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Exploring how perceived threat and self-efficacy contribute to college students' use and perceptions of online mental health resources



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ABSTRACT

Drawing from prior fear-appeal and information seeking research, this study explored how perceived threat and self-efficacy predicted college students' use and perceptions of online mental health resources. Results showed that perceived vulnerability was a modest, yet robust predictor of visiting any Internet website and joining an online support group, while self-efficacy modestly predicted greater perceived usefulness and trust for online support groups. Although numerous interactions emerged between self-efficacy and perceived threat, the impact of these relationships on use and perceptions of these services varied significantly. In particular, at higher levels of self-efficacy, perceived severity negatively predict use of online services yet also positively predicted trust in these resources. Furthermore, results showed that vulnerability was only associated with favorable judgments of web services at lower levels of efficacy. Overall, the findings suggest that self-efficacy and perceived threat play a small, yet significant role in explaining online mental health information seeking outcomes; however, the exact nature by which these factors operate together to influence one's use and larger impressions such resources remains unclear.

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1. Introduction

College students often struggle with mental health issues when grappling with a university environment filled with academic and social pressures. While mental health concerns are prevalent among people this age (Andrews, Hall, Teesson, & Henderson, 1999; Substance Abuse, 2009), prior research indicates that many young adults will not search for help that sufficiently addresses the severity of their condition (Rickwood, Deane, & Wilson, 2007; Sullivan, Arensman, Keeley, Corcoran, & Perry, 2004). Furthermore, when seeking assistance, the on-campus services offered may be inadequate. Recent data found that 62% of students who dropped out of college with mental health issues acknowledged the main reason being the challenge of managing school with mental health (National Alliance on Mental Illness [NAMI], 2012). The same study also found that nearly 40% of students seeking mental health services reported appointment wait times of 5 days or more (NAMI). Given both the reluctance to seek treatment as well as the possible inadequacies of on-campus services, it is critical to isolate factors that motivate college students to seek out other resources.

The Internet is one resource that has become increasingly more appealing for adults seeking health information. The web offers substantial advantages including greater personal anonymity (with the exception of IP addresses), privacy, and convenience. Most importantly, while mental health stigma deters many from seeking out certain resources for treatment (Corrigan, 2004), the relative personal anonymity of the web provides some security against this social persecution (Berger, Wagner, & Baker, 2005). Research indicates that the majority of college students report using the Internet to acquire general health information and nearly half of all students indicate that they have frequently searched the web for this information (Escoffery et al., 2005). However, although recent studies conducted outside the US suggest many young adults are also using online resources to manage mental health issues (Horgan & Sweeney, 2010; Oh, Jorm, & Wright, 2009), there is little research exploring what contributes to young adults perception and use of these services.

To that end, this study examines how specific psychosocial factors contribute to students' use and perceptions of online mental health resources. Perceived threat and self-efficacy, factors frequently examined as predictors of physical health behavior (Rogers, 1975; Witte, 1994) and information seeking for physical health issues (Johnson & Meischke, 1993; Turner, Rimal, Morrison, & Kim, 2006) are explored as predictors of students' previous use and attitudes toward web services. In addition to addressing the

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independent contribution of these factors, this study aims to extend prior fear appeal research (Witte, 1992, 1994) by investigating the interaction of threat and efficacy on students' use and perception of these resources.

2. Online information seeking and mental health

Information seeking reflects purposeful attempts to attain information from specific information sources (Johnson, 1997). Information seeking from different sources can be used to fulfill specific functions. Schooler, Flora, and Farquahar (1993) posit that people will seek more extensive details from resources that provide more information, such as skills to manage one's health issues. For example, interpersonal relationships and health care providers are often a key source of health information (Lenz, 1984; Pecchioni & Sparks, 2007). Consequently, for many college students information seeking may reflect seeking out friends and family members for assistance, as well as consulting directly with a health care provider.

Although these traditional resources (as well as traditional forms of mass media) are useful outlets to obtain health information (Napoli, 2001), the Internet is increasingly becoming an attractive channel to acquire useful health knowledge. The advantages of online health information seeking are abundant, including opportunities for interaction, social support, and tailored search options, while simultaneously maintaining one's relative personal anonymity (Barker, 2008; Berger et al., 2005; Cline & Haynes, 2001; Drentea & Moren-Cross, 2005; Lambert & Loisel, 2007). Prior research indicates that nearly three-fourths of college students report ever using the Internet to acquire health information and nearly half of all students indicate that they have frequently searched the web for this information (Escoffery et al., 2005).

Communication research examining online health information seeking has primarily addressed physical health issues (Han et al., 2010; Johnson & Meischke, 1993). However, recent data shows that the percentage of adults seeking mental health information online rose from 22% in the year's 2002–2006 to 28% in 2008 (Fox & Jones, 2009). Few studies (Horgan & Sweeney, 2010; Oh et al., 2009) have specifically examined young adults perception and use of online mental health resources. These investigations, which were conducted outside the US, suggest that young adults value online mental health information. One recent study conducted at an Irish university found that roughly 31% of young people had sought out mental health information online (Horgan & Sweeney). Preferences for this medium centered on themes of accessibility, anonymity, and integrity. In addition, Oh et al. found that following a brief vignette describing someone with a mental health problem, over 70% of Australian adults aged 18–25 rated "looking up a website" as being helpful for that person (p. 295). While these studies offer evidence that students value and frequently use online mental health resources, researchers have yet to clearly address the health-related and social elements that motivate use. The following sections draw on previous research in the domain of physical health issues to examine specific psychosocial factors (perceived self-efficacy, threat, and public stigma) that may assist in explaining students' use and perceptions of online mental health resources.

