8-2013

Physiological and Evaluative Differences between Internet-based and In-Person Interview Techniques

Joseph R. Castro

Abstract

A growing trend in job selection is the use of automated online interviews as a cheap and easy tool for gaining many applicants. The use of the Internet for selection interviews may have ramifications on the interviewer's perception of the candidate's personality and performance. It can also affect the candidate's physiological responses and ability to process information. Two types of interviews were conducted, a face-to-face interview and a computer-mediated interview. Comparisons between the two conditions were made for ratings of performance, the accuracy of an observer's estimation of the participant's personality, cognitive interference, and physiological reactivity. There was no difference for self or observer ratings of performance, the observer's overall accuracy, or for any potential moderators. Participants in the face-to-face condition showed greater physiological reactivity and a pattern of coactivation of the SNS and PNS.

PHYSIOLOGICAL AND EVALUATIVE DIFFERENCES BETWEEN INTERNET-BASED AND IN-PERSON INTERVIEW TECHNIQUES

By

Joseph R. Castro
B.A. State University of New York Purchase College, 2009

MASTERS THESIS

Submitted in partial fulfillment of the requirements for the degree of Master of Science in Social Psychology in the Graduate School of Syracuse University

August 2013

Table of Contents

List of Figures and Tables

Physiological and Evaluative Differences between Internet-based and In-Person Interview Techniques

It can seem that many important turning points in a person's life revolve around a single decision made by an interviewer or group of interviewers. Whether it is for a new job, an application to a graduate school, or meeting a significant other's family for the first time, a selection interview can induce a great deal of stress. The Bureau of Labor Statistics (2010) found that the average person changes jobs ten times over his or her lifetime, often with multiple job interviews for each change. During a recession, landing a good job can become a major goal of one's life and a selection interview can be a major roadblock in achieving that goal. As competition for jobs increases, job seekers must venture further from their home to find well-paying jobs, increasing the time and money needed to find employment. Employers also face similar problems. Bringing prospective employees for interviews can cost the company thousands of dollars in travel and hotel fees and not guarantee a quality applicant (Kiviat, 2009). The most common type of job interview is the traditional face-to-face (FTF) interview; which also is a well-studied version of the selection interview (a review, see Huffcutt, 2011). However, in order to lower costs companies have been turning to the growing trend of computer mediated (CM) interviews.

Online Interviewing

There are several types of CM interviews. One of the most popular is the automated internet-based interview. This type of interview is commonly conducted through a third party human resource company with its own proprietary interview programs and equipment. Applicants sign on to the hiring company's web site and are routed to the interview company's online system. The applicants then sign in and verbally answer the questions presented by the

computer while being recorded by their webcam. This type of CM interview has a number of benefits for both the employer and the applicant. Even with hiring an outside company, online interviews can save a company up to 75% of its hiring budget and reduce the total time involved with hiring by up to 50% (HireVue, 2011). Applicants can participate in the interview on their own schedule and can search for jobs at companies outside of their normal traveling limit. Also, by being able to interview from the comfort of their own home, the applicants may gain a "home field advantage". This advantage can have a large effect on stress and performance. Chu, Strong, Ma, and Greene (2005) found that 71% of office workers feel more comfortable in their home environment and 66% feel more confident. This confidence and comfort may lead to a decrease in physiological stress reactions (Elfering & Grebner, 2011). When applicants are finished with their interview, the system automatically saves the video for later review on the hiring company's servers. The HR department is then able to sift through all of the applicants' recordings, either reviewing an entire applicant's interview as a whole or watching multiple applicants' answers to the same question (HireVue, 2011).

With the increasing use of computer-based interview methods, an important question is raised: in what ways do these methods differ from the standard FTF interview? Several studies have found that social interactions via the Internet have diminished or missing social components that would be present in FTF contact, such as nonverbal cues (Chapman & Rowe, 2001; Chapman & Rowe, 2002; Fullwood, 2007; Wilson & Lu, 2008) and social presence (Skalski & Tamornini, 2007). Social interactions in which these components are missing or diminished have been found to decrease liking of the interaction partner (Straus, Miles, & Levesque, 2001; Weisband & Atwater, 1999), lower ratings of the partner's competence and fluency (Fullwood, 2007; Straus, Miles, & Levesque, 2001), and increase conversation difficulty (Wilson & Lu,

2008). All of these factors can play a large role in influencing an interviewer's decision about an applicant.

Non-Verbal Cues

One of the most important of the nonverbal components missing or diminished for online communication is eye contact. Maintaining eye contact with the interviewer can increase the applicant's chances for being hired (McShane, 1993). Eye contact via a webcam can be difficult to maintain for those unfamiliar with the technology and can thus decrease the interviewer's appraisal of the applicant (Chapman & Rowe, 2002). Untrained applicants are more likely to focus on the picture of the interviewer on the screen rather than at the webcam itself, resulting in the appearance of a downward gaze. Along with the loss of nonverbal cues, the diminished social presence of an interviewer can result in an increase in self-enhancement, such as rating oneself as being more productive than other members of a group (Weisband & Atwater, 1999). Both of these effects can have a negative influence on the outcome of an interview. The diminished or missing nonverbal cues can also play a role in decreasing the accuracy of judgments made by the interviewer. Obvious visual cues tend to lead to greater accuracy when making judgments about another than do audio cues (Depaulo, Rosenthal, Eisenstat, Rogers, & Finkelstein, 1978). The diminished or absence of nonverbal cues and unfamiliarity with online communication can have an increase in cognitive interference. Klinger (1996) defined cognitive interference as causing awkwardness, distraction, and inattention.

The loss of nonverbal cues has also been shown to affect the accuracy of observer judgments. In a study conducted by Blackman (2002), interviews were conducted either FTF or over the telephone. After the interview, participants rated themselves on various personality traits and had the same traits rated by a friend and by the interviewer. In both conditions there was a

strong agreement between the participant's self-rated personality and a friend's ratings. This indicates highly accurate personality assessments by those familiar with the participant regardless of nonverbal cues. For the interviewer there was greater agreement with the participant's self-rated personality in the FTF condition than in the telephone condition. With the removal of nonverbal cues a person unfamiliar with the participant, such as an interviewer, was less accurate in estimating the participant's personality. Further evidence of the effects of diminished or removed nonverbal cues come from research demonstrating that the greatest differences between self and observer ratings are found for personality traits that have been rated as having a strong nonverbal component, such as extroversion and warmth (Blackman, 2002; DeGrot & Gooty, 2009).

While the loss or diminishing of nonverbal cues seems to be disadvantageous to the applicant, several lines of research have suggested that this is advantageous to the interviewers. With the decreased reliance on nonverbal cues, the interviewers are compelled to rely on the content of the applicant's speech rather than on how the applicant is presenting it. This allows the interviewer to be more objective and less influenced by the applicant's personality (Fullwood, 2007; Weisband & Atwater, 1999). This can be especially helpful when interviewing applicants who are skilled at flattery and controlling how others perceive them (Turnley & Bolino, 2001). In some situations the interviewer's objectivity can be an advantage for the applicant. The reliance on facts allows interviewers to more easily change their minds when presented with new information rather than sticking with their first impressions (e.g., when applicants explain stretches of unemployment on their resumes; Nordstrom, Hall, & Bartels, 1998).

Social Presence

Defined by Short et al. (1976) as the salience of another person in an interaction, social presence is a feature that is diminished during online communication. This lack of social presence is likely what spurred the growth of increasingly interactive forms of online communication. The development of online communication has grown from message boards, to personal messages, to webcam based video conferencing, and to the current development of virtual reality software. Each new format of online communication is designed to increase the feelings of intimacy, connectedness, and social presence with the people with whom we are communicating with. While early theories viewed the level of social presence as a static element inherent to the medium of communication (Short et al., 1976), current theories state that there are three dimensions that define the social presence felt during a conversation. Tu (2000) defined these dimensions as the context of the communication, the type of communication, and the interactivity between the participants. The context of communication dimension defines the intent of the communication and the relationship between the actors, such as a quick chat with a friend or an official job interview with a prospective employer. The type of communication dimension is defined as the exact format used for the discussion, such as email, a chat program, or via webcam. The lack of social presence in a CM interview stems from the nature of the communication and the degree of interactivity between the interviewee and interviewer. It has been shown that communicating via webcam is lower in social presence than FTF (Chapman & Rowe, 2000) and that there is a complete lack of interactivity (Tu, 2000). The lower social presence results in a lack of engagement by the interviewee (Williams & Rice, 1983).

When social presence is high, as in an FTF interview, the interviewee has the social stimuli needed to engage and act naturally with the interviewer. An increased social presence,

along with the evaluative nature of interviews, would likely lead to increased social facilitation, enhancing the participant's performance during the interview. However, a potential downside to the increased social presence is that the mere presence of an evaluator can lead to an increase in arousal and physiological stress (Dickerson & Kemeny, 2004). If the stress is overwhelming, it may become an inhibiting factor on the interviewee's performance. Moderate stress may actually have the opposite effect and help performance rather than hinder it. In an FTF interview the social presence can have both a facilitating effect as well as a hindering effect, while the social presence in a CM interview would be too low to have either effect. Since moderate stress can either be helpful or at least not a hindrance it is believed that the benefits of social presence in an FTF interview will outweigh any hindrances that may appear.

Self-Monitoring

Snyder and Gangestad (1986) defined self-monitoring as the extent to which people can and do observe and control their expressive behavior and self-presentation. High self-monitors can regulate their expressions of self-presentation and desired public appearance. High self-monitors are also more responsive to social, interpersonal, and nonverbal cues to socially appropriate behaviors and actions. Low self-monitors either lack the ability or drive to regulate and change their expressions of self-presentation. Instead the expressions of low self-monitors are believed to be reflections of their own internal attitudes and personalities, rather than reflections of their interaction partner. While high self-monitors are believed to be the minority, consisting of roughly 40% of the population, they are much more likely to pursue achievement and strive for better paying career opportunities (Kilduff & Day, 1994). Because of this, high self-monitors are likely to make up a larger percentage of the job applicant pool. Since online interview situations have a decrease in available social cues, self- monitoring likely becomes less

effective. An applicant high in self-monitoring would have fewer ways to tell when the interview is going badly and would have less of an ability to change his or her behavior to be more presentable and in line with what the interviewer wants to see.

