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Nicole M. Sanders

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Approved:

Karl W. Stukenberg, Ph.D., ABPP
Chair, School of Psychology

Morell Mullins, Ph.D.
Thesis Chair

Gender Differences in Computer Frustration Reactions with Online Applications

Thesis Committee

Chair	Morell Mullins, Ph.D. Associate Professor of Psychology
Member	Mark Nagy, Ph.D. Associate Professor of Psychology
Member	Dalia Diab, Ph.D. Assistant Professor of Psychology

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Abstract

Previous research has evaluated the consequences of computer frustration in the workplace. This study was the first to examine whether gender differences exist in computer frustration with online applications. It was hypothesized that women would have higher computer anxiety, lower computer self-efficacy, and a more negative attitude towards computers, relative to men. Additionally, it was hypothesized that after experiencing a frustration manipulation, women would report experiencing a higher level of frustration. Data were collected online through MTurk from a sample of 387 participants. Independent samples *t*-tests evaluated gender differences on each scale used. None of the hypotheses were supported except for the hypothesis, which predicted that women would score significantly lower than men on the computer self-efficacy scale. Although there was no significant difference between males and females on the computer frustration scale, data were available on whether any difference existed in the drop-out rate for men and women that coincided with the frustration manipulation. A binomial test was run to analyze the drop-out data, in which the results showed that women were more likely than men to drop out of the online application when technology did not appear to work properly. Contributions and limitations are discussed.

Chapter I

Review of the Literature

As technology advances, the use of computers increases as well. “In an era characterized by rapid technological developments our society is becoming increasingly more dependent on information technology, and particularly on computers” (Levine & Donitsa-Schmidt, 1998, p. 126). The majority of the population owns a computer or works with one on a daily basis (Lazar, Jones, Bessiere, Ceaparu, & Shneiderman, 2004; Rainer & Miller, 1996). Computers have become useful tools in many aspects of life, when used properly. As usage increases, so does the probability of experiencing complications with technology. This leads researchers to study computer anxiety, computer self-efficacy, experience, and response styles. Research has shown individuals may experience negative emotions while dealing with computer difficulties, particularly individuals who have less exposure to computers (Bessiere, Ceaparu, Lazar, Robinson, & Shneiderman, 2004; Lazar et al., 2004; Levine & Donitsa-Schmidt, 1998; Simsek, 2011). Frustration is the most commonly known reaction to technology and almost every individual, in the workplace or at home, has experienced frustration with a computer. For example, frustration with technology has been in the news lately, with the much-publicized problems relating to the glitches that frustrated many consumers during the launch of healthcare.gov (Mullaney, 2013), but research on the topic is sparse.

When computers or other technology are difficult to use, it can produce lower productivity levels and trigger negative emotions such as frustration. Lazar et al. (2004) defined frustration as a condition that interferes or prevents the progress of reaching a goal. They stated that computer frustration should be of interest to businesses and organizations because computers had a significant impact on employee performance. Even with training and technical support, individuals sometimes still find computers difficult to use. Lazar et al. found people reported as much as 40% of work is wasted on the computer because of frustrating experiences, including the time it takes to recover the results of these frustrating experiences. Emotional reactions and their subsequent effects may interfere with an organization's productivity or environment. Thus, with computer frustration being a recurring problem in the workplace, it should be further researched and applied to Industrial/Organizational (I/O) psychology.

Previous literature evaluated the consequences of computer frustration in the workplace. The present study seeks to address whether gender significantly affects reactions to computer frustration with online applications. It seems to be a common trend in today's society that companies are no longer focusing on paper applications and are instead utilizing online applications. It is important to examine whether computer frustration during the application process may decrease the interest an applicant has in a job. With computer usage growing, it is important for the organization to be prepared to handle responses to technological difficulties and understand whether such responses may be partly a function of applicant gender that could result in differential attraction or hiring. In the following sections, key literatures will be considered in order to understand why gender may have an impact on computer frustration experiences. The review begins

with computer frustration and its related constructs, such as computer self-efficacy, computer anxiety, and computer attitudes. Finally, the relationship between these constructs and gender differences in reactions to computer frustration will be discussed.

Computer Frustration

Computer frustration can lead to negative attitudes about technology, and result in the belief that a person cannot complete computer-dependent goals or should avoid computers altogether (Nickell & Pinto, 1986; Sam, Othman, & Nordin, 2005). Evolving technology brings a number of positive and negative attitudes associated with computer usage to an organization (Nickell & Pinto, 1986). Ajzen and Fishbein (1980) defined an attitude as "an index of the degree to which a person likes or dislikes an object" (p. 28) and stated that "the attitude is determined by the beliefs about the object" (p. 28). Computer attitudes play a key role in whether an individual experiences positive or negative emotions in reaction to a potentially frustrating experience. The initial attitude of the individual is important to examine as well as the attitude after the frustrating experience.

To illustrate, Flavián-Blanco, Gurrea-Sarasa, and Orús-Sanclemente (2011) conducted a study on emotional responses to using online search engines. They examined three variables: (1) perceptions of success and effort on the search process, (2) the initial emotional state of the individual, and (3) emotions during the search process. They reported perceived effort and success were significantly related to positive emotions experienced after the search process and the initial state of the individual. They also found perceived failure was positively correlated with negative emotions. One possible

conclusion based on their study is that individuals who have an initial negative attitude towards computers are more likely to experience higher levels of computer frustration.

Furthermore, because frustration has been shown to affect the initial state of an individual, frustration may play a role in shaping future attitudes towards computers. Research consistently demonstrates that attitudes and beliefs are predictors of behavior (e.g., Levine & Donitsa-Schmidt, 1998). Therefore, understanding computer frustration is critical. Two potential determinants of computer frustration are computer self-efficacy and computer anxiety. Computer self-efficacy and computer anxiety together can help predict how much effort individuals put forth with their computer task, and their reaction, to failure on the task.

Computer self-efficacy. A recent line of research in I/O Psychology relates to computer self-efficacy. Computer self-efficacy is an individual's judgment of his or her capability to perform tasks on the computer. The foundation for this construct was laid by Bandura (1986), who defined self-efficacy as follows:

> People's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances. It is concerned not with the skills one has but with judgments of what one can do with whatever skills one possesses. (p. 391)

Bessiere, Ceaparu, Lazar, Robinson, and Shneiderman (2004) stated that an individual's judgments of self-efficacy were related to how much effort they put forth on the task, the amount of time they spent on the task, and the resiliency they experienced in situations of failure or setback. There are three dimensions of self-efficacy: magnitude (level of capability), strength (amount of confidence), and generalizability (extent to which the

judgment is limited to a particular situation). These dimensions holistically create an individual's self-efficacy.

The dimensions of computer self-efficacy resemble the dimensions of self-efficacy generally, with the following refinements (Compeau & Higgins, 1995). For magnitude, computer self-efficacy can be considered as the level of capability the individual believes himself or herself to have while using a computer. Individuals with a high magnitude will believe they can accomplish arduous computing tasks, and will not need support or assistance with these tasks. Individuals with low magnitude will see themselves only being able to complete simple computer tasks (Compeau & Higgins, 1995).

Following magnitude is strength. Strength reflects the amount of confidence an individual feels while performing a task on the computer (Compeau & Higgins, 1995). Individuals with a high sense of computer self-efficacy will not be discouraged by challenging problems and will have a higher level of confidence (high strength) when performing demanding tasks. They tend to overcome obstacles that are present based on a higher computer self-efficacy. When considering a weak sense of computer self-efficacy, individuals will be more frustrated with any obstacles that occur, their performance will decrease, and their computer self-efficacy will decrease (Compeau & Higgins, 1995).

Finally, generalizability refers to the degree of an individual's judgment that may be limited to a certain aspect of the computer, such as different software (Compeau & Higgins, 1995). Individuals with high generalizability expect that they can use any computer software or systems, whereas those with a low generalizability would believe

their abilities are limited to one type of computer software or system (Compeau & Higgins, 1995).

Success or failure at a task may be linked with the complexity of the task. Stajkovic and Luthans (1998) stated that self-efficacy is related to work-performance measures such as adaptability, managerial performance, skill acquisition and advanced technology. Self-efficacy is positively related to tasks with different complexities, ranging from simple to complex. Stajkovic and Luthans examined the relationship between self-efficacy and performance and found that the aforementioned relationship is moderated by task complexity, such that the higher the task complexity, the weaker the relationship between self-efficacy and performance. The relationship was found to have greater significance for lower levels of task complexity than it did for high and moderate levels. The differences between simple and complex tasks decrease over time due to repeated performance trials. Self-efficacy is not as important later in the learning process because an individual is more familiar with the task; therefore, their self-efficacy is higher.

