levels of depression, anxiety and stress among young adults in both settings.

Method

Participants and Procedure

Participants in both cohorts of this study were young adults, ranging from 18-21 years for the Australian sample, and 17-20 years for the Indian sample, with both studies conducted in 2015. The Australian sample included 298 individuals, of whom 225 (75.50%) were female and 73 (24%) were male, and the average age was 19.98 years ($SD = 1.05$). The Indian sample was comprised of 300 individuals, of whom 169 (56.33%) were female and 131 (43.67%) were male, with an average age of 18.08 years ($SD = 1.09$). Whilst the majority of Indian respondents completed this study offline, the demographics section of the Indian survey (but not the Australian survey) included a question asking who pays for their mobile phone bill, with 74% paying their own, and 26% paid by their parents, confirming that the Indian sample did have access to phone-based technology.

An independent samples t -test identified a significant difference between the ages of participants in Australia and India ($t(594) = 21.62, p < .001$), and this was accounted for in regression analyses. Likewise, a Chi-square test of independence found a significant difference between the gender distributions of the samples ($\chi^2(1) = 24.44, p < .001$).

Approval to conduct the study was obtained from each of the authors' institution's Human Research Ethics Committee. Australian participants were recruited by student researchers through a Facebook advertisement and a snowballing technique that allowed participants to share the study on their external Facebook pages or forward the link to the study on to other potential participants. Once potential participants clicked on the link in the invitation, a new window would open to a Plain Language Statement describing the purpose and nature of the study. The PLS also informed potential participants that they were under no obligation to participate in the research, that their participation was completely voluntary, and that the submission of the survey would be taken to signify that they had consented to partake in the study. If willing to continue with the survey, participants clicked on an agreement tab which led them to the survey.

In India, pilot work was carried out with 50 participants recruited through social networking sites and snow balling to assess the feasibility of using the online data collection method. However, although these participants expressed satisfaction with the approach, further participants were difficult to access. Due to this low response rate, permission was sought from the ethics committee to administer the survey offline in hardcopy format. Colleges based in Bangalore, Karnataka, India were randomly selected and approached. Once approvals from the administrations were received, the survey was administered to groups of approximately 10-20 students who provided informed consent.

Measures

This study involved an online and paper-based survey focusing on sexting behaviours and mental health status. Descriptives for measures can be found in Table 1.

Sexting behaviours. The survey included demographic items, questions pertaining to participant engagement in receiving and sending sexually explicit images via text messages (sexts), consistent with the definition used by Dake et al. (2012). Participants were asked about receiving and sending of sexts via two questions: "Have you ever received sexually explicit images via text message?" (Yes/No) and "Have you ever sent sexually explicit images of yourself via text message?" (Yes/No).

Mental health. Mental health was assessed through responses to the short form of the Depression, Anxiety and Stress scale (DASS-21, Lovibond & Lovibond, 1995). This 21-item self-report questionnaire consists of three seven item subscales designed to measure the negative emotional states of depression (e.g., "I couldn't seem to experience any positive feeling at all"), anxiety (e.g., "I was aware of dryness of my mouth"), and stress (e.g., "I found it hard to wind down"). Respondents rate the extent to which each statement applied to them over the past week on a 4-point Likert scale (0 = *Not at all*; 3 = *Very much, or most of the time*). Scores for the DASS-21 are computed by adding the responses to items for each 7-item subscale, and then multiplying the sum by 2 (for comparison with norms from the longer 42-item scale). Higher scores indicate more severe emotional distress. The DASS-21 has adequate and high internal consistency with a Cronbach's alpha of .88 for the Depression subscale, .82 for the Anxiety subscale and .90 for the Stress subscale (Henry & Crawford, 2005). When compared to other measures of depression and anxiety, the DASS-21 has good convergent and discriminant validity (Henry & Crawford, 2005). In the current study, Cronbach alphas were .83 for the Depression subscale, .78 for the Anxiety subscale, and .78 for the Stress subscale. For the Australian sample the alphas were .90, .86 and .87 respectively, and for the Indian sample, .73, .66 and .63.