Interview Experience

It is possible that interview experience could help an interviewee develop skills that can affect his or her performance in an interview. This improvement can stem from the development and practice of crucial interviewing skills such as appropriate nonverbal cues, tone of voice, and the format for answering common questions (Huffcut, Iddekinge, & Roth, 2011). Interview experience has been shown to affect performance ratings in similar types of interviews (Schleicher, Van Iddekinge, Morgeson, & Campion, 2010), but improvements may not transfer to an interview in a different format. It is possible that the more recent development and use of CM format will lessen any benefit from experience in more traditional FTF interviews.

Interview experience may also affect the levels of stress experienced by an interviewee. Consistent with the reinforcement principle, repeated exposure to a stress-provoking situation tends to reduce stress reactions towards the situation (Fishman & Franks, 1992; Johnson, Tyler, Thompson, & Jones, 1971). It is possible that interviewees who have been through many stress-inducing interviews eventually will have a weakened stress reaction towards them. Like performance effects, this change in physiological reaction may be specific to only the FTF interview and may not translate to an interview that is as different as the CM interview.

Physiological Responses

Despite the possible evaluative advantages of the FTF interview, the CM interview may produce less physiological stress for the interviewee. The mere presence of an evaluator in an evaluative setting can lead to a greater stress response (Dickerson & Kemeny, 2004). Specific

variants of face-to-face interviews, such as the Trier Social Stress Test, are used as experimental tools to induce great stress in the participant (Kirshbaum, Pirke, & Hellhammer, 1993). It is important to know how different types of interviews affect the stress levels of the interviewee. Stress is regulated by the autonomic nervous system (ANS) — the division of the nervous system outside of conscious control that helps regulate the organs in the body and maintain homeostasis. The ANS consists of two main branches: the sympathetic nervous system (SNS) and parasympathetic nervous system (PNS). Generally the two systems have opposite effects on the organs and systems they innervate. The SNS works to activate or excite the body's systems and is considered the major contributor to the fight-or-flight response. The PNS works in the opposite direction, slowing the body systems down (Cacioppo, Tassinary, & Bernston, 2000; Lovallo & Sollers, 2000). Generally, the two systems work in a reciprocal fashion — as one increases the other decreases. There are also some situations where the two systems work independently (i.e., one increasing without change in the other). They can even increase or decrease activity in concert, a process known as coactivation, (Bernston, Cacioppo, & Quigley, 1991; Bernston, Cacioppo, & Quigley, 1993).

Indicators of Autonomic Activation

Based on prior research (Kirshbaum, Pirke, & Hellhammer, 1993) participants in an interview setting would be expected to show an increase in SNS activity and a decrease in PNS activity from a baseline rest period to the interview. When the interview was completed they would show a decrease in SNS and increased PNS from interview to recovery period. The reactivity of both SNS and PNS physiological responses can be measured or calculated in several ways.

Three common measures of SNS activity are skin conductance, heart rate, and respiration rate. Skin conductance is one of the most common measures of SNS activity and can be measured by the galvanic skin response (GSR). A weak electrical current is passed between two sensors that are attached to an area of the body. An increase in this conductance indicates an increase in SNS activity. Respiration rate is measured with a respiration band placed across the participant's chest. As the participant breathes, the band expands and compresses a pressure sensor that records the expansion of the chest during inhalation and exhalation. An increase in SNS activity increases the rate of breathing, represented by the inhalation-exhalation cycle.

Heart rate is a more complicated means of gauging SNS activity. The heart is constantly under PNS innervation, acting much like a parking break keeping a car from moving. An increase in heart rate can either mean an increase in SNS innervation or a decrease in the PNS "parking break" that holds the heart in check.

Heart Rate Variability

Heart Rate Variability (HRV) results from the dynamic relationship between the influences of the SNS and PNS over time. One of the ways it can be measured is the change in HR over the respiration cycle. During inhalation the PNS decreases and the heart rate speeds up and during exhalation the PNS increases and HR goes down. HRV can be measured in many ways (Allen, Chambers & Towers, 2007). Three measures were chosen for this experiment: two types of respiratory sinus arrhythmia (RSA) and low-frequency HRV.

Respiratory sinus arrhythmia is a measurement of HRV across the respiration cycle and can be calculated from heart rate and respiration rate to assess PNS activation. RSA is a measure of the influence of the vagal nerve on the cardiac cycle and is considered one of the purest measures of PNS activity (Berntson et al., 1997). Two types of RSA can be measured. The first,

deemed high-frequency heart rate variability (HF-HRV), measures the heart rate change over a cycle of .15 to .4 Hz - a cycle roughly corresponding to the normal human respiratory cycle. The second measure, which is simply referred to as RSA, can be measured using the participant's individual breathing cycle, rather than assuming a normal respiration rate as with HF-HRV. A third HRV measurement, Low-frequency heart rate variability (LF-HRV) is calculated using heart rate variation over a cycle of .04 to .15 Hz (outside the range of normal breathing). LF-HRV is not considered a pure measure of PNS but instead indicates a coactivation of PNS and SNS (Goedhart, Willemsen, Houtveen, Boomsma & De Geus, 2008). LF-HRV and HF-HRV were measured via power spectrum analysis. Measurements were in units of time between heartbeats (measured by r-spikes) squared, divided by the cycle rate in hertz (s2/Hz). RSA was measured by the difference between the maximum and minimum heart rate period for each respiration cycle.

Current Study

In the current study, we compared two types of interviewing methods: the face-to-face (FTF) and the computer mediated (CM) interview. These interviewing methods differ in format as well as in the levels of the interviewers' social presence and access to nonverbal cues. The FTF condition has interviewers with full social presence and access to nonverbal cues. The CM condition has no social presence for the interviewer and no access to nonverbal cues. We examined whether the participants in the two interview conditions show a difference in physiological stress reactivity, measures of performance (self-reported, and observer ratings), and the accuracy of observers' impressions of the participant (difference between the participant's scores on personality scales and the observer's estimation of those scores). We also tested if these differences varied with the participant’s levels of self-monitoring and interview experience.

Hypothesis 1. Because the presence of others will allow the participants to act more naturally they will have higher ratings of self-rated and observer-rated performance in the FTF condition than in the CM condition.

Hypothesis 2. The presence of others will also affect how the participants present themselves and how observers perceive them. There will be greater accuracy in the observer's estimation of the participant's personality in the FTF condition than in the CM condition.

Hypothesis 3. Along with the evaluative benefits, the presence of others will cause an increase in stress responses. In the FTF condition there will be a greater increase of SNS activity from baseline to interview than in the CM condition, with an accompanying decrease in PNS activity. The increased stress response in the FTF condition will also result in slower return to normal SNS activity, which is indicated by a smaller change in SNS activity from the interview to recovery stage. In the CM condition there will be a full recovery. The physiological measures will return to baseline levels during the recovery period.

Hypothesis 4. The unusual nature of the CM interview will cause more cognitive interference than in the FTF interview. When presented with a list of stimuli mid-interview the participants in the CM condition will recall less of the stimuli once the interview is over.

Hypothesis 5. A familiarity with interviews from experience, training, or being an interviewer, was predicted to act as a moderator. Participants with greater interview experience will show less stress, greater ability of self-presentation (indicated by higher accuracy in the observers' estimation of the participants personality), and higher measures of performance (Baum, Fisher, & Solomon, 1981) in the FTF condition but not in the CM condition.

Hypothesis 6. Those who are high in self-monitoring rely on nonverbal and other social cues to regulate their own behavior and self-presentation. Due to the format of the CM interview,

self-monitoring is predicted to act as a moderator between the performance and physiological measures in the conditions. High self-monitors would show higher ratings in performance and less physiological stress response in the FTF condition, where they have social cues in which to gauge and modify their behavior. Participants in the CM condition would show the opposite pattern. High self-monitors will have worse performance and a greater stress response. Low self-monitors would show no difference between the conditions. The lack of nonverbal and social presence in the CM condition would have little effect on their behavior or responses.

Method

Participants

Eighty-four undergraduate students were recruited from Syracuse University. Participants were randomly assigned to each of the two interview conditions; 41 participants were in the FTF condition and 43 were in the CM. Slightly over half of the participants were female (58.3%). Forty five percent of the participants were Caucasian, 23% were African American, 23% were Asian, and 9% were of other ethnic origins. All subjects were medication free and were told to refrain from smoking, physical exercise, eating, or drinking alcoholic beverage for at least 1 hour prior to testing. Participants were awarded course credit for their participation.

Design

This experiment was a 2x3 mixed-subjects design, with interview condition as a between-subjects variable (FTF and CM) and Interview Stage as a within-subjects variable (baseline, interview and recovery). The independent variable was the type of interview and stage of interview. Dependent variables were the physiological stress measures (heart rate, respiration, GSR, and HRV), ratings of performance, and the accuracy of the observers' estimations of the participants' personality scores.

Materials

The laptop computers used for the experiment were Dell Latitude E6320s with 13-inch screens and integrated webcams. Physiological measurements were taken using a MP150 module and analyzed using Acqknowledge 4.2 software (Biopac, Goleta, CA).

Procedure

Participants were randomly assigned to one of two conditions. The first condition was an interview in a face-to-face setting and the second condition was an interview conducted in a computer-mediated format. Programs that are used by businesses to conduct computer-mediated interviews typically allow the interviewees to view themselves during the interview. To keep this constant, participants were able to view themselves via webcam in both conditions.