It is paramount for an organization utilizing online applications to evaluate its application system and employ an appropriate method for individuals with high and low computer self-efficacy; if they choose to ignore this, the system may inadvertently select (or select-out) applicants based solely on its mode of presentation. If an organization is searching for applicants with high computer self-efficacy, it may format its system toward individuals with high magnitude and strength. Alternatively, if an organization is not looking for potential employees who are technologically savvy or need a high level of computer self-efficacy, and their application system is technologically complex, they

could miss out on valuable applicants. In addition to computer self-efficacy, computer anxiety is another factor that organizations should be aware of when evaluating their computer application systems.

Computer anxiety. Simsek (2011) defined computer anxiety as "an affective (to some extent emotional) response that includes the fear and apprehension felt by an individual when considering the utilization of computer technology or when actually using it" (p. 178). Computer anxiety is a construct with two dimensions, computer anxiety duration and computer anxiety intensity. The duration aspect can be temporary or permanent; the intensity can be normal or neurotic (Chua, Chen, & Wong, 1999). The distinction between the two concepts is important because duration can determine whether the individual can overcome the anxiety and be effective with the computer. Intensity evaluates the level of anxiety that the individual feels generally towards the computer.

Computer anxiety is the leading cause of computer avoidance, which is the tendency to use means other than a computer to accomplish tasks (Brosnan, 1998; Chua et al., 1999; Simsek, 2011). There are three perspectives from which this concept can be viewed: psychological, sociological, and operational (Chua et al., 1999). The psychological view is comprised of the individual's attitude, self-efficacy, and personality. The sociological view includes variables such as socioeconomic status, age, and gender, each of which may have contributed to prior access to computers. It also focuses on the insecurities of job status and demand when considering computer experience. The operational outlook is the fear of operational issues while performing the

task. This is a major issue because a key factor with computer frustration is having little experience with the technology (Chua et al., 1999).

Past literature suggests that one-third of individuals within most populations experience computer anxiety to some degree (Brosnan, 1998; Cooper, 2006). An individual's anxiety, lack of confidence, and understanding of computers may affect their overall experience. This may then influence future job acceptance during an online application process. A positive aspect of computer self-efficacy and anxiety is they are situation-specific. An individual's confidence can be increased by positive experiences, and training can decrease an individual's computer anxiety by creating encouraging experiences through workshops or classes. Low computer-self-efficacy or high computer anxiety should not make an individual incapable of successfully negotiating an online job application process if opportunities for success or training can be made available. With key constructs relating to computer frustration removed, a question that remains is whether gender differences may be related to computer frustration.

Gender Differences in Computer Frustration

In order to understand potential gender differences in computer frustration, it is important to first discuss the literature on gender in general. Because literatures related to gender are vast, only a very small sub-set will be reviewed as part of this study. Gender is a potentially important variable in examining computer frustration because computer use and skill with computer tasks have been portrayed in our society as more appropriate for males than females (Whitley, 1996). Traditionally, computers have been deemed a masculine technology, which tends to be validated when looking at gender statistics in multiple computer frustration studies (e.g., Corston & Colman, 1996; Huffman, Whetten,

& Huffman, 2013). Although it has been shown that women can excel and be just as effective/technology-savvy as men, research also shows that women have a different attitude towards computer usage (Huffman et al., 2013).

Schumacher and Morahan-Martin (2001) stated research has shown males have a more positive attitude toward computers, therefore leading to more participation in computer usage. The authors also examined gender differences in computer attitudes and usage of the internet. They found males reported using the internet and computers 10% more than females and had higher reports of experience and skill level. Current studies are beginning to indicate that the gap between male and female computer usage is diminishing. According to the Cole (2013), the gap between male and female internet usage now ranges between 2% and 5%. Approximately 87% of males surveyed reported using the internet in 2012, compared to 84% of females.

Huffman et al. (2013) found men have more socially acceptable interactions with technology, which include skills, motives, and beliefs that are necessary to complete technological tasks. They also found men report lower levels of anxiety, more comfort, and appear to be more knowledgeable about all aspects of computers. Because women tend to have less experience than men with computers, even if that gap is shrinking, they may respond differently to a computing situation because they have not adapted the skills and beliefs necessary to complete the tasks.

With respect to gender and technology, researchers have examined the concept of "digital divide," which is the inequality between groups of individuals who do not have the same access to, experience with, or use of technology. Helbig, Gil-García, and Ferro (2009) mentioned the digital divide is multidimensional, and within the construct, there

are five divides: (1) the global divide (cross-national inequalities due to economic development), (2) the social divide (the gap of information for the rich and for the poor within a society), (3) the democratic divide (the issue of those who use the internet for public resources in comparison of those who do not), (4) the skills divide (the issue of people with a higher socio-economic status having more sophisticated technological skills), and (5) the economic opportunity divide (the gap of those missing opportunities due to no access of technology). The authors stated the market would not be able to decrease this multifaceted gap over time, particularly within the areas of computer literacy, employment opportunities, or community redevelopment (Helbig et al., 2009).

In general, women have shown to be less technology-savvy, which influences their employment opportunities. According to Cooper (2006), there is a dramatic divide between genders. He stated not only do women enjoy interacting with computers less than men, they take fewer classes involving technology and are less likely to graduate in a technology-based field. Cheryan, Drury, and Vichayapai (2013) found masculine stereotypes impact women's interest and decisions in the computer science field. The authors stated it is important to encourage women to enter this field because women's perspectives are valuable to the contributions that computer science makes to society, and allow women the opportunity for high-status careers.

The issue of gender and the digital divide is worldwide and has been of concern to researchers for years (Helbig et al., 2009). Therefore, it is important to investigate the issue of gender in relation to the digital divide regarding online applications because differential usage can create an unequal opportunity for women in employment (and, as a result, the potential for adverse impact in hiring decisions). If women do not have access

to or experience with computers, this can decrease their chance of receiving a job if the application is only online. Furthermore, if women have less opportunity and are less encouraged to learn computers and related technology, then it is possible that they may get more frustrated when forced to use technology either as part of their job or as part of an application process.

In summation, negative computer experiences may have a disadvantageous effect on female applicants. Individuals with high computer self-efficacy and low computer anxiety have the ability to overcome technological issues and be less frustrated with their task (Bessiere et al., 2004; Simsek, 2011). Applicants' beliefs in their ability, anxiety, and attitude towards computers may affect their overall experience with the application process. This could also be unfavorable to an organization. If a job applicant has a negative attitude or reaction toward the online application because of computer frustration, it may cause an organization to lose a potential employee. In a case where an organization is looking for an employee with computer experience, discouraging those who lack such computer adaptive skills may be positive, but when companies are not looking for that type of experience, it can have a negative effect on the hiring process. Furthermore, according to research, males tend to have more experience and positive attitudes towards computers (Cole, 2013; Schumacher & Morahan-Martin, 2001). This may lead an organization to hire more males than females. Overall, current research has demonstrated that women tend to have a more negative approach towards computers in general (Corston & Colman, 1996; Huffman et al., 2013; Schumacher & Morahan-Martin, 2001), and exposing them to an application system with potential technological

difficulties may lead to unfavorable results for female applicants, and by extension, the organization as a whole.

Chapter II

Rationale and Hypotheses

As seen in the prior chapter, there has been minimal research on gender and computer frustration reactions, and particularly limited research on frustration reactions in the context of online applications. Computer frustration is a common problem (Lazar et al., 2004) that can potentially affect the success of an organization. Computer self-efficacy and computer anxiety are two potential determinants of this construct. Computer self-efficacy is the level of confidence an individual has about their capability to perform tasks on the computer (Compeau & Higgins, 1995), and computer anxiety is the affective response of fearing the use of computers (Simsek, 2011). Huffman et al. (2013) found that men report lower levels of anxiety, more comfort, and appear to be more knowledgeable about computers than women. The more experience an individual has with a computer, the less anxiety they will have, producing higher levels of confidence and positive computer attitudes (Levine & Donitsa-Schmidt, 1998).