2.1. Efficacy and threat appraisal

2.1.1. Self-efficacy

Self-efficacy, or the perceived ability to execute behaviors necessary to achieve specific goals (Bandura, 1997) has been extensively researched as a predictor of healthier behaviors (see Bandura, 2004). Importantly, these self-perceptions also translate into greater health information seeking behavior. Johnson (1997) posits that one's "perception of the extent to which he or she can

control events" may impact information-seeking behavior (p. 73). Research has found that those with a greater feeling of control and self-efficacy are more likely to seek health information, whereas those in more powerless states are less likely (Harris, 1998; Lee, Hwang, Hawkins, & Pingree, 2008; Leydon et al., 2000; Lichter, 1987). Overall, both theoretical and empirical research supports a positive relationship between efficacy and information seeking. This leads to the following hypothesis:

H1. Self-efficacy will be positively associated with use of online mental health resources.

The comprehensive model of information seeking (CMIS) postulates that efficacy beliefs are one of various health-related factors that contribute to greater perceived utility of information resources (Johnson, 1997). Based on the authors' search, only one study has assessed the association between self-efficacy and perceptions of online health information (Rains, 2008). Results of that study showed that an Internet-specific measure of self-efficacy was positively associated with more favorable attitudes concerning the quality of health information on the web. Drawing from this research as well as the CMIS, the following is predicted:

H2. Self-efficacy will be positively associated with favorable impressions of online mental health resources.

2.1.2. Threat appraisal

Perceived threat is often also posited as a central predictor of health behaviors (Rogers, 1975; Rosenstock, 1974; Witte, 1992). Threat appraisals reflect situations in which people examine elements that raise or lower the probability they will alter behavior, employ a protective behavior, or do both (Neuwirth, Dunwoody, & Griffin, 2000). These evaluations result from perceptions of personal severity and vulnerability to the threat (McMath & Prentice-Dunn, 2005). Severity involves the seriousness of a specific threat whereas vulnerability refers to how likely one is at risk (Umeh, 2004; Witte, 1992). Although perceived severity and vulnerability are frequently combined to form one perceived threat measure (e.g., Turner et al., 2006; Witte, 1992), researchers have also investigated the unique relationship each has with a given health behavior (e.g., McKinley, 2009; Umeh, 2003).

In addition to the utility of perceived threat for explaining specific health behaviors, various theoretical models include this concept as a predictor of information seeking action (e.g., Johnson, 1997; Turner et al., 2006). For example, initial tests of the CMIS assessed subjective probability and fear of cancer (combined into a 'perceived salience' construct) as health-related factors that indirectly predicted information-seeking behavior through perceived utility of the information source. In addition, three theoretical approaches drawn from the fear appeal literature – protection motivation theory (PMT), the extended parallel processing model (EPPM), risk perception attitude framework (RPA) – examine how personal threat is linked to information seeking and information avoidance (Neuwirth et al., 2000; Turner et al., 2006; Witte, 1992).

With few exceptions (Johnson & Meischke, 1993) prior research suggests that perceived threat is associated with health information seeking (Brouwers & Sorrentino, 1993; Neuwirth et al., 2000; Rains, 2007; Rippetoe & Rogers, 1987; Turner et al., 2006). This leads to the following predictions:

H3a. Perceived severity will be positively associated with use of online mental health resources.

H3b. Perceived vulnerability will be positively associated with use of online mental health resources.

Few studies (Johnson & Meischke, 1993; Rains, 2007) have explored the connection between threat and perceptions of information resources. Although the CMIS predicts that perceived threat would influence perceived utility of health information sources, neither study exploring this relationship found a significant association between these variables. Furthermore, of these investigations, Rains (2007) found that perceived cancer risk was not associated with perceived usefulness of *online* information. This finding, coupled with earlier research (Johnson & Meischke) suggests that it is unclear what relationship, if any, exists between threat appraisal and perception of online mental health information. This leads to the following research questions:

RQ1a: Is perceived severity associated with favorable impressions of online mental health resources?

RQ1b: Is perceived vulnerability associated with favorable impressions of online mental health resources?

2.1.3. The interaction between threat and efficacy

An extensive body of research has assessed how threat and efficacy interact to predict health behaviors (Witte & Allen, 2000). While research generally indicates that significant interactions exist between these factors, when applied to health information seeking, findings across studies have been inconsistent. In particular, although increased threat coupled with low levels of efficacy does appear to trigger greater anxiety (Turner et al., 2006; Witte, 1994), the resulting anxiety may lead to greater or lesser information seeking behavior (Czaja, Manfredi, & Price, 2003; Turner et al., 2006). Furthermore, recent studies suggest that those perceiving greater levels of threat may not necessarily engage in avoidance strategies, but rather, may actively seek out health information as a means of alleviating these concerns (Turner et al., 2006). Overall, efficacy and perceived threat do appear to interact to predict health information seeking, however, the inconsistency in the nature of this interaction leads to the following research questions:

RQ2a: How does self-efficacy interact with perceived severity to predict use of online mental health resources?

RQ2b: How does self-efficacy interact with perceived vulnerability to predict use of online mental health resources?