The interview area consisted of a table with two laptop computers. The primary computer was placed in the center of the table and provided the questionnaires for both conditions and presented the interview program for the CM interview. The secondary computer was placed on the left of the participants and angled towards their seated position. The secondary computer ran the AcqKnowledge software and recorded the physiological measures as well as the video and audio for both conditions.

Upon arrival, all participants were seated and had the galvanic skin response (GSR) sensors applied to the index and middle finger on the left hand. The sensors were placed on the palm side of the distal segment of the finger. After these were applied the participant used the primary computer to complete the following questionnaires:

1) Demographic information

-Age, Gender, Academic Major, Race/Ethnicity, Nationality, Birth Language, Number of previous interviews, interview training, and interviews conducted.

2) Big Five personality inventory (Benet-Martinez & John, 1998; Appendix A)

3) Balanced Inventory of Desirable Responding (Paulhus, 1988; Appendix B)

4) Self-Enhancement Scale (Taylor & Gollwitzer, 1995; Appendix C)

5) Fear of Negative Evaluation Scale (Watson & Friend, 1969; Appendix D)

6) Eighteen-Item Measure of Self-Monitoring (Snyder and Gangestad, 1986; Appendix E)

7) Rosenberg Self-Esteem Scale (Rosenberg, 1965; Appendix F)

After the questionnaires were completed, the experimenter set up each participant with measures of the heart's electrical activity (EKG) and respiration, and then the GSR leads were connected to the sensors. The EKG sensors were placed on the left calf and right wrist. Respiration was measured with a wireless elastic band placed around the participant's chest, just above the sternum. In both conditions the experimenter left the room and the participant had a three-minute rest period in which a baseline for all physiological measures was established. Participants were instructed to move as little as possible after the sensors were attached as movement may disrupt the physiological readings.

After the baseline period, the experimenter returned and gave the participant instructions about the interview and its format. The experimenter explained that the participant was to imagine him or herself on a normal job interview for an internship. The participants in the FTF condition were told that they would be in a typical in-person interview and in the CM condition they were instructed that the interview would be conducted via a computer program that would record their interview and provide them with questions and instructions.

In the FTF condition, the interviewers entered and were seated across from the participant. The interviewers (a male and female research assistant) alternated asking scripted questions (Appendix G). The interviewers were instructed to act naturally during the interview

and not engage in small talk with the participant or their fellow interviewer. If the participant spent less than 20 seconds answering a question the interviewer asking the question used a scripted phrase to prompt the participant to continue (e.g., “Please elaborate on that question a bit more”). Likewise, if the participant went longer than 2 minutes the interviewer who asked the question used a scripted phrase to cut the participant off and move to the next question (e.g., “If you don't mind, we should move on to the next question”).

In the CM condition, the experimenter readied the primary computer and opened the interview program. The interview program was coded in Flash and displayed scripted questions across the screen (Appendix G). If the participant spent less than 20 seconds answering a question the program displayed a scripted phrase to prompt the participant to continue. Likewise, if the participant went longer than 2 minutes, the program displayed a scripted phrase to cut the participant off and move to the next question.

After the fifth question in both conditions the participants were given a list of 10 interview topics that are prohibited by the U.S. Equal Employment Opportunity Commission (EEOC.gov; Appendix H) that the participants read on their own (no time maximum or minimum was established). These questions were chosen so they were related to the interview itself and would not seem out of place. In both conditions the participants were simply instructed to read the questions and were unaware that they would later be asked to recall them. The purpose of this task was to assess cognitive interference during the interview.

After the interview the participant was left for a three-minute recovery period. After this period was completed the experimenter removed the physiological sensors and the participant was asked to complete a final performance questionnaire (Appendix I). The final questionnaire also asked the participants to recall as many of the illegal interview questions as they could.

After the final questionnaire had been completed, the participant was thanked and debriefed. Once the interviewers exited the room, they completed their performance measure and estimates of the participant's self-recorded personality (Appendix J).

Results

Performance

Hypothesis 1 predicted that there would be a difference between conditions in self-rated and observer-rated interview performance. Specifically, participants in the FTF interview were predicted to have higher performance ratings (self and observer) than were participants in the CM condition.

Self and observer ratings of performance were each scored on ten item measures **(**Appendix I & J). The observers were two trained research assistants who did not serve as interviewers, were not present during the interviews, and reviewed the video recordings of the interviews. The self and observer performance measures each had high reliability ($\alpha = .93$ for self-performance and $\alpha = .95$ for observer ratings) and in each case, the ten items were averaged into overall ratings of performance for each participant. Reliability between the observers was very high ($\alpha = .91$) and the scores were averaged to obtain a single observer score for each participant. Descriptive data for the self and observer rated performance scores can be found in Table 1.

Contrary to hypothesis 1 there was no difference between the conditions for self-performance ($t(82) = 1.136$, $p = .27$) or observer rated performance ($t(82) = .746$, $p = .458$). Performance ratings were higher in the FTF condition for both self and observer ratings, but this difference was not enough to be significant. Interestingly, observer performance ratings were

more positive than self ratings in both conditions (Table 1.) but the differences were not significant (FTF: $t(81) = 1.12$, $p = .87$; CM: $t(81) = .718$, $p = .76$).

The relationship between the observer and self-rated performance scores was calculated as a rough estimation of accuracy in performance evaluations. A strong correlation between the self and evaluated scores would suggest that the participants had a vague idea of how they performed during the interview. There was a moderate significant correlation between the self and observer performance ratings in the FTF condition ($r = .47$) but a non-significant correlation in the CM condition ($r = .15$). This suggests that participants can get a more accurate idea of their performance if there is some evaluator present for them to interact with and observe.

Accuracy

An outcome of an interview is that the interviewer forms an impression of the interviewee's personality. Hypothesis 2 was concerned with the accuracy of these impressions. Do the impressions formed by the observers correspond to the participants' personalities, as measured by their scores on the personality questionnaires? Hypothesis 2 predicted that the observers in the FTF condition would be able to gain a more accurate view of the participant's personality than would the observers in the CM condition. To test this hypothesis, an accuracy score was calculated. First, a discrepancy score for each personality measure was calculated by subtracting the self-rated scores from the observer-estimated scores (Table 2). These scores were then converted to absolute differences and standardized (some measures used different scales). These standardized absolute-difference scores were then averaged into a single accuracy score for each participant.

The mean difference between conditions in the standardized accuracy scores was not significant (FTF: M = .81, SD = .19; CM: M = .84, SD = .23), $t(81) = -.654$, $p = .515$. Evaluators

had a similar ability to estimate a participant's personality whether the participant interacted with an interviewer or responded to question prompts from a computer.

There was a significant correlation (r = .39) between the accuracy of the observers' personality estimations and their performance ratings of the participant (with accuracy scores reversed so that a positive correlation indicates a more accurate estimation). Participants that were able to present themselves clearly and accurately were rated higher than those participants whose personality could not be easily estimated.

Physiological Responses

Hypothesis 3 predicts that the physiological responses will show a greater stress response in the FTF condition than in the CM condition. There were three recorded physiological responses: GSR, respiration, and EKG These measures were used to calculate six other measures: GSR level, respiration rate (RR), heart rate (HR), low-frequency HRV (LF-HRV), high-frequency HRV (HF-HRV) and respiratory sinus arrhythmia (RSA).

Consistent with prior research on physiological stress and interviews it was assumed that the data would show a quadratic pattern. That is, there should be reactivity from baseline to interview and then reactivity in the opposite direction from interview to recovery (i.e. back to baseline levels). Whether the reactivity between the three stages was an increase or a decrease was dependent on the type of physiological measure. Because of this assumption all tests examined the difference between the quadratic patterns between the interview conditions.

Data Selection and Cleaning. Physiological measurements were taken throughout each of the three stages of the experiment (baseline, interview, and recovery). For the baseline and recovery stages the data were averaged across the first three useable minutes. For the interview stage all useable data were used in the average. Minor cleaning was used when possible. If a

section of data could not be salvaged it was not used to obtain the average. This resulted in some baseline and recovery stages with less than three minutes. Some data was unsalvageable and resulted in the dropping of some participants in later calculations. For GSR 2 participants were excluded. For respiration, 23 participants were excluded. For HR, 17 participants were excluded. For LF-HRV and HF-HRV, 20 participants were excluded in each. For RSA, which was affected by both HR and respiration, 28 participants were excluded.

Galvanic Skin Response: This measure was taken from the raw physiological recording and was measured in microsiemons (μS). GSR was analyzed using a mixed model (stage by condition). Due to the difference in scaling but not change for some of the participants the mixed model was calculated with a random intercept and a fixed slope. There was a significant quadratic pattern for stage, $F(1, 159) = -11.545$, $p < .0001$. Contrary to hypothesis 3, there was no significant difference in the quadratic effects between the conditions, $F(1,81) = 1.209$, $p = .275$. The pattern of data is presented in Figure 1. Note that there is no significant difference in the baseline ratings between the conditions.

Heart Rate: This measure was calculated from the EKG score and measured the average amount of r-spikes within a given minute (hBPM). HR was analyzed using a multivariate test and a significant quadratic pattern was found across the stages $F(1,66) = 92.223$, $p < .001$. Heart rate increased from baseline to interview then decreased from interview to recovery. Coinciding with hypothesis 3, there was a significant difference in the quadratic patterns between the FTF and CM conditions, $F(1,66) = 10.093$, $p = .002$. The participants showed a more dramatic quadratic effect, with a much greater increase in the interview stage, in the FTF condition than the CM condition. The means for each stage in each condition can be found in Table 2, the

pattern of data is presented in Figure 2. Note that there is no significant difference in the baseline ratings between the conditions.