Computer attitudes play a role in computer frustration. Furthermore, given the influence of prior attitudes, frustration may also play a role in predicting future attitudes. Research consistently demonstrates that attitudes and beliefs are predictors of behavior (e.g., Levine & Donitsa-Schmidt, 1998). Flavián-Blanco et al. (2011) found that perceived effort and success were significantly related to positive emotions and the initial state of the individual. Schumacher and Morahan-Martin (2001) found that males have

more positive attitudes toward computers, leading to more participation in computer usage.

Computers have been considered a masculine technology, which tends to be supported by current research (Cheryan et al., 2013; Cooper, 2006; Corston & Colman, 1996; Huffman et al., 2013). Based on the research as reviewed regarding computer frustration and gender differences, the following are hypothesized:

H1: Women will score significantly higher than men on the computer anxiety scale, thereby displaying greater anxiety towards computers.

H2: Women will score significantly lower than men on the computer self-efficacy scale, thereby displaying lower confidence in their abilities towards computers.

H3: Women will score significantly lower than men on the computer attitude scale, thereby displaying less favorable attitudes toward computers.

H4: Women will score significantly higher than men on computer frustration scale, thereby displaying greater frustration.

Past studies have shown that failure leads to the strengthening of negative emotions (Flavián-Blanco et al., 2011). The Positive and Negative Affect Schedule (PANAS), which is comprised of Positive Affect (PA) and Negative Affect (NA) scales, can be used to determine an individual's current state of emotion (Flavián-Blanco et al., 2011). PA reflects positive emotions and mood states, whereas NA reflects negative emotions and mood states. For exploratory purposes, PANAS will be provided at the end of the study to examine whether men and women differ on negative affectivity after a frustrating experience.

H5: Women will score significantly higher than men on negative affectivity following participating in a frustrating simulated online job application.

Chapter III

Method

Participants

Participants were recruited using Amazon Mechanical Turk (MTurk), an online site through Amazon.com permitting individuals to participate in human intelligence tasks (HITs) provided by requesters (the creators of the HITs). The survey data were collected using SurveyGizmo, utilizing the most rigorous anonymization settings to protect participant identities. MTurk participants are slightly more demographically diverse than traditional college samples, increasing generalizability (Buhrmester, Kwang, & Gosling, 2011). There were 202 participants (100 men and 102 women) who completed the study, but an additional 149 participants (63 men and 86 women) started the study and dropped out when they were forced to re-enter information, and 36 participants (18 men and 18 women) dropped out before they reached the manipulation. In order to collect demographics and control for diversity, participants were asked to report their age, gender, and race. All participants (n = 387) were 18 years or older and lived in the United States (see Table 1 for demographics). Gender was the most important demographic to collect for this study, with gender differences being focal to the hypotheses. The study was published on MTurk and individuals received a small compensation of 50 cents for completing the brief survey and passing the quality checks. The survey anticipated taking no longer than 20 minutes. The median study on MTurk

Table 1

Demographics for All Participants and Participants that Completed the Study

	Total Participants #	Total Participants %	Completed Participants #	Completed Participants %
Gender				
Male	181	46.8%	100	49.5%
Female	206	53.2%	102	50.5%
Age Range				
18-19	4	1%	2	1%
20-29	155	40%	81	40.3%
30-39	109	28.2%	55	27.5%
40-49	53	13.7%	30	15%
50-59	42	10.9%	25	12.5%
60-69	22	5.7%	8	4%
70-79	2	0.5%	1	0.5%
Race				
Caucasian	298	77%	152	75.2%
Black or African descent	29	7.5%	14	6.9%
Hispanic/Latino	22	5.7%	14	6.9%
Asian	24	6.2%	12	5.9%
Indian	2	0.5%	2	1%
American Indian or Alaskan	2	0.5%	1	0.5%
Multiracial	8	2.1%	6	3%
Other	1	0.3%	1	0.5%
Prefer not to answer	1	0.3%	0	0%

requires only a few minutes and pays five to 10 cents (Downs, Holbrook, Sheng, & Cranor, 2010). Due to the short duration and lack of difficulty required by the present survey, 50 cents for survey completion appeared fair and within the normal range.

Measures

Computer Anxiety. Computer anxiety was measured by the Computer Anxiety Rating Scale – Form C (CARS – C) by Rosen and Weil (1995). The CARS-C asks participants to indicate their level of computer anxiety at the time towards 20 statements.

The scale was scored on a 5-point scale with anchors of (1) *not at all*, to (5) *very much*. The scores were added up and the total scores ranged from 20 to 100 with high scores indicating high computer anxiety. Coefficient alpha for this scale has been reported as $\alpha = .84$ (Rosen & Weil, 1995). For the current study, coefficient alpha for the CARS - C was $\alpha = .94$. Source information for all copyrighted measures is provided in Appendix A.

Computer Self-Efficacy. Computer self-efficacy was assessed by the 29-item Modified Computer Self-Efficacy Scale (M-CSE). This scale was originally developed by Torkzadeh and Koufteros (1994) and modified by Durndell, Haag, and Laithwaite (2000). This scale was not written to evaluate the three dimensions that were covered in the literature review. Each item is preceded by the phrase "I feel confident" and is positively worded, reflecting a variety of computer related skills. Torkzadeh and Koufteros found high alpha reliability of $\alpha = .96$ for the Modified CSE.

Responses were scored on a 5-point scale, with scores ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The scores were added up with high scores indicating a

high level of computer self-efficacy. The coefficient alpha of the M-CSE in the current study was α = .98.

Computer Attitudes. Computer attitudes were measured by the Computer Attitude Scale (CAS). The CAS is a 20-item self-report scale, formulated to measure general positive and negative attitudes towards computers (Nickell & Pinto,1986). It was particularly designed to evaluate individual's attitudes toward the influence of computer usage in society. The scale consists of eight positive attitude and 12 negative attitude statements about computer usage. Each item response was scored on a 5-point scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The scores on this unidimensional scale ranged from a minimum of 20 to a maximum of 100. High scores indicated more positive attitudes.

The CAS has been used in a variety of populations (the United States and other countries) for almost three decades and has shown to be a reliable and valid measure when evaluating computer attitudes (Nickell & Pinto (1986). When the scale was created using a sample of 47 computer operators and 444 students, it had a Cronbach's alpha of α = .81 for the entire scale (Rainer & Miller, 1996). In the current study, coefficient alpha for the CAS was α = .87.

Negative Affectivity. Negative affectivity was evaluated by the Positive and Negative Affect Schedule (PANAS). It was used to assess participant emotion after experiencing the computer frustration manipulation. This instrument consists of 20 items and is comprised of two scales, a 10-item Positive Affect (PA) scale and a 10-item Negative Affect (NA) scale. Watson et al. (1988) found that coefficient alpha reliability

when measuring the "in the moment" version of the PA scale was α =. 89, and for the NA scale, alpha was α = .85.

Responses were made on a 5-point scale ranging from 1 (*very slightly or not at all*) to 5 (*extremely*; Watson et al., 1988). This scale consists of different words that describe emotions and feelings. The participants were asked to rate the words from 1-5 on how they feel at the present moment. The scores were then added up. The current study focused on the NA scale items to evaluate negative affectivity. High scores on the NA scale indicate an individual with a negative level of emotions, and low scores on the NA scale indicated that the individual did not have a negative attitude. In the current study, the coefficient alpha reliability was α = .91 for the NA scale, and α = .90 for the PA scale.

Computer Frustration. Computer frustration was measured by the Frustration Scale (Peters, O'Connor, & Rudolf, 1980). This 3-item scale evaluated an individual's level of frustration with the task he or she completed. Coefficient alpha for the scale was found to be α = .76 (Peters et al., 1980). An example question for this scale in the current study is, "Trying to get this online application done was a very frustrating experience". The original scale asked information about completing a job, and was modified to fit the current study's simulated job application process. The third question is reversed-scored, setting up the high scores to reflect a frustrating experience. These questions were scored on a 5-point scale with scores ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The coefficient alpha reliability for the Frustration Scale in the current study is α = .88.

Demographics. Demographic information that was collected included age, gender, race, nationality, and the MTurk user ID (see Appendix B). The MTurk user ID

was collected for compensation purposes and was removed from the data set prior to conducting any analyses.