Analysis

All analyses were conducted using IBM SPSS V.25. Although there was a significant difference in the age and gender profiles for the two samples, this difference was accounted for in analyses, as was country. In order to investigate Hypothesis 1, chi square tests of independence were conducted between age, country and gender and sexting behaviour. To investigate Hypothesis 2, whether the mental health variables of depression, anxiety and stress are associated with increased engagement in sexting behaviours (specifically receiving and sending sexts), a MANCOVA, correlations and binary logistic regression analyses were performed, with gender, age and country included in these analyses to control for these factors.

Results

In order to investigate the first hypothesis, chi-square tests of independence were performed to examine the relationships between country, gender and sexting behaviours, specifically receiving and sending of sexts. Comparisons across nationality overall found significant differences in both receiving ($\chi^2(1) = 65.47, p < .001$) and sending ($\chi^2(1) = 152.42, p < .001$), with Australians having higher rates of both behaviours (see Table 1).

Separate comparisons for each gender revealed that Australian males were more likely than Indian males to send sexts ($\chi^2(1) = 37.66, p < .001$), while Australian females were more likely to both send and receive sexts than Indian females, ($\chi^2(1) = 119.84, p < .001$ and $\chi^2(1) = 107.88, p < .001$ respectively). When gender differences were analysed by country, Indian males and Indian females differed significantly on both receiving ($\chi^2(1) = 83.72, p < .001$) and

sending sexts ($\chi^2(1) = 15.62, p < .001$), with Indian males having higher rates of both. Australian males and females did not differ significantly on either receiving ($\chi^2(1) = 3.64, p = .056$) or sending sexts ($\chi^2(1) = 0.081, p = 0.78$).

In order to test the second hypothesis, a MANCOVA controlling for age was used to explore gender and country differences in depression, anxiety and stress scores (see Table 1). The model was significant $F(3, 583) = 3.11, p = .03$, Wilks' $\lambda = .98$, partial $\eta^2 = .02$, observed power = .73. There were significant effects for both country $F(3, 583) = 6.90, p < .001$, Wilks' $\lambda = .97$, partial $\eta^2 = .03$, observed power = .98 and gender $F(3, 583) = 5.52, p = .001$, Wilks' $\lambda = .97$, partial $\eta^2 = .03$, observed power = .94. There was also a significant interaction between country and gender, $F(3, 583) = 5.27, p = .01$, Wilks' $\lambda = .97$, partial $\eta^2 = .03$, observed power = .93. Post-hoc testing revealed that Indian participants scored higher than Australian participants on the DASS subscales measuring depression, $F(1) = 5.69, p = .02$, partial $\eta^2 = .01$, observed power = .66, and anxiety, $F(1) = 16.20, p < .001$, partial $\eta^2 = .03$, observed power = .98. Male participants scored higher on the anxiety subscale than did females, $F(1) = 4.12, p = .04$, partial $\eta^2 = .07$, observed power = .53 (see Table 1). There were no significant interaction effects at the univariate level.

Table 1. Mean and Standard Deviations for Depression, Anxiety and Stress scores, and Frequency and Percentages of Engagement in Sexting Behaviours by Country and Gender.

	Depression (M, SD)	Anxiety (M, SD)	Stress (M, SD)	Has sent sext (frequency and %)	Has received sext (frequency and %)	Has both sent and received (frequency and %)
Australia						
Male	10.9 (10.16)	8.53 (9.41)	11.15 (9.57)	42 (57.5%)	57 (78.1%)	42 (57.5%)
Female	8.43 (8.7)	7.74 (8.35)	13.00 (9.69)	125 (55.6%)	149 (66.2%)	114 (50.7%)
Total	9.03 (9.1)	7.94 (8.6)	12.55 (9.68)	167 (56%)	206 (69.1%)	156 (52.4%)
India						
Male	12.84 (9.11)	13.77 (8.67)	13.30 (7.75)	21 (16%)	85 (64.9%)	19 (14.5%)
Female	12.40 (7.91)	11.97 (7.20)	12.18 (7.04)	5 (3%)	23 (13.6%)	3 (1.7%)
Total	12.59 (8.44)	12.75 (7.91)	12.67 (7.36)	26 (8.7%)	108 (36%)	22 (7.4%)