Respiration Rate: This measure was calculated from the respiration score recorded from the participant and is measured in breaths per minute (rBPM). RR was analyzed using a multivariate test and a significant quadratic pattern was found between the stages $F(1,61) = 21.142$, $p < .001$. Contrary to hypothesis 3, there was no significant difference in the quadratic pattern between the conditions $F(1,61) = 1.97$, $p = .166$. The mean pattern of data showed a decrease from baseline to interview (15.64 - 13.71 BPM) and an increase from interview to recovery (13.71 - 16.65 BPM). This pattern was most likely caused by the participants talking during the interview condition and thus breathing less than normal. The pattern of data for both conditions is presented in Figure 3. Note that there is was a significant difference, $t(66) = -2.373$, $p = .02$, in the baseline ratings between the conditions.

Heart Rate Variability: HRV measures the variation between heart beats over a given length of time. Three measures of HRV were calculated; LF-HRV, HF-HRV, and RSA. Both HF-HRV and RSA were calculated due to inherent weaknesses present in either calculation. HF-HRV assumes a normal respiration cycle but it may not be the case, RSA uses the participant's respiration data but can be affected by any complications in that data (e.g. speaking can alter respiration patterns).

All of the HRV measures showed the same patterns between conditions (Table 3.). They all had significant quadratic effects, with increases from baseline to interview and decreases from interview to recovery. All HRV measures also showed a difference in the magnitude of the quadratic pattern between the conditions (though RSA was only marginally significant). For each, there was a more dramatic quadratic effect in the FTF condition than in the CM condition.

The patterns of data for LF-HRV can be found on Figure 4., HF-HRV can be found on Figure 5. and RSA on Figure 6. Note that there is no significant difference in the baseline ratings between the conditions for any of the HRV measurements.

Cognitive Interference

Hypothesis 4 predicted that there would be greater cognitive interference in the CM condition than the FTF condition due to the novel situation of an automated interview. This measure was determined by the number of mid-interview questions that the participant could recall at the end of the experiment. There was a significant difference between the FTF and CM conditions, $t(82) = -2.321$, $p = .023$. This difference in scores was actually the opposite of the predicted pattern. The participants in the CM condition remembered more questions (M = 4.1) than those in the FTF condition (2.8), thus showing less cognitive interference. This effect may be due to the presence of the interviewers during the presentation of the stimuli. The participant might have rushed through the questions in order to not keep the interviewers waiting, spending less time studying the questions than those in the CM condition.

Moderators

The final two hypotheses postulated the presence of variables that may moderate the effect of condition on the performance ratings, accuracy, physiological measures, and cognitive interference.

Hypothesis 5 predicted that the participants with more interview experience would have higher performance, lower physiological responses, greater accuracy, and less cognitive interference in the FTF condition and there would be no effect in the CM condition. No effect of interview experience as a moderator was found for any of the relationships with *p*-values ranging from .08 to .98. The marginal effect of .08 was for the moderation of condition on self rated

performance. Participants with greater interview experience showed higher self-rated performance in the FTF condition and not the CM condition.

Hypothesis 6 predicted that the higher a participant's self-monitoring score the higher performance ratings, lower physiological responses, greater accuracy and less cognitive interference in the FTF condition and the opposite effects in the CM condition. No effect of self-monitoring as a moderator was found for any of the relationships with *p*-values ranging from .11 to .89.

Interviewer Ratings

The participants were rated on their performance and personality by the observers watching the interview recordings and by the interviewers conducting the interviews. Interviewer data were also averaged between the two interviewers to obtain an averaged interview-rated performance score. Since the interviewers were only present in one condition (FTF) they could not be used to make comparisons between groups. In the FTF condition there was a strong correlation between observer and interviewer performance ratings (r = .73). There was also a high correlation between the observer and interviewer estimations of the participant's personality (Mean r = .51). Due to the high correlations between the observer and interviewer scores and the lack of interviewer scores in the CM condition, the observer scores were used.

Discussion

This study provided evidence that, despite the differences in format, there was no evaluative difference between face-to-face and computer mediated interview techniques. There was no mean difference found between the conditions for the participants' ratings of their own performance or outside observers' ratings of the participant's performance. There was also no difference in the observers' overall accuracy in estimating the participants' personality scores.

There was a difference however, between interview conditions for the observer's accuracy for a few personality traits. Agreeableness and conscientiousness were estimated more accurately (showing a smaller difference score, see Table 2) in the FTF condition, and were correlated with higher observer performance ratings (Agreeableness r = .24 and Conscientiousness r = .27). With the two traits being associated with performance appraisals and with the more accurate estimations in the FTF condition, there is the suggestion that performance ratings may be more valid in the FTF interview.

Despite resulting in less accuracy for some traits, the CM interview condition has the advantage of generating less cognitive interference than the FTF condition. How much or what sort of an advantage is up for debate. There is no interviewer in the CM condition, so the interviewee cannot ask questions and gain information. If the interviewee does not learn any new information then he or she cannot take advantage of the lack of cognitive interference.

The physiological results show a surprising and uncommonly documented pattern of SNS and PNS coactivation in the FTF condition. This runs contrary to previous research into physiological reactivity to interview protocols, which are often designed to show an increase in SNS activity and a corresponding decrease in PNS activity (Kirshbaum et al., 1993). The coactivation observed in the present study is likely due to the social and interpersonal nature of the interview. The interviewers did not adapt an evaluative orientation or cold demeanor towards the participants. The presence of the interviewers allowed the participants to exert some control over the situation. In prior interview research the participant the interviewers ran a very structured interview and the participant had little control (Kirshbaum, et. al., 1993). It is also possible that this effect is caused by the questions that were asked to the participants. The questions asked during the interview required the participants to recall events from their own

past and share them with the interviewer. This type of reminiscing and disclosure has been shown to affect ANS levels (Tarrant, Dattilo, Driver, & Manfredo, 1995) and a similar pattern of coactivation has been found using similar types of questions (Gramzow, Willard, & Mendes, 2008). Other types of questions (i.e. non-biographical) can be used in future studies to see if the coactivation effect is driven entirely by self-disclosure.

Implications

The current study has implications for how the Internet is used for selection interviews. The current trend for CM interviews is to use them as a type of first round draft, interviewing many applicants for little cost and then weeding out the unworthy candidates for a second round of more in-depth interviews. The driving force behind this study was to discover if this strategy was unfairly weeding out applicants who would have been hired had the company used a more traditional style of interview. The results of this study suggest that this is not the case. Using CM interviews may be a useful and unbiased strategy for recruitment. With only a single caveat, there was no difference in observer rated performance or observer estimated personality scores between the conditions. The single caveat is that the estimations for some personality traits were more accurate in the FTF condition. The traits in question, agreeableness and conscientiousness, are ones that were moderately correlated with observer performance ratings and may have had an influence on the observers' decisions. Though inaccuracy was still low (less than a one point difference on a seven point scale), both traits could be indicators of future performance. Further evidence for the equal utility of the different interview format is the lack of moderation by self-monitoring and interview experience. It could be assumed that high self-monitors would have a harder time with the CM condition. Despite the lack of nonverbal cues in the CM condition, high

self-monitors were not rated any lower on performance ratings and estimations of their personalities were no less accurate than if they were in person.

Limitations

One of the largest limitations to the current study is the use of only two types of interview formats. Other types of interviews, such as phone and live webcam-based interviews, are also common. However, these interview formats fall between the FTF and CM formats on a continuum of nonverbal cues and social distance. For the purpose of this study, the extreme ends of that continuum were tested first. It is possible that there are attributes unique to phone and webcam based interviews that may affect how people are rated or perceived. Most likely these types of interview formats would have results between the formats used in this study.

The use of physiological equipment poses a limitation on ecological validity. One of the main advantages of a CM interview is that it takes place in the comfort of the interviewee's home, granting them a "home field" advantage (Chu, Strong, Ma, & Greene, 2005). By using physiological measures, it necessitated the participants coming into the lab and being connected to equipment which can be uncomfortable and restrict movement. Though it is constant in both conditions the mere use of physiological equipment may have biased the observers against some participants. Those participants who are used to gesticulations and animated forms of speech may have had a more difficult time adjusting to the limited range of movement that was necessary to record clean physiological data. It is possible that these types of participants would have been rated differently in the different conditions if they had been able to move naturally. Another limitation to ecological validity is the use of the observer ratings of performance and accuracy in both conditions. In real-world CM interviews the observers watching the recorded interview make the selection decision. In real-world FTF interviews the decision is typically

made by the interviewer's themselves. The use of observers for both conditions also introduces another possible limiting factor. In the CM condition the observers are just basing their ratings on the participant's answers. In the FTF condition the observers are basing their ratings on the participant's answers and any social interaction with the interviewers. A solution to this problem would be to have the observers rate the participants on short clips of them just answering questions. It has been found that observers can form accurate impressions with short clips (anywhere from 6 to 30 seconds) when in an evaluative context (Ambady & Rosenthal, 1993). With a careful selection of video clips, the use of this thin-slice method would reduce the effects of any social interactions with the interviewer and would hide the condition from the observers.

Future Directions

Future experiments could be used to specifically test some of the unexpected results found during this experiment, such as the coactivation of the PNS and SNS and the effects of the accuracy of influential personality traits on performance ratings. Future experiments can also place a greater emphasis on ecological validity, attempting to mimic the real-world use of these interviews as closely as possible.

The coactivation of the SNS and PNS is an unusual finding and merits further study to determine if it is caused by the social engagement of the participant or some other factor inherent to the methodology itself. Experiments could be designed to manipulate the level of social engagement as well as the degree of interaction between the participant's and interviewers. It is also a possibility that the coactivation is the result of the normal SNS activation associated with an interview and the activation of PNS by the reminiscing and disclosing of positive personal details to the interviewers. This could be manipulated by changing the type of questions, having personal vs. impersonal questions and a positive or negative valence to the questions. It can be

expected that questions that are personal questions with a positive valence would show a high degree of coactivation where impersonal questions with a negative valence would show just SNS activation.