Procedures

Approval for this study was sought through the Xavier University Institutional Review Board (IRB) in the Exempt category (see Appendix C for the IRB approval letter). Data for this research were collected through MTurk and SurveyGizmo. There were separate HITs for males and females to increase the chances of receiving the number of participants needed for each gender. Participants signed up for this study through MTurk, but were provided a link for them to complete a survey on SurveyGizmo. MTurk users receive a MTurk worker ID when they sign up for the site, which was used to track them for compensation purposes. In order to do this, participants were asked to enter their MTurk worker ID as part of the Demographics page on the survey itself, so that their participation was accurately reported. All worker ID numbers were discarded after proper payment had been made to the participants who completed the study, and before analyses were done to ensure protection of participants. Also to ensure participant protection, SurveyGizmo provides security and privacy promises stating that they will not share or sell information with anyone (Widgix, 2013). The anonymous setting in SurveyGizmo was used so that SurveyGizmo would not report user IP addresses or geotracking data that could potentially compromise participant anonymity.

Before participating in the study, participants read an informed consent form (see Appendix D) telling them they will be taking part in a study examining psychological factors that may affect the job application process. Participants were informed that they were able to quit the study at any time and choose not to answer any question they were

not comfortable with. However, participants only received compensation upon completion, because according to Buhrmester et al. (2011), this is standard procedure. Then, the participants were given information asking them to participate in this study as if they were applying to their dream job with a sparse amount of time to get the application completed.

Research protocol. Participants first filled out the demographic form and then they were asked to complete a set of surveys consisting of the CARS-C, the M-CSE, and the CAS to assess their attitudes, levels of anxiety, and confidence with computer usage. Next, the participants were given a questionnaire resembling a job application (see Appendix E) that asked general questions that would appear on an application. Some information that was included was: education, employment history, and skills and qualifications. The job application questionnaire included a frustration manipulation to which all participants were exposed. The frustration manipulation involved an apparent failure of the survey system to allow them to accurately input their data, such that participants received an error message after pressing continue, that stated, "Please click continue to re-enter your availability information." This error occurred two times for the same page before the subject was allowed to continue to the next step.

Originally, participants were asked to re-enter their employment history along with the long narrative answer to the statement, "We expect all employees to be strong contributors and to add value to the organization. From your experiences so far (including school, community, or work experience), please describe a time when you delivered significant results. Please include details of the context, the actions you took, and the results that were achieved. (Max 950 characters including spaces)." There was an

individual that was very frustrated that he had to repeat this information in order to be paid an amount of 50 cents. When he was sent the explanation email that stated, “Thank you for contacting me about the problem with the survey. I am aware of the issues. Having been in contact with other MTurk users, I know that the problem is isolated to a single page of the job application, and that no one has had to fill out that page more than three times in order to have it register correctly. I would ask that you please go back through the study and attempt to re-enter the requested material at least three times.” He took that information and posted it to a popular MTurk forum, TurkOpticon, which allowed other workers to infer what the study was about.

Therefore, this led to a change in procedure and when the study was reposted, the information that they were required to re-enter was their availability information only. It was expected that having to re-enter even this small amount of information multiple times would create frustration for participants. In order to evaluate whether the manipulation initially worked, there was a pilot test on 12 graduate students to ensure that it actually created frustration. The pilot study was conducted before the availability change, and was judged to create frustration based on only two pilot participants completing the survey and ten dropping out. After the participants completed the second time re-entering their information, the next page stated that they had successfully submitted their application. In order to prevent harming the integrity of the data, it was made clear to the participants that they were only to use the survey navigation buttons at the bottom of their screen, and not to use the web browser forward and back buttons.

After participants finished the simulated application, they were asked to complete the PANAS and the frustration scale, which asked their current state of emotion and how

frustrating their experience was, keeping in mind that they were applying for their dream job. There were two quality check items included in the surveys, and a manipulation check at the end of the study (see Appendix F), that stated, “Previous respondents have indicated that the survey software did not always respond correctly. To allow us to provide feedback to the vendor, please indicate whether you experienced any problems during the course of the study, and describe any problems in the space below,” which clearly showed if the subjects actually participated in the study because every participant experienced the “Please re-enter your information” manipulation. Participants who did not report experiencing any problems were not removed from the analyses and were paid, because their data was still of interest for this study. After the study was finished and all assessments were submitted, the participants were debriefed and received a description of the actual purpose of the study (see Appendix G). They were thanked and received their monetary compensation if they passed all of the quality check items.

Chapter IV

Results

Intercorrelations of all continuous study variables, along with descriptive statistics and internal consistency reliabilities, are presented in Table 2. The hypotheses were tested using independent samples *t*-tests (see Table 3 for means and standard deviations across genders on each study variable). When possible, the total sample of participants were included in analyses, including those who dropped out, in order to provide the most comprehensive view of the relationships being studied. The pattern of results did not change, however, when only those participants who completed all elements of the study were included.

Hypothesis 1 predicted that women would score significantly higher than men on the computer anxiety scale. There was no significant difference between males and females for computer anxiety; $t(359) = 0.51$, $p = .61$. Therefore Hypothesis 1 was not supported. Hypothesis 2, however, predicted that women would score significantly lower than men on the computer self-efficacy scale, and was supported. There was a significant difference between males and females on computer self-efficacy; $t(359) = 2.27$, $p = .02$, $d = 0.24$.

Hypothesis 3 posited that women would score significantly lower than men on the computer attitude scale. However, there was no significant difference between males and females, $t(359) = -1.16$, $p = .25$, failing to support the hypothesis. Hypothesis 4 predicted

Table 2

Descriptive Statistics, Intercorrelations, and Reliabilities of Scales Utilized

	Mean	SD	1	2	3	4	5
1. CARS - C	35.15	14.42	(.94)	---	---	---	---
2. M-CSE	114.52	24.62	-.52**	(.98)	---	---	---
3. CAS	74.80	11.29	-.39**	.42**	(.87)	---	---
4. NA (PANAS)	14.01	6.15	.34**	-.32**	-.25**	(.91)	---
5. Frustration Scale	8.70	3.54	.06	-.17*	-.07	-.37**	(.88)

Note: Numbers in parentheses are coefficient α reliabilities.
CARS – C = computer anxiety rating scale – form c; M-CSE = modified computer self-efficacy scale; CAS = computer attitude scale; NA (PANAS) = negative affectivity on the positive and negative affect schedule.
* $p < .05$
** $p < .01$

Table 3

Means and Standard Deviations for Men and Women on Study Variables

	Mean (SD), Men	Mean (SD), Women	*t*-value	*p*-value
Computer Anxiety	35.56 (16.05)	34.79 (12.85)	0.51	.61
Computer Self-Efficacy	117.64 (23.49)	111.78 (25.31)	2.27	.02
Computer Attitudes	74.07 (10.80)	75.44 (11.70)	-1.16	.25
Frustration	8.36 (3.37)	9.03 (3.68)	-1.35	.18
Negative Affectivity	14.36 (6.90)	13.67 (5.33)	0.80	.43

that women would score significantly higher than men on the computer frustration scale. There was again no significant difference between males and females regarding frustration, $t(200) = -1.35$, $p = .18$.

Although there was no significant difference between males and females on the computer frustration scale, data were available on whether any difference existed in the drop-out rate for men and women that coincided with the frustration manipulation. Because gender information was collected prior to the presentation of the mock job application, it was possible to test whether there was a difference in the probability that an individual would opt-out of the study when the repeated error message occurred. This provides a potential behavioral indicator of frustration to augment the self-report measures of frustration. Of the 181 men who began the study, 100 completed it and 81 dropped out during the administration of the mock application, for a drop-out rate of 44.8%. Of 206 women who began the study, 102 completed it and 104 dropped out during the application, for a drop-out rate of 50.5%. There were two different drop-out stages during the application. One drop-out stage was before the manipulation, consisting of 36 of the total sample participants and the second stage was after the frustration manipulation, comprising of 149 participants. Two binomial tests were conducted to compare the proportion of males and females who dropped out at each point of the study (see Tables 4 and 5 for complete binomial results). Based on the data, 45.7% of females ($n = 86$) dropped out of the study at the manipulation stage (not including those who dropped out before the manipulation) in comparison to 38.7% of males ($n = 63$). A binomial test indicated that the difference in these proportions was significant ($p = .03$). In other words, the proportion of females who quit the study when presented with the

Table 4

Binomial Data for Women vs. Men, Excluding Those Who Dropped Out Prior to Manipulation

	Observed Frequency, Women	Observed Percentage, Women	Observed Frequency, Men	Observed Percentage, Men
Dropped out at manipulation	86	45.7%	63	38.7%
Did not drop out at manipulation	102	54.3%	100	61.3%

Note: Difference in proportion of men vs. women who dropped out was statistically significant, $p = .03$
$n = 113$

Table 5

Binomial Data for Women vs. Men, Including All Participants Who Started the Study (Women = 86/206, Men = 63/181)

	Observed Frequency, Women	Observed Percentage, Women	Observed Frequency, Men	Observed Percentage, Men
Dropped out at manipulation	86	41.7%	63	34.8%
Did not drop out at manipulation	120	58.3%	118	65.2%

Note: Difference in proportion of men vs. women who dropped out was statistically significant, $p = .02$
$n = 149$

frustration manipulation was significantly higher than the proportion of males who did so. These results suggest that females were more likely to drop out when technology did not appear to work properly, providing some measure of behavioral support for a gender difference in frustration reactions.