To test the relationship between country, gender, age, mental health variables and sending of sexts, bivariate correlations were performed between these variables using data from both countries (see Table 2). These correlations showed significant correlations between sending sexts and country, $r(597) = .502, p < .001$, age, $r(595) = -.390, p < .001$, anxiety, $r(594) = .120, p < .01$ and depression, $r(596) = .112, p < .01$.

Table 2. Correlation Table for Country, Gender, Age, Depression, Anxiety and Stress Scores and Sending Sexts.

	Country	Gender	DASS_Stress	DASS_Anxiety	DASS_Depression	Age	Sent Sexts
Country	-	-.200***	.008	.279***	.198***	-.664***	.502***
Gender		-	.006	-.129**	-.106*	-.020	-.022
DASS_Stress			-	.667***	.661***	.028	-.046
DASS_Anxiety				-	.693***	-.212***	.120**
DASS_Depression					-	-.141**	.112**
Age						-	-.390***
Sent sexts							-

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

Logistical regression analyses were used to determine if depression, anxiety, and stress ratings predicted participants' likelihood of sending sexts when controlling for country, gender and age (see Table 3). The results of regressions using all participants from both countries indicate that country ($B(1) = -2.310, p < .001$), gender ($B(1) = -0.589, p = .05$) and stress ($B(1) = -0.040, p < .05$) are all significant predictors of sending sexts, with Australians, males, and higher levels of stress being linked to sexting.

Table 3. Results for Regression Analysis of Depression, Anxiety and Stress Scores, against Engagement in Sexting Behaviours by Country and Gender.

Mental Health	B	SE	Wald	Df	Sig	Exp (B)
Sending a sext – Overall						
Age	-0.160	0.099	2.606	1	.106	0.852
Gender*	-0.589	0.243	5.869	1	.015	0.555
Country**	-2.310	0.308	56.139	1	< .001	0.099
DASS_Stress*	-0.040	0.019	4.728	1	.030	0.960
DASS_Anxiety	0.002	0.019	0.016	1	.898	1.002
DASS_Depression	0.033	0.018	3.376	1	.066	1.033
Constant	5.612	1.823	9.478	1	.002	273.654
Sending a sext – Indian sample						
Gender**	1.712	0.505	11.493	1	.001	5.542
Age	-0.050	0.195	0.065	1	.798	0.951
DASS_Stress*	-0.081	0.038	4.478	1	.034	0.923
DASS_Anxiety	0.064	0.041	2.426	1	.119	1.066
DASS_Depression	-0.003	0.036	0.006	1	.939	0.997
Constant	1.153	3.840	0.090	1	.764	3.168
Sending a sext – Australian sample						
Gender	0.151	0.292	0.266	1	.606	1.163
Age	-0.166	0.116	2.066	1	.151	0.847
DASS_Stress	-0.023	0.022	1.097	1	.295	0.978
DASS_Anxiety	-0.015	0.022	0.419	1	.517	0.986
DASS_Depression	0.033	0.021	2.596	1	.107	1.034
Constant	2.936	2.456	1.429	1	.232	18.836
Sending a sext – Whole sample split by gender						
Male						
Age	0.021	0.169	0.015	1	.901	1.021
DASS_Stress*	-0.071	0.035	4.244	1	.039	0.931
DASS_Anxiety	-0.004	0.031	0.015	1	.903	0.996
DASS_Depression*	0.065	0.028	5.511	1	.019	1.067
Country**	2.104	0.474	19.732	1	< .001	8.199
Constant	-2.711	3.770	0.517	1	.472	0.066
Female						
Age*	-0.258	0.123	4.390	1	.036	0.773
DASS_Stress	-0.016	0.023	0.458	1	.499	0.985
DASS_Anxiety	0.017	0.025	0.453	1	.501	1.017
DASS_Depression	-0.007	0.025	0.078	1	.780	0.993
Country**	2.946	0.496	35.219	1	< .001	19.028
Constant	2.116	2.705	0.612	1	.434	8.295