Because the observers' performance ratings were highly correlated with their estimates of certain aspects of the participants' personalities, it is important to understand how accurately these personality dimensions can be predicted. It has been found that certain personality traits are more easily predicted through observation, such as traits that are high in observability (e.g. extroversion) and traits that are low in desirability (e.g. neuroticism). The majority of the studies on trait-accuracy are done using self-esteem and the Big 5 personality traits (Vazire, 2010). In an interview context, it is important to understand how accurately observers can predict personality traits that are highly correlated with job performance. Future studies could include a similar methodology but narrow the focus to personality traits that have been correlated with greater job performance, such as tolerance, temper, and confidence (Goffin et al., 2011). Even if there is no overall difference in performance ratings between conditions, if there is less accuracy in a CM format then the observers may be basing their performance ratings on incorrect personality ratings.

Increasing ecological validity would require a few modifications to the current methodology. Much like a real-world interview the participants would have to be offered an incentive to do well in the interview and to want to be rated positively. This could be accomplished by offering money or extra credit to the person who is selected by the observers as the most hirable of all the participants. A further boost to ecological validity would be obtained by removing the physiological measures completely. This would no longer restrict the movement of the participants and would allow the CM interview to be conducted in the comfort of the

participant's home, just as they would be in a real-world CM interview. Measuring stress in such an experiment could be done by self-report measures of perceived stress, such as those used in the Biopsychosocial model (Blascovich, Mendes, Hunter, & Salomon, 1999), which gauge stress and the level of perceived challenge and threat. Participants feel challenged when they face a difficult task that they have the resources to overcome. They feel threat when they face a difficult task that the feel that the cannot overcome. Differentiating the two could be important to understand the pattern of physiological reactivity. Coactivation of the SNS and PNS are more likely to occur during a challenge. During a threat only the SNS is more likely to be activated.

The extent to which the physiological equipment affected results, both by limiting movement and necessitating the presence of the participants in the lab could also be studied. A study could be conducted by comparing participants using a CM format without physiological equipment and the participants being interviewed either in their home or in the lab. We could also compare participants in the lab with and without physiological equipment restricting their movement.

Other possible avenues of research are driven by unexpected patterns of data unrelated to the hypotheses. While not significant there was a higher correlation between socially relevant personality traits (e.g., extroversion and self-monitoring) and self-rated performance in the CM condition and not the FTF condition. It is possible that by watching themselves on the webcam during the interview, those who are high in socially relevant personality traits viewed their performance as better because there were no interviewers present to indicate differently. This could be tested by running the FTF and CM conditions with and without the participants being able to see themselves during the interview.

Conclusion

With the Internet becoming increasingly pervasive, it is important to understand how it can affect different types of social interactions. Companies have begun to use the Internet as a cost saving measure without knowing how the innate characteristics of the medium can affect their decision-making. More research is needed to see if some specific types of personality are easier to gauge during face-to-face interviews. This study has shown that despite the vast difference between interview formats, using a computer mediated can be an effective way to find quality hires.

Appendix A

Big Five Inventory (Benet-Martinez & John, 1998)

Please indicate the degree to which you agree or disagree with each of the following statements. You should rate the degree to which the pair of traits applies to you, even if one does more than the other. Please use the following scale for your rating.

Disagree strongly			Neither agree nor disagree			Agree strongly
1	2	3	4	5	6	7

I see Myself as Someone Who...

___1. Is talkative
___2. Tends to find fault with others*
___3. Does a thorough job
___4. Is depressed, blue
___5. Is original, comes up with new ideas
___6. Is reserved*
___7. Is helpful and unselfish with others
___8. Can be somewhat careless*
___9. Is relaxed, handles stress well*
___10. Is curious about many different things
___11. Is full of energy
___12. Starts quarrels with others*
___13. Is a reliable worker
___14. Can be tense
___15. Is ingenious, a deep thinker
___16. Generates a lot of enthusiasm
___17. Has a forgiving nature
___18. Tends to be disorganized*
___19. Worries a lot
___20. Has an active imagination
___21. Tends to be quiet*
___22. Is generally trusting
___23. Tends to be lazy*
___24. Is emotionally stable, not easily upset*
___25. Is inventive
___26. Has an assertive personality
___27. Can be cold and aloof*
___28. Perseveres until the task is finished
___29. Can be moody
___30. Values artistic, aesthetic experiences
___31. Is sometimes shy, inhibited*
___32. Is considerate and kind to almost everyone
___33. Does things efficiently
___34. Remains calm in tense situations*
___35. Prefers work that is routine*
___36. Is outgoing, sociable
___37. Is sometimes rude to others*
___38. Makes plans and follows through with them
___39. Gets nervous easily
___40. Likes to reflect, play with ideas
___41. Has few artistic interests*
___42. Likes to cooperate with others
___43. Is easily distracted*
___44. Is sophisticated in art, music, or literature

*marks questions that will be reversed scored

Appendix B

The Balanced Inventory of Desirable Responding (Paulhus, 1988)

Please indicate the degree of truth in each of the following statements. Please use the following scale for your rating.

Definitely False			Neither true or False			Definitely True
1	2	3	4	5	6	7

1) My first impressions of people usually turn out to be right
2) It would be hard for me to break any of my bad habits
3) I don't care to know what other people really think of me.
4) I have not always been honest with myself.
5) I always know why I like things.
6) When my emotions are aroused, it biases my thinking.
7) Once I've made up my mind, other people can seldom change my opinion.
8) I am not a safe driver when I exceed the speed limit.
9) I am fully in control of my own fate.
10) It's hard for me to shut off a disturbing thought.
11) I never regret my decisions.
12) I sometimes lose out on things because I can't make up my mind soon enough.
13) The reason I vote is because my vote can make a difference.
14) My parents were not always fair when they punished me.
15) I am a completely rational person.
16) I rarely appreciate criticism.
17) I am very confident of my judgments.
18) I have sometimes doubted my ability as a lover.
19) It's alright with me if some people happen to dislike me.
20) I don't always know the reasons I do the things I do.
21) I sometimes tell lies if I have to.
22) I never cover up my mistakes.
23) There have been occasions when I have taken advantage of someone
24) I never swear.
25) I sometimes try to get even rather than forgive and forget.
26) I always obey laws, even if I'm unlikely to get a caught.
27) I have never said something bad about a friend behind his or her back.
28) When I hear people talking privately, I avoid listening.
29) I have received too much change from a salesperson without telling him or her.
30) I always declare everything at Customs.
31) When I was young I sometimes stole things.

32) I have never dropped litter on the street.
33) I sometimes drive faster than the speed limit.
34) I never read sexy books or magazines.
35) I have done things that I don't tell other people about.
36) I never take things that don't belong to me.
37) I have taken sick leave from work or school even though I wasn't really sick.
38) I have never damaged library book or store merchandise without reporting it.
39) I have some pretty awful habits.
40) I don't gossip about other people's business.

Self-Deception (1-20); Impression Management (21-40)

Appendix C

Self-Enhancement

In the following questionnaire, you will use the scale below to rate yourself relative to other Northeastern students your own age and gender:

1	Bottom 5%
2	Lower 10%
3	Lower 20%
4	Lower 30%
5	Lower 50%
6	Upper 50%
7	Upper 30%
8	Upper 20%
9	Upper 10%
10	Top 5%

For example, if one of the traits was "handwriting/penmanship", a person who believes that he or she is just below average in handwriting-neatness would choose "5" for this question, whereas a person who writes more neatly than 80% of his or her classmates would mark "8", indicating that he or she is in the top 20% on this dimension.

1) Athletic Ability
2) Cheerfulness
3) Leadership ability
4) Social self-confidence
5) Popularity with own sex
6) Popularity with opposite sex
7) Writing ability
8) Public speaking ability
9) Intellectual self-confidence
10) Originality
11) Creativity
12) Academic ability
13) Drive to achieve
14) Artistic ability
15) Sensitivity to others
16) Understanding of others
17) Clarity of personal goals
18) Confidence in the ability to attain personal goals
19) Personal appearance

20) Self-respect
21) Individuality

Now we are going to focus on more negative traits. For example, if one of the traits was "violent", a person who perceives himself or herself to be very low in violence might choose "1" or "2", whereas a person who thinks that he or she is very violent might choose "8", indicating that he or she is in the top 20% on this dimension. So, higher values will now mean that you see yourself as more negative compared to other NU students your own age and gender

1) Nervous
2) Dependent
3) Jealous
4) Lazy
5) Moody
6) Quiet
7) Selfish
8) Forward
9) Cranky
10) Lacking motivation
11) Dull
12) Manipulative
13) Awkward
14) Anxious
15) Self-defeating
16) Defensive
17) Shy
18) Impatient
19) Pretentious
20) Hostile towards others
21) Difficulty making friends

Appendix D

Fear of Negative Evaluation (Watson & Friend, 1965)

Please indicate how each of the following statements is characteristic of you. Please use the following scale for your rating.

Not At All a Characteristic of me			Moderately Characteristic of me			Definitely Characteristic of me
1	2	3	4	5	6	7

1) I worry about what other people will think of me even when I know it doesn't make a difference.
2) I am unconcerned even if I know people are forming an unfavorable impression of me.
3) I am frequently afraid of other people noticing my shortcomings.
4) I rarely worry about what kind of impression I am making on someone.
5) I am afraid that others will not approve of me.
6) I am afraid that people will find fault with me.
7) Other people's opinions of me do not bother me.
8) When I am talking to someone, I worry about what they may be thinking about me.
9) I am usually worried about what kind of impression I make.
10) If I know someone is judging me, it has little effect on me.
11) Sometimes I think I am too concerned with what other people think of me.
12) I often worry that I will say or do the wrong things.