For exploratory purposes this study examined whether men and women differed on negative affect after a frustrating experience. Hypothesis 5 was not supported because there was no difference between males and females on the negative affectivity scale; $t(200) = 0.80$, $p = .43$.

Chapter V

Discussion

The purpose of this study was to investigate whether men and women reacted differently to a frustrating simulated online application experience. None of the hypotheses were supported based on self-report measures except for Hypothesis 2, which stated that men would have higher computer self-efficacy than women. This suggests that men are more confident in their abilities to use a computer and perform computer-related tasks. Hypotheses 1, 3, 4, and 5 were not supported, however. Hypothesis 1 predicted that women would score significantly higher than men on the computer anxiety scale, and hypothesis 3 predicted that women would score significantly lower than men on the computer attitude scale, thereby displaying less favorable attitudes toward computers. These self-reported results suggest that men and women did not differ on their computer anxiety or attitudes towards computers in the present sample. Moreover, Hypothesis 4 posited that women would score significantly higher than men on computer frustration, which was not the case based on self-reports.

Even though there was no significant difference between men and women on self-reported frustration, data were available to show that a significant difference existed in the drop-out rates for men and women, with women being proportionately and significantly more likely than men to drop out following the presentation of the frustration manipulation. It is possible that the lack of gender significance in self-reported

frustration on the frustration scale was due to the most frustrated participants simply not finishing the study. Differential drop-out rates as a behavioral indicator of frustration supports Hypothesis 4, suggesting that if there are frustrating components to an online application process, women may be more likely to leave that process. If they do so, they may end up under-selected relative to men. This result supports the whole theory of this study that there really can be an issue between gender drop-out rates in online applications.

For exploratory purposes, the PANAS was provided at the end of the study to examine whether men and women differed on negative affectivity after a frustrating experience. Hypothesis 5 stated that women would score significantly higher than men on negative affectivity following participating in a frustrating simulated online job application. This was not supported.

Contributions

This study makes contributions to both theory and practice of I/O psychology. On the theory side, something that was not expected is a disconnect between the frustration scale and the behaviors associated with frustration. A frustration scale may potentially be impractical if it follows a frustrating experience from which individuals may choose to withdraw. If the manipulation works, as the one in this study seems to have done, then individuals who are frustrated may never complete the scale, and may simply leave the process. This leads to the idea that an online application may also be impractical if the participants are dropping out due to frustration, leaving the company to lose potential candidates. Although many researchers have argued for the relevance and validity of self-report measures in a variety of contexts (Baer, Smith, & Allen, 2004; Del Boca &

Noll, 2000), researchers have to be aware of the possibility that self-reports may not always be ideal.

Also, from a theory perspective, it is important to notice that there were no differences between men and women in computer attitudes or computer anxiety based on data including all participants. This may suggest that some of the findings from prior research about gender differences in technology use are not as pronounced as they used to be. However, given that the data of this study were collected from an online sample, there may have been some self-selection of those who are naturally attracted to or comfortable with computers.

Theoretically speaking, having women significantly more likely to leave an online application process than men when a frustrating experience occurs is important. Gender differences in reactions are something that needs to be understood better, particularly as technology advances. If organizations do not meet the needs of both genders in an application process, it may result in a dominant male workforce in the United States. Researchers should be examining how far we have actually come from the times when there was a cultural message of what women were "expected" to be able to do. According to the results of this study, it seems that gender differences have become minimal in the areas of computer attitudes and computer anxiety, but that there is still a gap in technology-related confidence between genders. People are less likely to take a risk in something they do not feel confident in doing, and in this case it is using an online application to apply for a job. Additionally, when individuals do take risks and begin to fail, they typically drop out sooner than people who are excelling (Atkinson, 1957). This seems to be what happened with women in comparison to men during this study, which is

why it is important to understand what may be causing women greater frustration with technological issues in online applications.

On a practical side, the study offers data that organizations may never capture, because people who drop out of the application process may not even be "data points." Practically speaking, organizations ought to collect voluntary demographic information early in the process, so that if people drop out, analyses can be conducted to determine whether there are patterns in those drop-outs that potentially result in disparate impact on members of specific groups, especially protected classes.

Moreover, this study observed frustration reactions among MTurk workers, who are (presumably) familiar with and favorably predisposed toward technology. If individuals who are comfortable working with technology are feeling frustrated and dropping out, that poses the question as to how the individuals who are not comfortable with technology will deal with a frustrating experience during an online application. Organizations should offer both online applications and paper applications to obtain a well-rounded balance of applicants. For example, past research states that technology is a "masculine" field (Cheryan, Drury, & Vichayapai, 2013; Cooper, 2006) and the data from this study support that this may be true, with women having significantly lower computer self-efficacy scores. If women are less confident in their abilities to complete a computer-related task, then they are less likely to apply for a job using an online application in the Information Technology field or any position that involves working with a computer. However, if they are able to complete a paper application, they may be more likely to apply if they know they will be trained. Although technology companies are looking for individuals who are pre-trained with computers, or confident working

with them in general, this may be something to reconsider when evaluating equality in the workplace. Stajkovic and Luthans (1998) found a .38 corrected correlation between self-efficacy and work-related performance in their meta-analysis. This suggests that organizations should not select people out based on self-efficacy, which only accounts for 14.4% of job performance, leaving over 85% unaccounted for. If managers hire intelligent people, they can be trained in ways that build their self-efficacy.

MTurk workers participate in studies to earn money for their Amazon accounts. Therefore, they are often participating in multiple HITs at once to earn money, and it causes frustration for them to (a) waste their time taking a survey that does not work and (b) not be able to receive compensation for the HIT. Similarly, an applicant may be applying for multiple jobs at a time, and frustration associated with one of the applications may lead to discontinuation of the process, resulting in attrition and the loss of a potentially valuable applicant. Although applying for a job is undeniably "higher stakes" than completing an MTurk HIT, it seems reasonable that the kinds of factors that result in withdrawal from one environment may also affect the other, to some extent.

Limitations and Future Research

As with all studies, there are limitations to this current investigation. First, despite the previous argument, the study's manipulation was not an exact replica of an actual job application, and may be viewed as lacking psychological fidelity. The MTurk users are aware that this is a study in which they are participating to evaluate the psychology of online job applications, and they are not applying for their "dream job." The participants were asked to fill out the survey as if they were applying for their dream job, but the results may differ between this study and a real world experience, resulting in frustration

being stronger if the study were to be conducted during a job application process with more significant outcomes at stake. People may have been more likely to persist further through the study, and not drop out if it was a high-stakes environment or if there were more than 50 cents offered. It is possible that the penalty for withdrawing was so minimal that participants did not care, especially after they had entered their MTurk ID. More research is needed to determine the parallelism (or lack thereof) of the decision processes in play, but it seems reasonable to suggest that some parallels do exist that need to be explored.

Second, although MTurk has many benefits for collecting a diverse sample, it is possible that with a lack of supervision, participants on MTurk did not answer all the survey questions honestly and accurately causing issues with the collection of data. Little compensation was provided for taking this survey, which may have affected the motivation to correctly complete the survey. However, the qualifications for this study were capitalized and bolded on the informed consent of the study (the first page of the survey on SurveyGizmo). Quality checks (e.g., please choose "2" for this item) were also in place to make sure that individuals were being attentive while participating in the survey. Any individuals who failed the quality check items were removed from the dataset. Furthermore, there was no obvious restriction of range in any of the variables that would indicate inattentive responding, and the scale reliabilities were good. Finally, the lowest reliability was .88, which is higher than the acceptable alpha of .70 (Cortina, 1993).