Further regression analyses for each country separately illustrated that within Indian participants (both genders), gender ($B(1) = -1.71, p < .01$) and stress ($B(1) = -0.08, p < .05$) were significant predictors of sexting behaviour, with being male and higher levels of stress linked to sending a sext, whilst there was no association with age. For the Australian sample overall, neither gender, age nor any of the mental health variables were significant predictors of sending a sext.

The sample was also analysed by gender. For males, country ($B(1) = 2.10, p < .001$), stress ($B(1) = -0.07, p < .05$) and depression ($B(1) = 0.07, p < .05$) were all significant predictors of sending a sext, with being Australian, higher levels

of stress and lower levels of depression all associated with increased likelihood of sending a sext. For females, country ($B(1) = 2.95, p < .001$) and age ($B(1) = -0.25, p < .05$) were the only significant predictors of sending a sext, with being Australian and being older associated with increased likelihood of sending a sext.

Discussion

The current study aimed to explore gender and cultural differences in sexting behaviours and the associations between sending and receiving of image-based sexts in India and Australia and mental health.

Overall, a clear difference in sexting behaviours between the two countries could be observed, with Australians overall more likely to engage in both receiving and sending of sexts than Indians. Hypothesis one predicted that a gender difference in engagement in sexting behaviours would be observed in India but not Australia, with males in India being more likely to sext than females. The results support this hypothesis, with the analyses indicating that within this sample, Indian males were more likely to both send and receive sexts than Indian females, whereas Australian males and females did not differ significantly on either sexting behaviour. When comparing the two nations, whilst Indian males were more likely to engage in sexting than Indian females, they were less likely to receive sexts than Australian males.

These findings are consistent with the large cross cultural study conducted by Baumgartner et al. (2014) among teenagers in Europe. It suggests that traditional cultural values may be protective against engagement in sexting behaviours for females and to a lesser extent, for males. The greater engagement in sexting for males could be attributed to traditional gender norms and attitudes, which support engagement in initiating sexual contact as more appropriate for males than females, as noted by Mehrotra, Zimmerman, Noar, & Dumenci, (2013).

We note that in another recent Indian study conducted by Brar et al., (2018), for which data was collected in 2015, there was no statistical difference in sending or receiving sexts between males and females. Whilst sample sizes in the study by Brar et al. (2018) were small and with significantly more males than females, the sample population was limited to students studying at a tertiary institution, and recruitment was conducted via MTurk, an online crowd-sourcing platform. Brar et al. (2018) do note a likely sample bias towards more digitally sophisticated users, who might be assumed to be more engaged in a range of online behaviours including sexting. However, various authors (Brar et al., 2018; Majumdar, 2017; Mehrotra et al., 2013) have noted a broader trend in Indian young adults to increased online sexual behaviours. It is suggested that behavioural norms in India may be moving rapidly, possibly with increased exposure and acceptance of non-traditional norms, as well as increased access to independent communication via digital technology.

Hypothesis two predicted that participants who scored higher on depression, anxiety and stress would be more likely to participate in sexting behaviour. Logistical regression analyses do not support these predictions. In the overall sample, of the mental health variables, only higher levels of stress were significantly associated with sending sexts. Reviewing the results by country due to significant differences in DASS scores, for the Indian sample, higher levels of stress were significantly associated with sending sexts whilst no mental health variables were associated with sending sexts for the Australian sample. When considered by gender, in addition to the country differences noted above, increased levels of stress and lower levels of depression were associated with sending a sext, whilst for females no mental health variables were associated with sending sexts.