Appendix E

Eighteen-Item Measure of Self-Monitoring (Snyder and Gangestad, 1986)

Please indicate the degree to which you agree or disagree with each of the following statements. Please use the following scale:

Disagree strongly			Neither agree nor disagree			Agree strongly
1	2	3	4	5	6	7

1) I find it hard to imitate the behavior of other people.*
2) At parties and social gatherings, I do not attempt to do or say things that others will like.*
3) I can only argue for ideas which I already believe. *
4) I can make impromptu speeches even on topics about which I have almost no information.
5) I guess I put on a show to impress or entertain others.
6) I would probably make a good actor.
7) In a group of people I am rarely the center of attention. *
8) In different situations and with different people, I often act like very different persons.
9) I am not particularly good at making other people like me. *
10) I'm not always the person I appear to be.
11) I would not change my opinions (or the way I do things) in order to please someone or win their favor. *
12) I have considered being an entertainer.
13) I have never been good at games like charades or improvisational acting. *
14) I have trouble changing my behavior to suit different people and different situations. *
15) At a party I let others keep the jokes and stories going. *
16) I feel a bit awkward in public and do not show up quite as well as I should. *
17) I can look anyone in the eye and tell a lie with a straight face (if for a right end).
18) I may deceive people by being friendly when I really dislike them.

*Items marked will be reverse coded.

Appendix F

Rosenberg Self-Esteem Scale

Strongly Disagree	Disagree	Agree	Strongly Agree
1	2	3	4

1. On the whole, I am satisfied with myself.
2. At times, I think I am no good at all.*
3. I feel that I have a number of good qualities.
4. I am able to do things as well as most other people.
5. I feel I do not have much to be proud of.*
6. I certainly feel useless at times.*
7. I feel that I'm a person of worth, at least on an equal plane with others.
8. I wish I could have more respect for myself.*
9. All in all, I am inclined to feel that I am a failure.*
10. I take a positive attitude toward myself.

* Items are reversed coded

Appendix G

Interview Questions

1) Tell us about your work experience.

2) Tell us about your academic experience.

3) Tell us about your strengths.

4) Tell us about your weaknesses.

5) Tell us about a time when you had to take a position of responsibility.

6) What's most important to you in a new position?

7) What is the career path you envision for yourself?

8) What has been your biggest professional or educational achievement?

9) Describe a time where you had to work in a team.

10) Can you tell us about a time that you worked well under pressure?

Appendix H

Illegal Interview Questions

To avoid discrimination and ensure quality selection processes, it is illegal for interviewers to ask you the following questions. It is within your right to refuse to answer any of these questions.

1) Interviewers cannot ask you about your Race or Ethnic background.

2) Interviewers cannot ask you about your Birthplace.

3) Interviewers cannot ask you about your exact Age.

4) Interviewers cannot ask you about your Sexual Orientation.

5) Interviewers cannot ask you about your Marital Status.

6) Interviewers cannot ask you about your Spouses or Significant Other's Occupation.

7) Interviewers cannot ask you about any Disabilities you may have.

8) Interviewers cannot ask you about any Health Conditions you may have.

9) Interviewers cannot ask you about your Religious Beliefs.

10) Interviewers cannot ask you about your Political Beliefs.

Appendix I

Self- Report Measure of Performance

Please indicate your agreement to the following statements on the following scale.

Disagree strongly			Neither agree nor disagree			Agree strongly
1	2	3	4	5	6	7

1) I feel like I would have a good chance of being hired from this interview. _____

2) I came across as competent during the interview. _____

3) I came across as well spoken and fluent during the interview. _____

4) I feel that the interviewers found me to be a likable person . _____

5)* I came across as awkward or distracted during the interview. _____

6) I feel that I made a good first impression. _____

7)* I came across as nervous during the Interview. _____

8) I came across as interested and engaged with the Interview. _____

9) I came across as confident during the interview. _____

10) I came across as controlled during the Interview. _____

* Reversed Scored

Appendix J

Interviewer Measure of Applicant Performance

Please indicate your agreement to the following statements on the following scale.

Disagree strongly			Neither agree nor disagree			Agree strongly
1	2	3	4	5	6	7

1) The participant would have a good chance of being hired from this interview. _____

2) The participant appeared competent during the interview. _____

3) The participant was well spoken and fluent. _____

4) The participant was a likable person. _____

5)* The participant appeared awkward or distracted during the interview. _____

6) The participant made a good first impression _____

7)* The participant appeared nervous during the Interview _____

8) The participant was engaged and interested in the Interview. _____

9) The participant was confident during the interview. _____

10) The participant was controlled during the interview. _____

* Reversed Scored

Estimated Scores on the Pre-Interview Questionnaires

Balanced Inventory of Desirable Responding
(1-7 Scale, 7 being Higher levels of Desirable Responding)

Mean Score _____

Impression Management _____ Self-Deception _____

Big Five
(1-7 Scale, 7 Being higher levels of trait)

Openness _____ Conscientiousness _____

Extroversion _____ Agreeableness _____

Neuroticism _____

Fear of Negative Evaluation
(1-7 Scale, 7 being higher levels of fear)

Mean Score _____

Self-Enhancement
(1-10 Scale, 10 being higher levels of Self-Enhancement)

Mean Score _____

Self-Monitoring
(1-7 Scale, 7 being a high Self Monitor)

Mean Score _____

Self-Esteem
(1-4 Scale, with 4 being High Self-Esteem)

Mean Score _____

Figure 1

Standardized Means of Galvanic Skin Response Across Three Stages for Both Conditions