Third, there was an issue with participants not reporting experiencing any issues with the survey, despite having to complete one section three times. A non-trivial number

of participants (n = 73) stated that they had not observed problems during the survey. Data from these individuals were retained and analyzed to observe why this could be. Examining the proportions of those who indicated no problems, 51% (n = 37) of women reported no problems, in comparison to 49% (n = 36) of men.

This issue in data collection could also have to do with the wording of the statement and the participants' interpretation of what they were being asked. The statement was, "Previous respondents have indicated that the survey software did not always respond correctly. To allow us to provide feedback to the vendor, please indicate whether you experienced any problems during the course of the study, and describe any problems in the space below." Some participants may have thought that it was an issue with the survey software and some may have thought it was an issue with the browser/Internet connection. More research is needed to determine whether people reported experiencing no issues because they interpreted the question wrong or whether they honestly did not feel re-entering information twice was an issue.

Fourth, it is possible that there was a self-selection of participants who are predisposed to technology. MTurk is an online website through Amazon.com, which could mean that these participants are especially comfortable using the internet. Individuals who have negative computer attitudes and a low computer self-efficacy may be less likely to use MTurk.. The fact that significant differences did emerge with a small effect size (d = 0.24) in self-efficacy across genders, however, would suggest that enough variability still existed in key constructs to make this study's methods meaningful and to lend credence to some of its conclusions. Although technology is advancing and the majority of the United States seems to be learning how to use it for multiple reasons,

especially for applying to jobs, it is important for future research to consider frustration levels for online applications, and to compare those levels to paper application frustration.

Fifth, a meaningful change to the study's protocol had to occur based on early adverse events. When the study was first posted on MTurk, participants had to re-enter their employment history along with the long narrative answer to the statement, "We expect all employees to be strong contributors and to add value to the organization. From your experiences so far (including school, community, or work experience), please describe a time when you delivered significant results. Please include details of the context, the actions you took, and the results that were achieved. (Max 950 characters including spaces)." There was an individual that was very frustrated that he had to repeat this information in order to be paid an amount of 50 cents. He took the information he had and posted it to a popular MTurk forum called, TurkOpticon. Re-posting communications from researchers is apparently not uncommon on TurkOpticon, and can potentially undermine a study entirely.

This led to (a) a re-design wherein only the availability information had to be re-entered, and (b) a delay of data collection to prevent the second round of data collection from being contaminated by the posting of information about first. Appropriate updates were submitted to Xavier's IRB, and the changes to the protocol were approved both by the IRB and the thesis committee. Because only a small number of participants (n = 11) took part in the initial pilot using the original protocol, it is unlikely that the second data collection was negatively influenced by this sequence of events, and none of the original participants took part in the final study.

Lastly, the datedness of some of the questions in the scales may have included irrelevant information, for example, “I feel confident handling a floppy disc correctly”. Today’s technology is much more complex than what technology used to be during the time these scales were developed. However, the reliabilities were still above the acceptable alpha of .70, indicating that the scales were relatively internally consistent. Future research should look into updating these scales to accommodate advanced technology.

Additionally, future research may attempt to replicate these findings with a different sample, possibly a real-life environment where the applicant is applying for a position they want. However, this may create ethical problems. It is possible to have applicants volunteer to be observed during their application, but if they know they are being observed there might be an issue of maximum performance (Klehe, Anderson, & Hoefnagels, 2007), which may influence frustration.

Researchers should also replicate these findings in a higher stakes environment, whether that is with an actual job application or completing the study in order to receive a higher compensation. When individuals feel more pressure that may increase their frustration levels.

Conclusion

Although all of the hypotheses except for one were not supported, important information can still be taken away from the results. The behavioral indicator of frustration supports the theory of this study by showing a differential drop-out rate across genders in completing a simulated online application. The importance of this behavioral indicator of frustration cannot be over-stated, and must be a focus for future research. If,

as the present data indicate, women are more likely to drop out of an online application process than men when faced with a technical problem that creates frustration, organizations must be highly aware of any problems that may arise, since these can restrict the sample of women who complete the application and, potentially, lead to adverse impact based on gender. Beyond this key finding, there is also a difference between men and women's beliefs on their computer-related performance, with women having a lower computer self-efficacy. If women are more likely to drop-out of the online application when faced with technological difficulties, it may be because of this lower self-efficacy, so the question of how this may be ameliorated should be addressed. This calls for concern because companies need to have equality and diversity in the workplace.

Chapter VI

Summary

There has been minimal research on gender and computer frustration reactions, and particularly limited research on frustration reactions in the context of online applications. Computer frustration is a common problem (Lazar et al., 2004) that can potentially affect the success of an organization. Computer self-efficacy and computer anxiety are two potential determinants of this construct. Computer self-efficacy is the level of confidence an individual has about their capability to perform tasks on the computer (Compeau & Higgins, 1995), and computer anxiety is the affective response of fearing the use of computers (Simsek, 2011). Huffman et al. (2013) found that men report lower levels of anxiety, more comfort, and appear to be more knowledgeable about computers than women. The more experience an individual has with a computer, the less anxiety they will have, producing higher levels of confidence and positive computer attitudes (Levine & Donitsa-Schmidt, 1998).

Computer attitudes play a role in computer frustration. Furthermore, given the influence of prior attitudes, frustration may also play a role in predicting future attitudes. Research consistently demonstrates that attitudes and beliefs are predictors of behavior (e.g., Levine & Donitsa-Schmidt, 1998). Flavián-Blanco et al. (2011) found that perceived effort and success were significantly related to positive emotions and the initial state of the individual. Schumacher and Morahan-Martin (2001) found that males have

more positive attitudes toward computers, leading to more participation in computer usage.

Computers have been considered a masculine technology, which tends to be supported by current research (Cheryan et al., 2013; Cooper, 2006; Corston & Colman, 1996; Huffman et al., 2013). Based on the research as reviewed regarding computer frustration and gender differences, the following are hypothesized:

H1: Women will score significantly higher than men on the computer anxiety scale.

H2: Women will score significantly lower than men on the computer self-efficacy scale.

H3: Women will score significantly lower than men on the computer attitude scale, thereby displaying less favorable attitudes toward computers.

H4: Women will score significantly higher than men on computer frustration scale.

Past studies have shown that failure leads to the strengthening of negative emotions (Flavián-Blanco et al., 2011). PA reflects positive emotions and mood states whereas NA reflects negative emotions and mood states. The PANAS will be provided at the end of the study to examine whether men and women differ on negative affect after a frustrating experience.

H5: Women will score significantly higher than men on negative affectivity following participating in a frustrating simulated online job application.

Method

Participants

Participants were recruited through Amazon Mechanical Turk (MTurk), an online site through Amazon.com permitting individuals to participate in human intelligence tasks (HITs) provided by requesters, and were paid $.50 for taking part. Participants were required to be at least 18 years old and living in the United States. There were 202 participants that completed the study, but an additional 149 participants started the study and dropped out when they were forced to re-enter information, along with 36 participants dropping out before they reached the manipulation, totaling 387 participants. Gender was the most important demographic to collect for this study, with gender differences being a key variable (206 female, 181 male).

Measures

Computer Anxiety. Computer anxiety was measured by the Computer Anxiety Rating Scale – Form C (CARS – C) by Rosen and Weil (1995). The CARS-C asks participants to indicate their level of computer anxiety at the time towards 20 statements. For the current study, coefficient alpha for the CARS-C was $\alpha = .94$.

Computer Self-Efficacy. Computer self-efficacy was assessed by the 29-item Modified Computer Self-Efficacy Scale (M-CSE). Each item is preceded by the phrase "I feel confident" and is positively worded, reflecting a variety of computer related skills. The coefficient alpha of the M-CSE was $\alpha = .98$.

Computer Attitudes. Computer attitudes were measured by the Computer Attitude Scale (CAS). The CAS is a 20-item self-report scale, formulated to measure

general positive and negative attitudes towards computers (Nickell & Pinto,1986). It was particularly designed to evaluate individual's attitudes toward the influence of computer usage in society. Coefficient alpha for the CAS was $\alpha = .79$.