Furthermore, to the authors' knowledge, there is no research that has examined the interactive effects of threat and efficacy on perceptions of health information resources. One conceivable prediction is that when perceiving high levels of personal threat but lacking adequate levels of self-efficacy to manage these concerns, users may view online information resources as being particularly valuable. Unfortunately, there lacks a broader theoretical rationale to support this assumption. This leads to the following research question:

RQ3a: Does self-efficacy moderate the relationship between perceived severity and favorable impressions of online mental health resources?

RQ3b: Does self-efficacy moderate the relationship between perceived vulnerability and favorable impressions of online mental health resources?

3. Method

A total of 443 undergraduate students from two medium-sized northeastern universities participated in this study. Students received modest extra credit for their participation. Participants ranged in age from 18 to 33 with a mean age of roughly 20 years old ($M = 19.97$; $SD = 2.69$). Males represented 33% of respondents whereas females comprised 67% of the sample. The majority of

students (71.6%) were white, followed by Hispanic/Latino (9%), African-American (7.7%), and Asian/Pacific Islander (5%). Roughly 7% of respondents (6.8%) reported being either mixed-race or other ethnic/racial designation. Given the disproportionately small number of participants ($n < 50$) in all categories except white, for analysis purposes, all respondents were grouped into either a white or non-white category.

3.1. Questionnaire

During the spring of 2012, students completed a survey that included the central variables in this study as well as demographics (mentioned above) and control measures. For all multi-item measures, items were summed together then averaged to create scales.

3.2. Control measures

3.2.1. Overall mental health

Overall mental health was addressed through the short-form mental health inventory scale (MHI-5, Berwick et al., 1991). This scale has been found to be as good or better at predicting the most significant Diagnostic Interview Schedule (DIS) disorders (depression, anxiety, affective disorders) as other frequently employed mental health assessments including, the 18-item MHI and the 30-item scale taken from the General Health Questionnaire (Berwick et al.). All items were measured on a 1–6 interval-level scale, with '1' labeled as "none of the time" and '6' labeled as "all of the time." Higher scores therefore reflected poorer mental health. An example item for this scale is, "How much of the time during the last month have you been a nervous person?" The reliability for this scale was $\alpha = .78$.

3.2.2. Perceived public stigma

Use of the Internet for health information is particularly important for individuals with stigmatized health issues, such as those pertaining to mental health (Berger et al., 2005). Stigma refers to a devaluing process traced to undesirable characteristics possessed by an individual (Brown, Macintyre, & Trujillo, 2003). In a national cross-sectional survey, Berger et al. (2005) found that those with stigmatized illnesses, and in particular, psychiatric conditions (depression and anxiety), were more likely to use the Internet to obtain health information than were those with less-stigmatized conditions. Drawing from these findings as well as other information-seeking research (Powell & Clarke, 2006), it is probable that perceiving negative social perceptions/stereotypes for seeking out mental health services may result in greater use of online resources. To measure perceived public stigma, the adapted version of the Stigma Scale for Receiving Psychological Help was employed. One of the only brief measures of perceived stigma to be empirically validated (Komiya, Good, & Sherrod, 2000; Pyne et al., 2004), the modified scale broadly addresses treatment received for mental or emotional problems (Golberstein, Eisenberg, & Gollust, 2008). This consists of 5-items measured on a 1–4 interval-level scale with '1' labeled as "strongly disagree" and '4' labeled as "strongly agree." A sample item is, "Receiving treatment for emotional or mental problems carries a social stigma." The items achieved adequate internal consistency ($\alpha = .76$).

3.3. Predictor variables

3.3.1. Perceived threat

Three items were used to assess the perceived severity of mental health issues. The measures, adapted from research examining physical health problems (Cox, Koster, & Russell, 2004; Greening & Stoppelbein, 2000) included: "I believe that experiencing mental or emotional problems is a threat to one's health," "I believe that

experiencing mental or emotional problems can lead to serious negative consequences,” and “I believe that experiencing mental or emotional problems can be extremely harmful.” All items were measured on a 1–5 interval-level scale, with ‘1’ labeled as “strongly disagree” and ‘5’ labeled as “strongly agree.” Higher scores reflected greater perceived severity of mental health problems. There was high internal consistency between these items ($\alpha = .92$).

Perceived vulnerability was measured by four items derived from Cox et al. (2004) and Witte, Cameron, McKeon, and Berkowitz (1996). This included the following three statements: “It is likely that I will experience a mental or emotional health problem,” “I am at risk for developing a mental or emotional health problem,” and “It is possible that I will develop a mental or emotional health problem.” All three of these items were measured by a 1–5 interval-level scale with ‘1’ labeled as “strongly disagree” and ‘5’ labeled as “strongly agree.” The fourth item included the statement “Compared to people my own age, my risk for developing a mental or emotional health problem is.” This was measured by a 1–5 interval level scale with ‘1’ labeled as “extremely low” and ‘5’ labeled as “extremely high.” The reliability for the four-item scale was $\alpha = .92$.

3.3.2. Self-efficacy

Self-efficacy was measured through Schwartz and Jerusalem's (1995) 10-item General Self-Efficacy Scale. This is comprised of a 1–4 interval-level scale with ‘1’ labeled as “not at all true” and ‘4’ labeled as “exactly true.” One sample item is “Thanks to my resourcefulness, I know how to handle unforeseen situations.” The internal consistency of this scale was adequate ($\alpha = .89$).