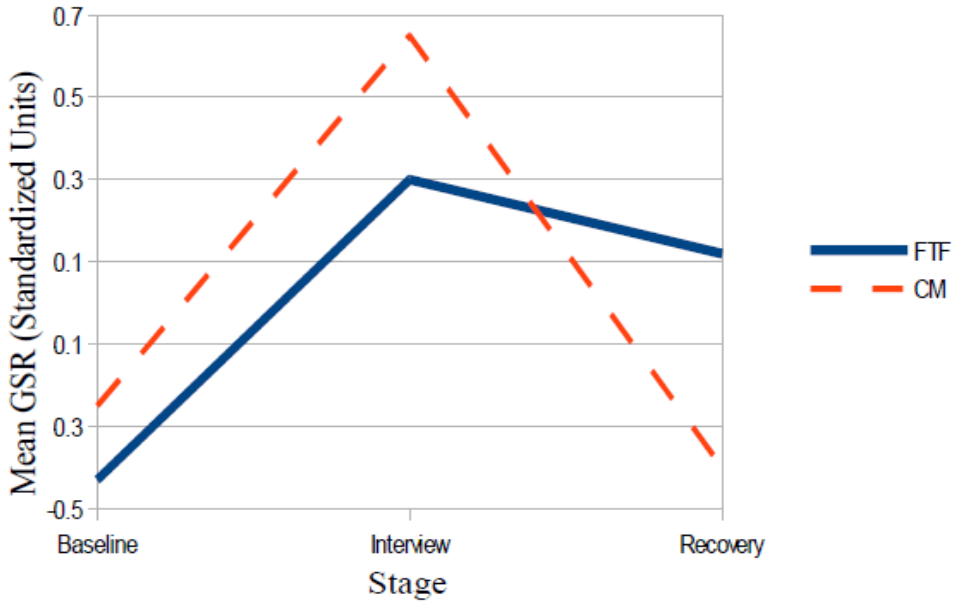

Figure 2

Heart Rate Across Three Stages for Both Conditions

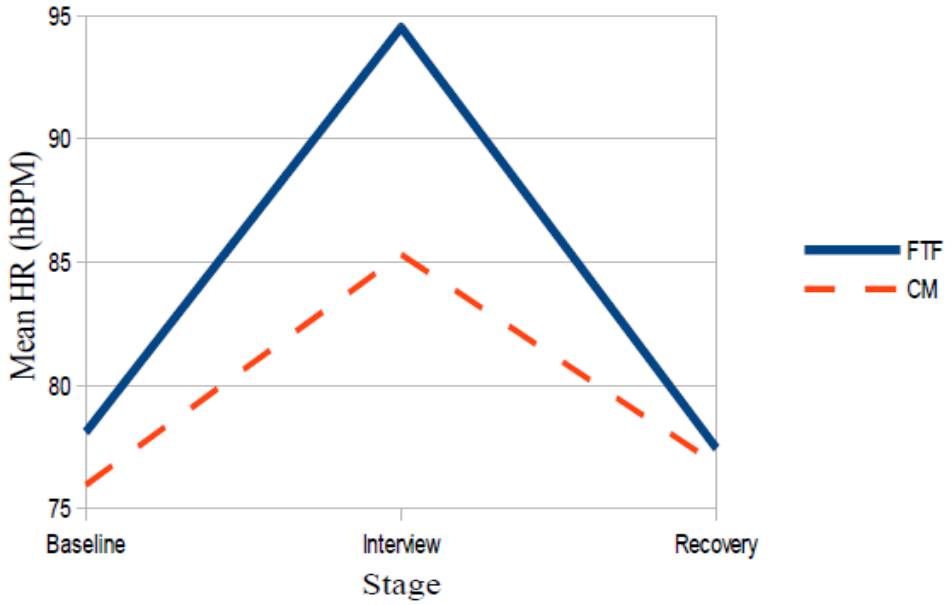

Figure 3

Respiration Rate Across Three Stages for Both Conditions

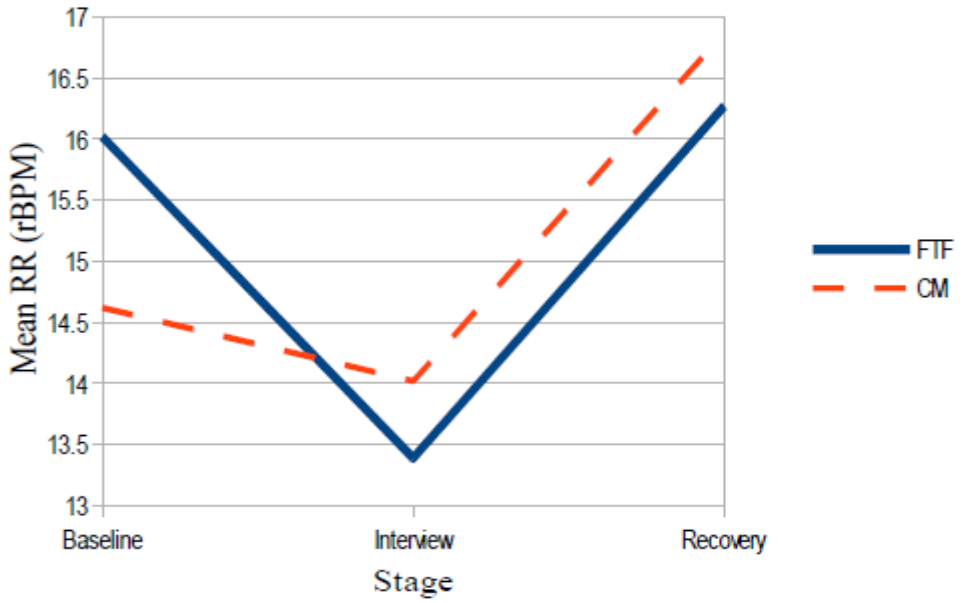

Figure 4

Low Frequency Heart Rate Variability Across Three Stages for Both Conditions

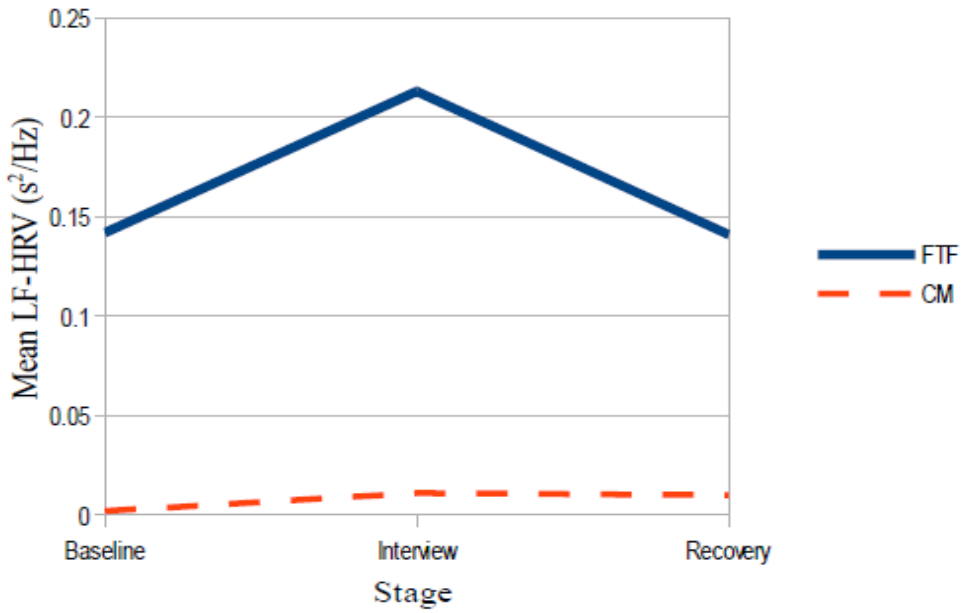

Figure 5

High Frequency Heart Rate Variability Across Three Stages for Both Conditions

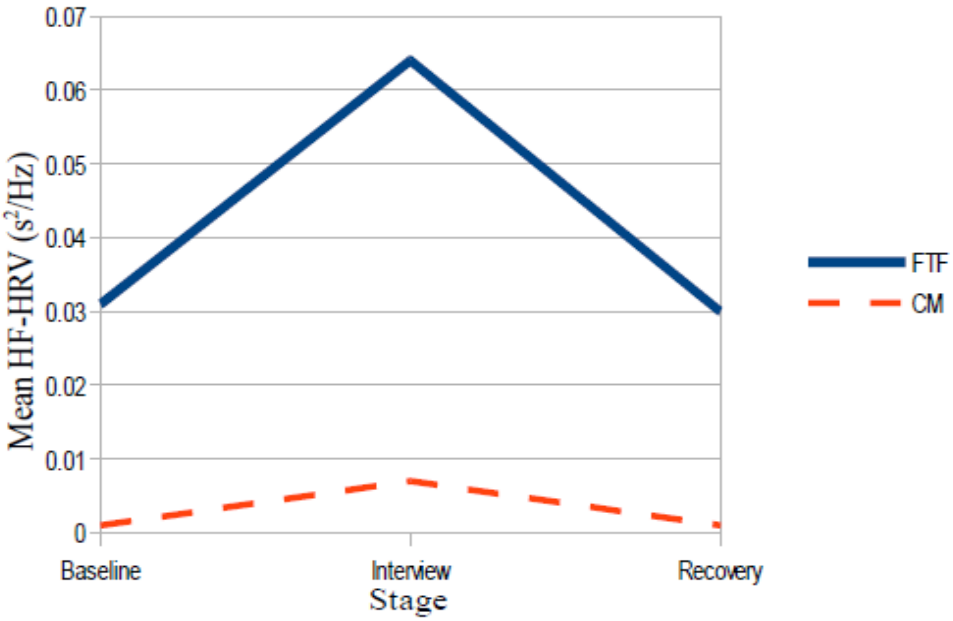

Figure 6

Respiratory Sinus Arrhythmia Across Three Stages for Both Conditions

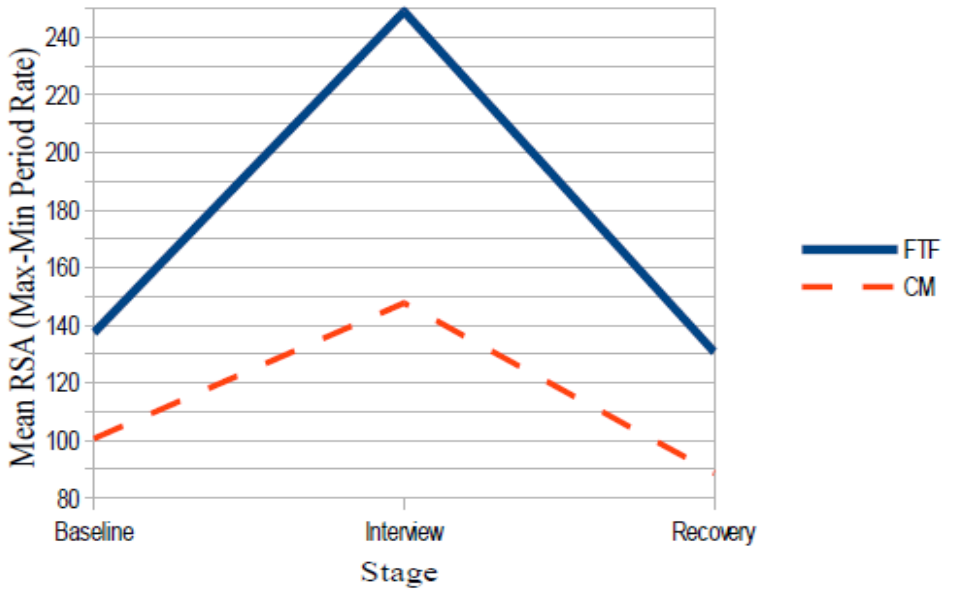

Table 1

Descriptive Statistics for Performance Measures Between Conditions.

	Self Rating	Observer Rating	Interviewer Rating			
Variables	**FTF**	**CM**	**FTF**	**CM**	**FTF**	**CM**
Mean	4.40	4.07	5.19	4.95	4.58	--
SD	1.29	1.41	1.05	1.91	1.10	--

Table 2

Unstandardized Difference scores for each Personality Measure

Variable	**Grand Mean**	**FTF**	**CM**	**T**	**Sig.**
BIDR	0.64	0.35	0.93	-1.907	.06
IM	1.11	0.79	1.44	-1.713	.09
SD	0.15	-0.25	0.56	-2.303	.02*
Openness	-0.10	-0.20	0.01	-0.601	.55
Conscientiousness	0.39	-0.003	0.81	-2.436	.02*
Extroversion	0.27	0.14	0.40	-0.732	.47
Agreeableness	0.39	0.08	0.73	-1.902	.06
Neuroticism	-1.38	-1.69	-1.06	-1.603	.11
FNE	-1.20	-1.12	-1.27	0.345	.73
Self-Monitoring	0.09	0.03	0.15	-0.326	.75
Self-Enhancement	-0.84	-1.15	-0.51	-1.595	.12
Self-Esteem	-1.55	-1.59	-1.51	-0.425	.67
Narcissism	7.58	9.63	5.48	0.807	.42

Note. All measures are on a 7-point scale with the following exceptions: Self-enhancement 1-10 scale, Self-esteem 1-4 scale and Narcissism 1-100 scale.

Table 3

Means and Significance for Quadratic Effects for Cardiovascular Measures

	Stage Means			F-Test		
Measure	**Baseline**	**Interview**	**Recovery**	**DF**	***F***	**Sig.**
Heart Rate						
FTF	78.09	94.51	77.43			
CM	75.95	85.30	76.79	1,66	10.093	.002
LF-HRV						
FTF	.142	.213	.141			
CM	.002	.011	.01	1,64	10.134	.002
HF-HRV						
FTF	.031	.064	.030			
CM	.001	.007	.001	1,64	11.922	.001
RSA						
FTF	137.48	248.98	130.76			
CM	100.65	147.73	88.65	1,56	3.667	.061

References

Baum, A. Fisher, J. D., Solomon, S. K., (1981). Type of information, familiarity, and the reduction of crowding stress. *Journal of Personality and Social Psychology, 40*(1), 11-23.

Benet-Martinez, V., & John, O. P. (1998). Los cinco grandes across cultures and ethnic groups: Multitrait multimethod analysis of the Big Five in Spanish and English. *Journal of Personality and Social Psychology, 75*, 729-750.