Negative Affectivity. Negative affectivity was evaluated by the Positive and Negative Affect Schedule (PANAS). It was used to assess participant emotion after experiencing the computer frustration manipulation. This instrument consists of 20 items and is comprised of two scales, a 10-item Positive Affect (PA) scale and a 10-item Negative Affect (NA) scale. The current study focused on the NA scale items to evaluate negative affectivity. The coefficient alpha reliability for the NA Scale for the current study was $\alpha = .91$.

Computer Frustration. Computer frustration was measured by the Frustration Scale (Peters, O'Connor, & Rudolf, 1980). This 3-item scale evaluated an individual's level of frustration with the task he or she completed. Coefficient alpha for the Frustration Scale in the current study is $\alpha = .88$.

Demographics. Demographic information that was collected included age, gender, race, and nationality.

Procedure

Participants were told that they were completing the survey to get a better understanding of the psychology of online job applications, and it was required that electronic consent forms were read and accepted in order to participate in the study. Quality check items were included (e.g., "Please choose "4" as the answer to this item") so that participants taking the survey improperly were eliminated. Participants were debriefed about the meaning of the study immediately after completing their surveys.

Results

The hypotheses were tested using independent samples *t*-tests. When possible, the total sample of participants were included in analyses, including those who dropped out, in order to provide the most comprehensive view of the relationships being studied. The pattern of results did not change, however, when only those participants who completed all elements of the study were included.

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Discussion

This study makes contributions to both theory and practice of I/O psychology. On the theory side, something that was not expected is a disconnect between the frustration scale and the behaviors associated with frustration. A frustration scale may potentially be impractical if it follows a frustrating experience from which individuals may choose to withdraw. If the manipulation works, as the one in this study seems to have done, then individuals who are frustrated may never complete the scale, and may simply leave the process. Although many researchers have argued for the relevance and validity of self-report measures in a variety of contexts (Baer, Smith, & Allen, 2004; Del Boca & Noll,

2000), researchers have to be aware of the possibility that self-reports may not always be ideal.

Both theoretically and practically speaking, having women significantly more likely to leave an online application process than men when a frustrating experience occurs is noteworthy. Gender differences in reactions need to be understood better, particularly as technology advances. If organizations do not meet the needs of both genders in an application process, it may result in a dominant male workforce in the United States. Researchers should examine how far we have come from the times when there was a cultural message of what women were "expected" to be able to do. According to the results of this study, it seems that gender differences have lessened in the areas of computer attitudes and computer anxiety, but there is still a gap in technology-related confidence between genders.

On a practical side, the study offers data that organizations may never capture, because people who drop out of the application process may not even be "data points." Organizations ought to collect voluntary demographic information early in the process, so that if people drop out, analyses can be conducted to determine whether there are patterns in those drop-outs that potentially result in disparate impact on members of specific groups, especially protected classes.

Moreover, this study observed frustration reactions among MTurk workers, who are (presumably) familiar with and favorably predisposed toward technology. If individuals who are comfortable working with technology are feeling frustrated and dropping out, that poses the question as to how the individuals who are not comfortable with technology will deal with a frustrating experience during an online application.

Organizations should offer both online applications and paper applications to obtain a well-rounded balance of applicants. For example, past research states that technology is a "masculine" field (Cheryan, Drury, & Vichayapai, 2013; Cooper, 2006) and the data from this study support that this may be true, with women having significantly lower computer self-efficacy scores. If women are less confident in their abilities to complete a computer-related task, then they are less likely to apply for a job using an online application in the Information Technology field or any position that involves working with a computer. Although technology companies are looking for individuals who are pre-trained with computers, or confident working with them in general, this may be something to consider when evaluating equality in the workplace.

MTurk workers participate in studies to earn money for their Amazon accounts. Therefore, they are often participating in multiple HITs at once, and it causes frustration for them to (a) waste their time taking a survey that does not work and (b) not be able to receive compensation for the HIT. Similarly, an applicant may be applying for multiple jobs at a time, and frustration associated with one of the applications may lead to discontinuation of the process, resulting in attrition and the loss of a potentially valuable applicant. Although applying for a job is undeniably "higher stakes" than completing an MTurk HIT, it seems reasonable that the kinds of factors that result in withdrawal from one environment may also affect the other, to some extent.

Limitations and Future Research

As with all studies, there are limitations to this current investigation. First, despite the previous argument, the study's manipulation was not an exact replica of an actual job application, and may be viewed as lacking psychological fidelity. The MTurk users are

aware that this is a study in which they are participating to evaluate the psychology of online job applications, and they are not applying for their "dream job." The participants were asked to fill out the survey as if they were applying for their dream job, but the results may differ between this study and a real world experience, resulting in frustration being stronger if the study were to be conducted during a job application process with more significant outcomes at stake. People may have been more likely to persist further through the study, and not drop out if it was a high-stakes environment or if there were more than 50 cents offered. It is possible that the penalty for withdrawing was so minimal that participants did not care, especially after they had entered their MTurk ID. More research is needed to determine the parallelism (or lack thereof) of the decision processes in play, but it seems reasonable to suggest that some parallels do exist that need to be explored.

Second, although MTurk has many benefits for collecting a diverse sample, it is possible that with a lack of supervision, participants on MTurk did not answer all the survey questions honestly and accurately, causing issues with the collection of data. Little compensation was provided for taking this survey, which may have affected the motivation to correctly complete the survey. However, the qualifications for this study were capitalized and bolded on the informed consent of the study (the first page of the survey on SurveyGizmo). Quality checks (e.g., please choose "2" for this item) were also in place to make sure that individuals were being attentive while participating in the survey. Any individuals who failed the quality check items were removed from the dataset. Furthermore, there was no obvious restriction of range in any of the variables that would indicate inattentive responding, and the scale reliabilities were good. Finally, the

lowest reliability was .88, which is higher than the acceptable alpha of .70 (Cortina, 1993).

Third, there was an issue with participants not reporting experiencing any issues with the survey, despite having to complete one section three times. A non-trivial number of participants (n = 73) stated that they had not observed problems during the survey. Examining the proportions of those who indicated no problems, 51% (n = 37) of women reported no problems, in comparison to 49% (n = 36) of men. Given the nearly-equal gender split, more research is needed to determine whether people reported experiencing no issues because they interpreted the question wrong or whether they honestly did not feel re-entering information twice was not an issue.

Fourth, it is possible that there was a self-selection of participants who are predisposed to technology. MTurk is an online website through Amazon.com, which could mean that these participants are especially comfortable using the internet. Individuals who have negative computer attitudes and a low computer self-efficacy may be less likely to use MTurk, if they even know what MTurk is and what it has to offer. The fact that significant differences did emerge with a small effect size (d = 0.24) in self-efficacy across genders, however, would suggest that enough variability still existed in key constructs to make this study's methods meaningful and to lend credence to some of its conclusions. Although technology is advancing and the majority of the United States seems to be learning how to use it for multiple reasons, especially for applying to jobs, it is important for future research to consider frustration levels for online applications, and to compare those levels to paper application frustration.

Fifth, a meaningful change to the study's protocol had to occur based on early adverse events. When the study was first posted on MTurk, participants had to re-enter their employment history along with the long narrative answer to the statement, "We expect all employees to be strong contributors and to add value to the organization. From your experiences so far (including school, community, or work experience), please describe a time when you delivered significant results. Please include details of the context, the actions you took, and the results that were achieved. (Max 950 characters including spaces)." There was an individual that was very frustrated that he had to repeat this information in order to be paid an amount of 50 cents. He took the information he had and posted it to a popular MTurk forum called, TurkOpticon. Re-posting communications from researchers is apparently not uncommon on TurkOpticon, and can potentially undermine a study entirely.

This led to (a) a re-design wherein only the availability information had to be re-entered, and (b) a delay of data collection to prevent the second round of data collection from being contaminated by the posting of information about first. Appropriate updates were submitted to Xavier's IRB, and the changes to the protocol were approved both by the IRB and the thesis committee. Because only a small number of participants (n = 11) took part in the initial pilot using the original protocol, it is unlikely that the second data collection was negatively influenced by this sequence of events, and none of the original participants took part in the final study.

Lastly, the datedness of some of the questions in the scales may have caused for irrelevant information. Today's technology is much more savvy then what technology used to be during the time these scales were developed. However, the reliabilities were

still good and above the acceptance alpha of .70. Future research should look into updating these scales to accommodate advanced technology.