3.4. Outcome variables

3.4.1. Use of online mental health resources

To more fully assess different elements of online mental health searches reflecting both active and interactive information seeking approaches (Johnson, 1997; Wilson, 1997) two different measures were employed. One measure assessed previous visit to any website with the aim of obtaining mental health information, whereas the other measure asked whether participants had ever joined an online support group. Consistent with prior CMIS research (DeLorme, Huh, & Reid, 2011; Rains, 2007) each of these measures of previous use was assessed through single, dichotomous yes/no items: “Have you ever visited any Internet website to get information about a mental or emotional problem?” “Have you ever joined an online support group to help deal with a mental or emotional problem?”

3.4.2. Perception of online resources

Two different measures, one measuring usefulness and the other assessing trust, were used to assess perception of online resources. Perceived usefulness and trust was assessed by having students rate the perceived usefulness and trust of the two Internet sources (any Internet website, online support groups) in relation to five different mental disorders (American Psychiatric Association [APA], 2013): depression, stress/anxiety, alcohol addiction, drug addiction, and eating disorders. Consistent with prior research (DeLorme et al., 2011; Rains, 2007), all items were measured on 5-point interval-level scale [‘1’ labeled as “not at all useful(trustworthy)”, ‘5’ labeled as “very useful(trustworthy)”. Results of a reliability analysis indicated that there was high internal consistency across these items: (for usefulness: α ranged from .95 to .96; for trust: α ranged from .96 to .97). Thus, two 5-item perceived utility scales and two 5-item trust scales were created that reflected average scores of usefulness/trust.

4. Results

4.1. Preliminary analyses

Given that this study aimed to predict previous use of a specific mental health resource rather than ever using *any* type of mental health service, preliminary analyses were run to identify and subsequently remove those with no experience seeking out this information/assistance. Fully 79% of respondents ($n = 350$) indicated that they had previously searched for mental health information from any source, while 40.9% of respondents ($n = 181$) noted that they had previously visited some Internet website to get information about a mental or emotional problem. Consequently, the final sample included only those 350 participants who had every searched for mental health information. All means for the central predictor variables were above the respective scale mid-point [self-efficacy: ($M = 3.03$, $SD = .53$); perceived severity: ($M = 3.52$, $SD = 1.10$); perceived vulnerability: ($M = 2.70$, $SD = 1.12$)].

4.2. Planned analyses

All hypotheses and research questions were tested through hierarchical regression analyses. These tests allow the researcher to examine the incremental variance explained by a set of predictor variables after accounting for the variance explained by other measures (i.e., current mental health). Current mental health, perceived public stigma, and demographic variables (age, gender, ethnicity) were included as control measures in block 1.¹ Block 2 included perceived threat (severity and vulnerability), and self-efficacy. These variables were mean-centered. Finally, the two interaction terms involving threat and self-efficacy were added to Block 3 of the hierarchical regression models. To decompose significant interactions, separate regressions were run at one standard deviation above and below the mean of the moderator variable (Aiken & West, 1991).

4.3. Use of online mental health resources

Recall that Hypotheses 1, 3a, and 3b predicted that self-efficacy and perceived threat (severity and vulnerability) would independently predict use of online mental health resources. In addition, Research Questions 2a and 2b explored whether self-efficacy moderated the relationship between perceived threat and use.

4.3.1. Visit to any Internet website

Results from a hierarchical logistic regression analysis indicated that block 1 explained significant variance in prior visit ($\chi^2 = 31.84$, $p < .01$). Age, gender, and overall mental health significantly predicted visit to any Internet website for mental health information (see Table 1, 1st column). While the inclusion of the perceived threat measures, and self-efficacy in block 2 explained significant incremental variance ($\Delta\chi^2 = 11.07$, $p < .01$), only perceived vulnerability was significantly associated with prior visit. This indicates that Hypothesis 3b was supported, while Hypotheses 1 and 3a were not supported. More specifically, perceived vulnerability was associated with a 1.50 (95% $CI = 1.14$ – 1.98)² increase in the odds of ever visiting any Internet website for mental health information. Finally, the inclusion of the two interaction terms in model 3 did not contribute any significant incremental variance to the model

¹ The authors assessed the impact of adding perceptions and web use as control variables to the respective models. Thus, perception was explored as a predictor of web use, and web use was explored as a predictor of perceptions. Overall, the inclusion of these variables as control measures had no impact on the significant associations found involving the central study variables.

² CI refers to Confidence Interval.

Table 1
Summary of hierarchical logistic regression analyses for variables predicting use of online mental health resources.

	Visit to any website		Joining online support group	
	β (SE)	95% CI	β (SE)	95% CI
<i>Model 1 – Control measures</i>				
Race (non-White)	1.11(.26)	.67–1.85	.56(.55)	.19–1.66
Gender (female)	.45(.27)**	.26–.76	.34(.78)	.07–1.56
Age	1.15(.06)*	1.03–1.28	.89(.13)	.69–1.14
Overall mental health	1.66(.15)**	1.24–2.21	1.80(.33)†	.94–3.45
Perceived public stigma	1.00(.20)	.68–1.47	2.04(.40)†	.94–4.43
	$\Delta\chi^2 = 31.84^{**}$		$\Delta\chi^2 = 13.46^*$	
<i>Model 2 – Predictors</i>				
Self-efficacy	.91(.26)	.55–1.51	.81(.57)	.26–2.48
Perceived vulnerability	1.50(.14)**	1.14–1.98	3.63(.37)**	1.77–7.43
Perceived severity	1.06(.12)	.84–1.34	.67(.28)	.39–1.15
	$\Delta\chi^2 = 11.07^*$		$\Delta\chi^2 = 15.51^{**}$	
<i>Model 3 – Interaction terms</i>				
Efficacy \times vulnerability	1.06(.22)	.66–1.62	2.28(.52)	.82–6.36
Efficacy \times severity	.78(.22)	.50–1.20	.22(.54)**	.08–.63
	$\Delta\chi^2 = 1.29$		$\Delta\chi^2 = 8.64^*$	

Note: β represents the odds ratio. An odds ratio greater than one indicates respondents were more likely to have visited any website/join an online support group. An odds ratio of less than one indicates that respondents were less likely to have visited any website/join an online support group.