Berntson, G. G., Bigger, J. T. Jr., Eckberg, D. L., Grossman, P., Kaufmann, P. G., Malik, M., et al. (1997). Heart rate variability: Origins, methods, and interpretive caveats. *Psychophysiology, 34,* 623– 648.

Bernston, G.G., Cacioppo, J.T., & Quigley, K.S. (1991). Autonomic determinism: The modes of autonomic control, the doctrine of autonomic space, and the laws of autonomic constraint. *Psychological Review, 98,* 459-487.

Bernston, G.G., Cacioppo, J.T., & Quigley, K.S. (1993). Cardiac psychophysiology and autonomic space in humans: Empirical perspectives and conceptual implications. *Psychological Bulletin, 114*, 296-322.

Blackman, M.C., (2002). The Employment Interview via the Telephone: Are we sacrificing accurate personality judgments for cost efficiency? *Journal of Research in Personality, 36*, 208-223.

Blascovich, J., Mendes, W.B., Hunter, S.B., & Salomon, K., (1999). Social "facilitation" as challenge and threat. *Journal of Personality and Social Psychology, 77* (1), 68-77.

Bureau of Labor Statistics (2010). Number of jobs held, labor market activity, and earnings growth Among the youngest baby boomers: Results from a longitudinal survey. *Bureau*

of Labor Statistics, Retrieved on February 24, 2012, from http://www.bls.gov/news.release/pdf/nlsoy.pdf

Cacioppo, J.T., Tassinary, L.G., & Bernston, G.G. (2000). Psychophysiological sciences. In J.T. Cacioppo, L.G. Tassinary, & G.G. Bernston (Eds.), *Handbook of psychophysiology* (pp. 3-23). New York; Cambridge University Press.

Chapman, D.S. & Rowe, P.M. (2001). The impact of videoconference technology, interview structure, and interviewer gender on interviewer evaluations in the employment interview: A field experiment. *Journal of Occupational and Organizational Psychology, 74*, 279-298.

Chapman, D.S. & Rowe, P.M. (2002). The influence of videoconference technology and interview structure on the recruiting function of the employment interview: A field experiment. *International Journal of Selection and Assessment, 10,* 185-197.

Chu, Y., Strong, W.F., Ma, J., & Greene, W.E. (2005). Silent messages in negotiations: The role of nonverbal communication on cross-cultural business negotiations. *Journal of Organizational Culture, Communication and Conflict, 9* (2), 113-129.

DeGroot, T., & Gooty, J., (2009). Can nonverbal cues be used to make meaningful personality attributions in employment interviews? *Journal of Business Psychology, 24,* 179-192.

Depaulo, B., Rosenthal, R., Eisenstat, R., Rogers, P., & Finkelstein, S. (1978). Decoding discrepant nonverbal cues. *Journal of Personal and Social Psychology, 36*, 313-323.

Dickerson, S.S., & Kemeny, M.E., (2004). Acute stressors and cortisol responses: A theoretical integration and synthesis of laboratory research. *Psychological Bulletin, 130*(3), 355-391.

EEOC.gov. (2013). *U.S. Equal Employment Opportunity Commission*. Retrieved on April, 15, 2013, from http://www.eeoc.gov/.

Elfering, A. & Grebner, S. (2011). Ambulatory assessment of skin conductivity during first thesis presentation: Lower self-confidence predicts prolonged stress response. *Applied Psychophysiology Biofeedback, 36*,93-99.

Fishman, D. B., & Franks, C. M. (1992). Evolution and differentiation within behavior therapy: A theoretical epistemological review. In D. K. Freedheim (Ed.), *History of psychotherapy: A century of change* (pp. 159–196). Washington, DC: American Psychological Association.

Fullwood, C. (2007). The effect of mediation on impression formation: A comparison of face-to-face and video-mediated conditions. *Applied Ergonomics, 38*, 267-273.

Goedhart, A.D., Willemsen, G., Houtveen, J.H., Boomsma, D.I., De Geus, J.C., (2008). Comparing low frequency heart rate variability and preejection period: Two sides of a different coin. *Psychophysiology 45,* 1086–1090.

Gramzow, R. H., Willard, G., & Mendes, W. B. (2008). Big tales and cool heads: Academic exaggeration is related to cardiac vagal reactivity. *Emotion, 8*, 138–144.

HireVue.com. (2011). Hirevue Retrieved on February, 22, 2012, from http://www.hirevue.com/

Huffcutt, A.I. (2011). An empirical review of the employment interview construct literature. *International Journal of Selection and Assessment, 19* (1), 62-81.

Huffcutt, A. I., Van Iddekinge, C. H., & Roth, P. L. (2011). Understanding applicant behavior in employment Interviews: A theoretical model of interviewee performance. *Human Resource Management Review, 21*, 353-367.

Johnson, T., Tyler, V., Thompson, R., & Jones, E. (1971). Systematic desensitization and assertive training in the treatment of speech anxiety in middle-school students. *Psychology in the Schools, 8*, 263–267.

Kilduff, M. & Day,D.V. (1994). Do chameleons get ahead? The effects of self-monitoring on managerial careers. *Academy of Management Journal, 37*, 1047-1060.

Kirschbaum, C., Pirke, K. M., & Hellhammer, D. H. (1993). The 'Trier Social Stress Test'—a tool for investigating psychobiological stress responses in a laboratory setting. *Neuropsychobiology, 28*(1-2), 76-81.

Kiviat, B. (2009). How skype is changing the job interview. *Time Magazine.* Retrieved on February 24, 2012, from http://www.time.com/time/business/article/0,8599,1930838,00.html

Klinger, E. (1996). The content of thoughts: Interference as the downside of adaptive normal mechanisms of thought flow. In I.G. Sarason, B.R. Sarason, & G.R.Pierce (Eds) *Cognitive interference: Theories, Methods and Findings* (pp 3-23). Hillsdale, NJ: Erlbaum.

Lovallo, W.R., & Sollers, J.J, III (2000). Autonomic nervous system. *Encyclopedia of stress*, 1, 275-284.

McShane, T.D. (1993). Effects of nonverbal cues and verbal first impressions in unstructured and situational interview settings. *Applied Human Resources Management Research, 4*, 137-150.

Nordstrom, C.R., Hall, R.J., & Bartels,L.K.(1998). First Impressions versus good impressions: The effects of self-regulation on interview evaluations. *The Journal of Psychology, 135*, 477-491.

Paulhus, D.L. (1988). Assessing self-deception and impression management in self-reports: The balanced inventory of desirable responding. *Unpublished Manual,* University of British Columbia, Vancouver, Canada.

Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press.

Schleicher, D. J., Van Iddekinge, C. H., Morgeson, F. P., & Campion, M. A. (2010). If at first you don't succeed, try, try again: Understanding race, gender, and age differences in selection test score improvement. *Journal of Applied Psychology, 95*, 603-617.

Short, J. A., Williams, E. & Christie, B. (1976). *The Social Psychology of Telecommunications*. London: John Wiley & Sons, Ltd.

Skalski, P. & Tamborini, R. (2007). The role of social presence in interactive agent-based persuasion. *Media Psychology, 10*, 385-413.

Snyder, M. & Gangestad, S. (1986). On the nature of self-monitoring: Matters of assessment, matters of validity. *Journal of Personality and Social Psychology, 51*, 125-139.

Straus, S.G, Miles, J.A., & Levesque, L.L. (2001). The effects of videoconference, telephone, and face-to-face media on interviewer and applicant judgments in employment interviews. *Journal of Management, 27*, 363-381.

Tarrant, M., Dattilo, J., Driver, B., & Manfredo, A (1995). Physiological response patterning of verbal and mental recreational reminiscence. *Therapeutic Recreation Journal 29*(3), 147-163.

Taylor, S. E., & Gollwitzer, P. M. (1995). The effects of mindset on positive illusions. *Journal of Personality and Social Psychology, 69*, 213-226

Tu, C.H. (2000). Online learning migration: From social learning theory to social presences theory in a CMC environment. *Journal of Network and Computer Applications, 23,* 27-37.

Turnley, W.H.& Bolino, M.C. (2001).Achieving desired images while avoiding undesired images: Exploring the role of self-monitoring in impression management. *Journal of Applied Psychology, 86*(2), 351-360. *Journal of Personality and Social Psychology, 98* (2), 281-300.

Vazire, S. (2010). Who knows what about a person? The self-other knowledge asymmetry (SOKA) model.

Watson, D., & Friend, R. (1969). Measurement of social-evaluative anxiety. *Journal of Consulting and Clinical Psychology, 33,* 448-457

Weisband, S. & Atwater, L. (1999). Evaluating self and others in electronic and face-to-face groups. *Journal of Applied Psychology, 84*, 632-639.

Williams. F., & Rice, R.E. (1983). Communication research and the new media technologies. In *Communication Yearbook 7* (R. N. Bostrom ed.), Beverly Hills, CA: Sage, 200–224.

Wilson, E.V. & Lu, Y. (2008). Communication goals and online persuasion: An empirical examination. Computers in Human Behavior, 24, 2554-2577.

VITA

NAME OF AUTHOR: Joseph R. Castro

PLACE OF BIRTH: Clarkstown, New York

DATE OF BIRTH: April 27, 1984

GRADUATE AND UNDERGRADUATE SCHOOLS ATTENDED:

Syracuse University, New York, USA

State University of New York Purchase College, Purchase, New York, USA

DEGRESS AWARDED:

Bachelors of Arts in Psychology, 2009, State University of New York Purchase College

PROFESSIONAL EXPERIENCE:

Teaching Assistant, Department of Psychology, SUNY Purchase, 2009-2010

Teaching Assistant, Department of Psychology, Syracuse University, 2010-2012

Instructor, Department of Psychology, Syracuse University, 2013