Additionally, future research may attempt to replicate these findings with a different sample, possibly a real-life environment where the applicant is applying for a position they want. However, this may create ethical problems. It is possible to have applicants volunteer to be observed during their application, but if they know they are being observed there might be an issue of maximum performance (Klehe, Anderson, & Hoefnagels, 2007), which may influence frustration.

Researchers should also replicate these findings in a higher stakes environment, whether that is with an actual job application or completing the study in order to receive a higher compensation. When individuals feel more pressure that may increase their frustration levels.

Conclusion

Although all of the hypotheses except for one were not supported, important information can still be taken away from the results. The behavioral indicator of frustration supports the theory of this study by showing a differential drop-out rate across genders in completing a simulated online application. The importance of this behavioral indicator of frustration cannot be over-stated, and must be a focus for future research. If, as the present data indicate, women are more likely to drop out of an online application process than men when faced with a technical problem that creates frustration, organizations must be highly aware of any problems that may arise, since these can restrict the sample of women who complete the application and, potentially, lead to adverse impact based on gender. Beyond this key finding, there is also a difference

between men and women's beliefs on their computer-related performance, with women having a lower computer self-efficacy. If women are more likely to drop-out of the online application when faced with technological difficulties, it may be because of this lower self-efficacy, so the question of how this may be ameliorated should be addressed. This calls for concern because companies need to have equality and diversity in the workplace.

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Appendix A

References and Sources for all Copyrighted Measures

Computer Anxiety Rating Scale – Form C

Rosen, L. D., & Weil, M. M. (1995). Computer Anxiety Rating Scale--Form C [Database record]. Retrieved from PsycTESTS. doi: 10.1037/t13663-000

Modified Computer Self-Efficacy Scale

Durndell, A., Haag, Z., & Laithwaite, H. (2000). Modified Computer Self-Efficacy Scale [Database record]. Retrieved from PsycTESTS. doi: 10.1037/t14073-000

Computer Attitude Scale

Nickell, G. S., & Pinto, J. N. (1986). Computer Attitude Scale [Database record]. Retrieved from PsycTESTS. doi: 10.1037/t13500-000

PANAS

Watson, D., Clark, L. A., & Tellegen, A. (1988). Positive and Negative Affect Schedule [Database record]. Retrieved from PsycTESTS. doi: 10.1037/t03592000

Frustration Scale

Peters, L. H., O'Connor, E. J., & Rudolf, C. J. (1980). Frustration Scale [Database record]. Retrieved from PsycTESTS. doi: 10.1037/t08834-000

Appendix B

Demographics Scale

Please check the box of or write in the answer that best describes you for each question.

1) Please indicate your sex.
    - Male, Female, or prefer to not answer
2) Please indicate your age.
    - (fill in)
3) Please indicate your race.
    - (Caucasian/Non-Hispanic, Black or of African descent, Hispanic/Latino, Asian, Indian, Native Hawaiian or Other Pacific Islander, American Indian or Alaskan, Multiracial, other, prefer not to answer)
4) Please indicate your nationality.
    - (fill in)
5) Please indicate your country of residence.
    - (fill in)
6) Please provide your Mturk worker ID number.
    - (fill in)

Appendix C

IRB Approval Letter

July 21, 2014

Nicole Sanders
66 Chapel Hill Dr.
Fairfield, OH 45014

Re: Protocol #13-100, *Gender Differences in Computer Frustration Reactions with Online Applications*

Dear Ms. Sanders:

The IRB has reviewed the materials regarding your study, referenced above, and has determined that it meets the criteria for the Exempt from Review category under Federal Regulation 45CFR46. Your protocol is approved as exempt research, and therefore requires no further oversight by the IRB. We appreciate your thorough treatment of the issues raised and your timely response.

If you wish to modify your study, including the addition of data collection sites, it will be necessary to obtain IRB approval prior to implementing the modification. If any adverse events occur, please notify the IRB immediately.

Please contact our office if you have any questions. We wish you success with your project!

Sincerely,

Kathleen J. Hart, Ph.D., ABPP
Vice Chair, Institutional Review Board
Xavier University

KJH/sb

Appendix D

Consent Form

You are being given the opportunity to participate in a Master's thesis study conducted by Nicole Sanders at Xavier University. The purpose of this study is to better understand the psychology of online job applications. For this study, you will be required to respond to a number of survey items, and complete a simulated job application as if it were for your "dream job." Please note that some of these items are included for quality check purposes, and others to ensure that you read the material provided carefully; **if you fail either the quality or attention checks**, your data will not be included in the study and you will **not be paid for your participation**.

This survey is anticipated to take about 20 minutes. There are no known risks associated with participating in this study. Participation in this study is voluntary, and you are free to withdraw from the study at anytime without penalty. If you complete the study and pass all relevant checks, you will be paid $0.25 for participating. However, if you decide to withdraw before completion (when you will be asked to enter your MTurk worker ID, as described below) or do not pass the quality or attention check items, you will not be compensated. Please be advised that you will only have 60 minutes to complete the survey. You must be at least 18 years old to participate in this study. Your survey answers will be anonymous. No one, other than the researchers, will have access to your information, and identifying information (e.g., your full name) will not be collected at any time as part of the study. You will be required to enter your unique MTurk worker ID at the end of the survey to receive compensation. MTurk worker ID numbers will be removed prior to any data analyses, further ensuring anonymity.

If you have any questions at any time during the study, you may contact Nicole Sanders at sandersn1@xavier.edu or the faculty advisor, Dr. Morrie Mullins, at mullins@xavier.edu. Questions about your rights as a research subject should be directed to Xavier University's Institutional Review Board at 513-745-2870, or electronically at irb@xavier.edu.

By pressing continue, you agree to the following statement:

I have been given information about this research study and its risks and benefits and have had the opportunity to ask questions and to have my questions answered to my satisfaction. I freely give my consent to participate in this research project.

Appendix E

Job Application

Please answer the following questions as if you were applying for your dream job. The personal information is auto-populated in order to protect your anonymity; those fields are not designed to be filled in by you.

PERSONAL INFORMATION:

Name

Job Applicant (Name and personal identifiers are not required to protect your anonymity)

Street Address

3800 Victory Pkwy

City, State, Zip Code

Cincinnati, OH, 45207

Phone Number

(513) 555-3000

Are you eligible to work in the United States?

Yes _____ No_____

AVAILABILITY:

Days/Hours Available

Monday ____
Tuesday ____
Wednesday ____
Thursday ____
Friday ____
Saturday ____
Sunday ____

Hours Available: from _____ to _____

What date are you available to start work?

_____

EDUCATION:

Degree/Diploma

Skills and Qualifications: Licenses, Skills, Training, Awards

_____

_____

EMPLOYMENT HISTORY:

Present Or Last Position:

Position Title: _____

From: _____ To: _____

Responsibilities: _____

_____

==========

Previous Position:

Position Title: _____

From: _____ To: _____

Responsibilities: _____

_____

We expect all employees to be strong contributors and to add value to the organization. From your experiences so far (including school, community, or work experiences), please describe a time when you delivered significant results. Please include details of the context, the actions you took, and the results that were achieved.

Appendix F

Quality and Attention Check Items

1) Please choose "2" for this item.

   Will be inserted near the middle of the modified self-efficacy scale.

2) Please choose "4" for this item.

   Will be inserted near the middle of the frustration scale.

3) Previous respondents have indicated that the survey software did not always respond correctly. To allow us to provide feedback to the vendor, please indicate whether you experienced any problems during the course of the study, and describe any problems in the space below.

___ I experienced problems with the survey.
___ I did not experience problems with the survey.

Please describe any problems here:
_____
_____
_____

Will be inserted at the end of the study.

Appendix G

Debriefing Form

Thank you for participating in this study. Its purpose is to understand gender differences in reactions to issues with online job applications. This exact relationship has not been explored before, highlighting the importance of your participation in this study. **The problems experienced were not real, and none of them were due to the fault of the survey vendor. SurveyGizmo is a well-regarded and highly reputable provider of survey services and any "problems" experiences were designed to be part of the study manipulation.**

If you have any questions or concerns, or if you would like to inquire about the results of this study, please contact Nicole Sanders at sandersn1@xavier.edu or her faculty advisor, Dr. Morrie Mullins, at mullins@xavier.edu.