† <.10.

* $p \leq .05$.

** $p \leq .01$.

($\Delta\chi^2 = 1.29, p > .05$), nor were any of the individual predictors statistically significant.

4.3.2. Joining online support groups

Results from a hierarchical logistic regression analysis indicated that Block 1 explained significant variance in joining online support groups ($\chi^2 = 13.46, p < .05$, see Table 1, 2nd column). Overall mental health and perceived public stigma emerged as marginally significant predictors. While the inclusion of the central predictor variables in Block 2 led to significant incremental explained variance ($\Delta\chi^2 = 15.51, p < .01$), only perceived vulnerability was significantly associated with joining an online support group. Thus, Hypothesis 3b was again supported, while Hypotheses 1 and 3a were not supported. Perceived vulnerability was associated with a 3.63 (95% CI = 1.77–7.43) increase in the odds of joining an online support group. Results from block 3 showed that the inclusion of the interaction terms explained significant incremental variance in the model ($\Delta\chi^2 = 8.64, p < .05$). Examination of the individual beta coefficients showed that the self-efficacy \times severity interaction ($OR = .22, 95\% CI = .08-.63$)³ was statistically significant. Inspection of this interaction revealed a significant negative association between perceived severity and joining of online support group at high levels of efficacy ($OR = .28, 95\% CI = .12-.64$) and a positive but non-significant association at low levels of efficacy ($OR = 1.38, 95\% CI = .62-2.12$). Fig. 1 displays this interaction.

4.4. Perceptions of online mental health resources

Hypothesis 2 predicted that self-efficacy would be significantly associated with more favorable impressions of online mental health resources. Research Questions 1a and 1b examined whether perceived threat components (severity and vulnerability) were similarly associated with perceptions of these services. Research Questions 3a and 3b explored interactions between perceived threat and efficacy to predict impressions of these resources.

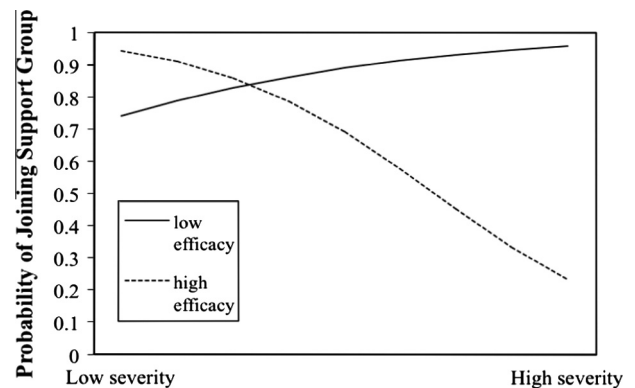


Fig. 1. Relationship between perceived severity and joining an online support group as a function of self-efficacy, indicated by logistic regression analysis.

4.4.1. Usefulness of Internet sources

A hierarchical regression analysis assessed what factors predicted perceived usefulness of Internet sources for mental health information. Table 2, first column displays these results. Block 1 did not explain significant variance in perceived usefulness, $R^2 = .01, F(5,312) = .48, p > .05$. The inclusion of perceived threat, and self-efficacy, in Block 2 did lead to significant incremental variance, $\Delta R^2 = .03, \Delta F(3,309) = 3.27, p < .05$; however, none of the individual predictors were statistically significant. More specifically, self-efficacy was a marginally significant predictor ($\beta = .11, p = .09$) of perceived usefulness. The variance explained by the inclusion of the interaction terms in block 3 was statistically significant, $\Delta R^2 = .03, \Delta F(2,307) = 3.29, p < .05$. Examination of the individual beta coefficients showed that the efficacy \times vulnerability interaction was statistically significant ($\beta = -.15, p < .05$). Results showed that at high levels of self-efficacy perceived vulnerability was not significantly associated with perceived usefulness ($\beta = -.01, p > .05$), whereas at low levels of self-efficacy perceived vulnerability was a significant positive predictor of perceived usefulness ($\beta = .26, p < .01$). Fig. 2 displays this interaction.

³ OR refers to Odds Ratio.

Table 2
Summary of hierarchical regression analyses for variables predicting favorable impressions of Internet sources.