These findings are in contrast with those of Van Ouystel et al. (2014) who reported that higher levels of depression were significantly positively associated with engagement in sexting, as well as those of several studies have found a significant link between anxiety and sexting (Drouin et al., 2015; Englander, 2012; Weisskirch & Delevi, 2011). A possible explanation is that sexting occurs in the context of initiating sexual contact, as a voluntary behaviour. As such, increased stress may be associated with this behaviour, due to the perceived potential consequences of the behaviour. For males, our current findings also suggest that initiation of sexual contact or activity is less likely when they are experiencing depression. Further research would be valuable to investigate this finding in more detail.

The finding that for Indian participants, increased levels of stress were associated with sending sexts is novel in that there are no previous studies exploring this link. We suggest that as previous research by Hulland et al. (2014)

has reported that higher stress levels are associated with greater sexual risk-taking behaviours, stress may also be associated with sexting, especially as sexting has already been associated with risky sexual behaviours (Ybarra & Mitchell, 2014). This finding warrants further investigation.

Despite the above, it should be noted that data from the Indian sample show that the majority of males have received sexts (64.9%), however only 16% of males, and 3% of females reported having sent them. The immediate implication from these numbers is that there are a small number of senders who are distributing to a wider audience. Alternatively, it may be that some of the images being shared are of celebrities or commercial pornography images, rather than of people known personally to the individual. The low level of engagement in sexting behaviour may also limit the confidence that can be placed in the results of the regression analyses. However, given the relatively scarcity of cross-cultural research examining sexting practices in western and non-western contexts, this study provides a useful benchmark of the prevalence of such behaviours in two contexts, and their associations with mental health variables of depression, anxiety and stress.

Limitations

Whilst this study provides some novel information, limitations are noted. In particular, we note the significant differences in the gender and age profiles for the two cohorts. Whilst regression analyses controlled for age and gender, the difference in gender profiles does limit the comparability of results between the two cohorts. Secondly, as a convenience sample, participants could be self-selecting on the basis of being more willing to discuss sexting behaviours, which may limit generalisability.

Another potential limitation with these findings is that all Australian participants completed the survey online, while the majority of Indian participants completed hardcopy questionnaires. It is possible that online survey participants are more likely to provide frank responses because the environment appears to be more anonymous. In contrast, paper-based surveys may feel less anonymous, especially as Indian participants also completed and signed a consent form. These participants may have been reluctant to admit to sending sexts regardless of privacy disclaimers. Conversely, as receiving a sext is a passive involvement in the interaction, it may be seen as not a punishable offence, and thus harmless enough to freely admit on a survey. As such, caution must be exercised when interpreting the results, as some respondents may have been reluctant to disclose behaviours they considered shameful or private. Small sub-group numbers, particularly for Indian females, should also be interpreted with caution. Lastly, as this study was based on responses to a single survey with no longitudinal analysis, no causation can be inferred from these analyses.

Implications

As noted earlier, prior authors have noted significant gaps in the current literature around sexting, particular with regard to a dearth of cross cultural studies (Ngo et al., 2017). This study addresses that gap through a cross-cultural study of Australian and Indian young adults and their rates of engagement in receiving and sending sexts, and the association with mental health indicators. We found significant differences in prevalence and association with mental health, which has significant implications and points to directions for future studies. Our results suggest that local gender norms, religious influences, parental attitudes towards sexuality and other cultural factors that have been found to influence other forms of sexual activity should be taken into account in future research, with regard to determining the frequency and impact of engagement in sexting behaviours. When discussing findings from sexting research drawn from western populations, researchers need to be cautious in drawing inferences to non-western settings.

However, this study does offer findings that suggest further research into sexting prevalence in different cultural contexts is worthwhile. Further studies that examine dimensions of psychological distress and their association with sending sexts is indicated as the association may vary by both gender and cultural context. It would also be helpful to examine more immediate state-based measures of mood and behaviour using techniques such as ecological momentary assessment (EMA; Bolger & Laurenceau, 2013). Finally, future studies might explore cultural identity and personal dimensions of culture that are associated with the level of engagement in sexting.

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