	Usefulness		Trust	
	β (SE)	t	β (SE)	t
<i>Model 1 – Control measures</i>				
Race (non-White)	.03(.13)	.55	.12(.12) [†]	2.18
Gender (female)	.06(.14)	1.04	.01(.12)	.11
Age	-.05(.03)	-.81	-.10(.02) [†]	-1.79
Overall mental health	-.02(.07)	-.31	-.02(.07)	-.34
Perceived public stigma	.04(.10)	.74	.11(.09)	1.78 [†]
	$R^2 = .01$ $F(5, 312) = .48$		$R^2 = .03$ $F(5, 314) = 2.23^*$	
<i>Model 2 – Predictors</i>				
Self-efficacy	.11(.13) [†]	1.72	.12(.12) [†]	1.88
Perceived vulnerability	.09(.07)	1.28	.02(.06)	.31
Perceived severity	.10(.06)	1.62	.10(.05)	1.59
	$\Delta R^2 = .03$ $\Delta F(3, 309) = 3.27^*$		$\Delta R^2 = .02$ $\Delta F(3, 311) = 2.66^*$	
<i>Model 3 – Interaction terms</i>				
Efficacy \times vulnerability	-.15(.10) [†]	-2.45	-.10(.09) [†]	-1.68
Efficacy \times severity	.09(.11)	1.52	.14(.10) [†]	2.31
	$\Delta R^2 = .02$ $\Delta F(2, 307) = 3.29^*$		$\Delta R^2 = .02$ $\Delta F(2, 309) = 3.14^*$	

Note: Regression coefficients are standardized.

** $p \leq .01$.

[†] $< .10$.

* $p \leq .05$.

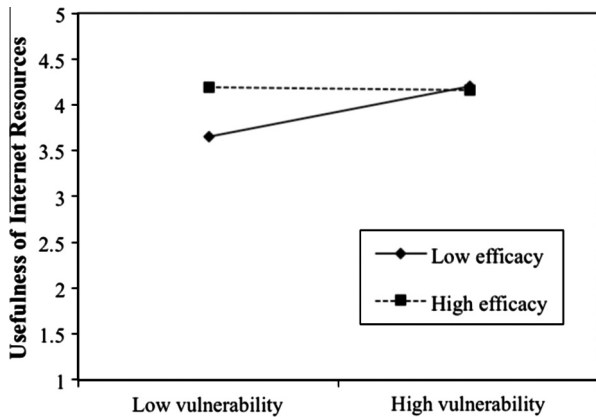


Fig. 2. Relationship between perceived vulnerability and usefulness of Internet sources as a function of self-efficacy, indicated by linear regression analysis.

4.4.2. Trust in Internet sources

The inclusion of the control measures in Block 1 explained significant incremental variance in trust in Internet sources for mental health information, $R^2 = .03$, $\Delta F(5, 314) = 2.23$, $p = .05$, see Table 2, 2nd column. Examination of the beta coefficients indicated that non-whites were more likely to trust Internet sources than whites ($\beta = .12$, $p < .05$). While Block 2 did explain significant variance in trust, $\Delta R^2 = .02$, $\Delta F(3, 311) = 2.66$, $p < .05$, none of the individual predictors was statistically significant. Inspection of the individual beta coefficients indicated that self-efficacy was a marginally significant predictor ($\beta = .12$, $p = .06$). Finally, results showed that the inclusion of the interaction terms in Block 3 explained significant variance in trust, $\Delta R^2 = .02$, $\Delta F(2, 309) = 3.14$, $p < .05$. Findings revealed that the self-efficacy \times severity interaction ($\beta = .14$, $p < .05$) was statistically significant. After decomposing this interaction, findings indicated that at high levels of efficacy, severity was positively associated with trust ($\beta = .20$, $p = .01$), whereas at low levels of efficacy severity was not associated with this outcome ($\beta = -.07$, $p > .05$). Fig. 3 displays this interaction.

4.4.3. Usefulness of online support groups

The second test of usefulness examined which variables significantly predicted perceived usefulness of online support groups. Table 3, first column displays these findings. Block 1 did not explain significant variance in perceived usefulness, $R^2 = .01$, $F(5, 314) = .44$, $p > .05$. The inclusion of the central predictors in Block 2 did explain significant incremental variance in usefulness, $\Delta R^2 = .03$, $\Delta F(3, 311) = 2.86$, $p < .05$. Results showed that self-efficacy was the only variable to independently predict usefulness ($\beta = .17$, $p < .01$). The inclusion of the interaction terms in Block 3 did not explain any significant incremental variance in usefulness, $\Delta R^2 = .01$, $\Delta F(2, 309) = 1.62$, $p > .05$.

4.4.4. Trust in online support groups

The final test assessed predictors of perceived trust in online support groups. Although results indicated that age was a significant negative predictor of trust ($\beta = -.15$, $p < .01$), the overall model again did not explain significant variance in this outcome, $R^2 = .03$,

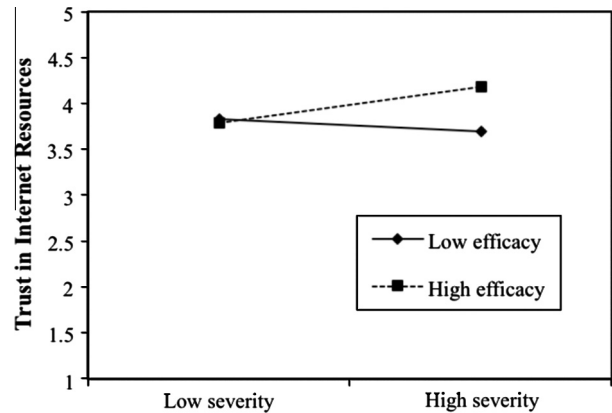


Fig. 3. Relationship between perceived severity and trust in Internet sources as a function of self-efficacy, indicated by linear regression analysis.

Table 3

Summary of hierarchical regression analyses for variables predicting favorable impressions of online support groups.

	Usefulness		Trust	
	β (SE)	t	β (SE)	t
<i>Model 1 – Control measures</i>				
Race (non-White)	-.02(.14)	-.29	-.01(.12)	-.20
Gender (female)	-.04(.14)	-.62	-.01(.13)	-.13
Age	-.04(.03)	-.61	-.15(.02)**	-2.59
Overall mental health	-.01(.08)	-.15	-.05(.07)	-.89
Perceived public stigma	.07(.11)	1.09	-.04(.09)	-.72
	$R^2 = .01$ $F(5, 314) = .44$		$R^2 = .03$ $F(5, 313) = 1.93^{\dagger}$	
<i>Model 2 – Predictors</i>				
Self-efficacy	.17(.14)**	2.63	.18(.12)**	2.87
Perceived vulnerability	.09(.07)	1.17	-.03(.06)	-.37
Perceived severity	.01(.06)	.22	.10(.06)	1.63
	$\Delta R^2 = .03$ $\Delta F(3, 311) = 2.86^*$		$\Delta R^2 = .04$ $\Delta F(3, 310) = 4.60^{**}$	
<i>Model 3 – Interaction terms</i>				
Efficacy \times vulnerability	-.06(.11)	-1.06	-.10(.09) [†]	-1.71
Efficacy \times severity	.11(.11) [†]	1.73	.12(.10) [†]	2.01
	$\Delta R^2 = .01$ $\Delta F(2, 309) = 1.62$		$\Delta R^2 = .02$ $\Delta F(2, 308) = 2.56^{\dagger}$	

Note: Regression coefficients are standardized.

[†] $< .10$.

* $p \leq .05$.

** $p \leq .01$.

$F(5, 313) = 1.93, p = .09$, see Table 3, 2nd column. Conversely, Block 2 explained significant incremental variance in trust in online support groups, $\Delta R^2 = .04, \Delta F(3, 310) = 4.60, p < .01$. Of the central predictor variables, self-efficacy was the only measure significantly associated with trust ($\beta = .18, p < .01$). The model that included the two interaction terms was marginally significant, $\Delta R^2 = .02, \Delta F(2, 308) = 2.56, p = .08$. Close inspection of the interaction terms showed that the self-efficacy \times severity interaction was statistically significant ($\beta = .12, p < .05$). Analysis of the separate regression slopes revealed that perceived severity was a significant positive predictor of trust at high levels of self-efficacy ($\beta = .18, p < .05$) but not significantly associated with trust at low levels of self-efficacy ($\beta = -.05, p > .05$).

4.4.5. Summary of findings

Hypothesis 2 was supported in two out of the four tests. More specifically, self-efficacy was a positive predictor of perceived usefulness and trust of online support groups, but did not predict perceived usefulness or trust of any Internet source. In addition, significant interactions emerged between self-efficacy and both perceived vulnerability and perceived severity. Results showed that vulnerability predicted perceived usefulness of web resources at low (but not high) levels of self-efficacy, whereas severity predicted perceived trust of web resources at high (but not low) levels of self-efficacy.

4.5. Post hoc tests

Although prior research has included stigma and psychosocial factors (e.g., perceived threat, self-efficacy) together in additive models to predict individual health outcomes (Andrinopoulos, Kerrigan, Figueroa, Reese, & Ellen, 2010; Smith, Ferrara, & Witte, 2007), to the authors' knowledge, no study has addressed how these factors interact to explain specific health-related actions. While the findings above did not support previous findings showing a direct link between perceptions of mental health stigma and use of online mental health resources, we explored whether this stigma operates as a moderator between threat and efficacy and use of mental health resources. Three additional interaction terms were added to all regression models reflecting self-efficacy \times stigma, perceived severity \times stigma, and perceived vulnerability \times stigma variables. Stigma was not found to be a significant moderator in either of the tests of web use.

5. Discussion

This study posited that perceived threat and efficacy, factors examined in previous fear appeal and information seeking research, operate independently and interactively to predict use of online services and more favorable impressions of these resources. Results showed that perceived vulnerability was the only variable that independently predicted previous online searches and joining of online support groups. Conversely, self-efficacy was the sole factor significantly associated with perceptions of online services, predicting greater perceived usefulness and trust in online support groups. When exploring interaction effects, results showed that at higher levels of self-efficacy, greater perceived mental health severity was negatively associated with joining an online support group. Several additional interactions emerged between these psychosocial factors when predicting impressions of web services. Specifically, vulnerability positively predicted perceived usefulness of online mental health resources strictly at low levels of efficacy, whereas severity positively predicted trust in these resources only at high levels of efficacy.

5.1. Practical implications

To the authors' knowledge, this is the first study to address how psychosocial factors may explain use of online mental health resources. The findings suggest that certain factors, such as perceived vulnerability and self-efficacy, are useful in explaining college students' use and perceptions of web services. Clearly, students value online health resources for its relative anonymity and convenience (Horgan & Sweeney, 2010; Oh et al., 2009). Our results add to this literature by suggesting that personal risk perceptions may help drive online searches as well as provide the motivation for joining online communities. In addition, the perceived ability to manage life's challenges may promote more favorable impressions of online mental health resources (particularly online support groups). Counselors and other mental health professionals may take solace in knowing that students feeling at-risk are more likely than low-risk students to use online resources, and, through greater self-confidence, perceive the value of these services. However, because many young adults experiencing mental illness fail to seek treatment (Rickwood et al., 2007; Sullivan et al., 2004), there is also legitimate concern that students will rely too greatly on web mental health services, including less accredited online resources. The university and broader mental health community must find ways to communicate/reinforce the value of treatment by trained professionals, a service that may be supplemented, but not replaced, through use of online support groups or general information sites.

Of note, while not a goal of this study, the findings also indicate that perceived public stigma does not directly factor into students attitudes or use of online mental health resources. This result is somewhat surprising given that social adjustment plays a key role in whether students succeed academically and are satisfied with their college experience (Tinto, 1993, 1997). Thus, the social risks tied to seeking mental health care should arguably take on greater significance for college students. However, this study indicates that personal mental health risk, and not perceived social risk, motivates use of online mental health resources.

5.2. Theoretical implications

This study tested factors drawn from prior fear-appeal research to explain use and perceptions of online mental health resources. Results seem to indicate that, at least in a non-experimental setting, perceived threat and efficacy operate both independently and interactively to predict attitudes and use. Perceived vulnerability appears to play a small, yet, significant role in explaining online mental health information seeking but offers little value in explaining perceptions of these resources. In contrast, results suggest that self-efficacy modestly predicts perceptions, but not use of, these resources. Importantly, the findings involving self-efficacy are consistent with prior information seeking research (Rains, 2008), and supports one of the key assumptions of the CMIS. Recall that this model hypothesizes that self-efficacy predicts perceived utility of information resources (Johnson & Meischke, 1993). Our findings indicate that self-efficacy contributes to perceived usefulness of, and trust in, online support groups. However, it is important to also acknowledge that this model posits that self-efficacy, along with other health-related factors, indirectly predicts media use through perceived utility of a medium (Johnson & Meischke). While not a focus of this study, a post hoc test showed that perceived utility of online support groups was not associated with joining an online support group ($OR = 1.41, 95\% CI = .88-2.25$). Thus, it does not appear that self-efficacy was indirectly associated with joining an online support group. Consequently, based on these results, the value of self-efficacy for explaining actual use of online mental health services remains unclear.

In addition, there seems to lack any clear trend to explain how self-efficacy and perceived threat interact to predict use and perception of online mental health services. The most complicated of these relationships appears to exist between severity and efficacy. Specifically, the findings suggest that when perceiving that mental health problems are of serious concern, students possessing greater self-efficacy may be less motivated to use online services. Conversely, at higher levels of self-efficacy, these concerns may also contribute to greater trust in online services. One implication is that possessing higher levels of threat and efficacy leads students to take more direct treatment-seeking actions (e.g., communicating face-to-face with mental health professionals). Certain direct actions, such as face-to-face therapy sessions, may actually lead to discussions whereby mental health professionals tout the credibility of certain online resources.

Finally, while prior information-seeking studies have often combined perceived severity and perceived vulnerability into a single perceived threat construct, the results of this study suggest that when explored as separate variables, vulnerability may be a more valuable predictor of health information seeking. Furthermore, within this context, there appear to be distinctions in how each of these factors interacts with self-efficacy. Vulnerability was only linked to impressions of web services at low levels of efficacy whereas severity contributed to impressions strictly at higher levels of efficacy. In sum, these results indicate that scholars should consider treating these concepts as independent predictors of health information seeking.

5.3. Limitations

There are some key limitations of this study. First, this investigation employed a cross-sectional survey design to assess the relationships between variables. By using this strategy, the researchers could not assess the causal impact of the independent variables on both use and perception of online mental health resources. Although contrary to theory, it is possible that use of online resources leads to greater perceived mental health risk.

Second, our sample consisted strictly of college students who had previously sought mental health information. This limits the ability to generalize the results to all students as well as to any non-student population. It is important to note that the majority of students (79%) reported having sought mental information in the past. Thus, the final sample used was not necessarily unique from most students, but rather a reflection of the attitudes and behaviors common to many college students. However, this representativeness likely does not extend beyond the university population. Thus, while there was significant rationale for examining college students, their comfort and familiarity with online resources may differ from that of other populations.

5.4. Areas for future research

This study will hopefully promote future work examining why and how students use various mental health resources. To provide greater explanation for students' motivation to seek out web services, other key psychosocial factors, including social support, should be incorporated within these analyses. In addition, to expand on information-seeking research, future researchers may wish to address longitudinally how these motivational factors indirectly contribute to treatment-seeking actions through use of online services. Although there are possible ethical concerns, future researchers could also manipulate perceived threat and self-efficacy to examine the causal impact of these factors on use of online mental health resources. Furthermore, future studies examining use of online mental health services should employ more detailed outcome measures, such as time spent on websites and the

number and diversity of sites visited. Finally, within these more nuanced investigations, researchers may wish to perform more qualitative assessments of online communities. These analyses could shed light on whether motivational factors, such as self-efficacy and perceived threat, promote greater self-disclosure and ultimately generate more feedback and assistance.

6. Conclusion

Drawing from prior fear-appeal and information seeking research, this study explored how self-efficacy and perceived threat contribute to use and perceptions of online mental health resources. Results showed that perceived vulnerability was significantly associated with visiting any Internet website and joining an online support group, while self-efficacy predicted greater perceived usefulness and trust for online support groups. Although numerous interactions emerged between self-efficacy and perceived threat, the impact of these relationships on use and perceptions of these services varied significantly. In particular, at higher levels of self-efficacy, perceived severity negatively predicted use of online services, yet also positively predicted trust in these resources. Furthermore, results showed that vulnerability was only associated with favorable judgments of web services at lower levels of efficacy. Overall, the findings suggest that self-efficacy and perceived threat play a small, yet significant role in explaining online mental health information seeking outcomes; however, the exact nature by which these factors operate together to influence one's use and larger impressions such resources remains unclear.

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