Physiological Reactance and Discrimination in Response to Visual Stimuli of Persons with Down Syndrome

by

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Abstract

Despite the enactment of several pieces of legislation, persons with disabilities still experience discriminatory human resource practices. The following dissertation investigates the effect of several physiological measures including electrocardiography, electrodermal activity, respiratory sinus arrhythmia, pre-ejection period, and electromyography on the evaluation of image stimuli of an applicant with Down syndrome and an applicant without Down syndrome. A pilot study of 81 Auburn University undergraduate students tested image stimuli and résumés for equivalency. Another fifty-four students participated in a mock evaluation study to evaluate two equally qualified job applicants, one with Down syndrome and one without, and rated both applicants' qualification for a grocery store bagger position. Participants' physiology was monitored while completing the mock evaluation study. Differences in physiological responses were found when participants viewed images of an applicant with Down syndrome in comparison to an applicant without. Additionally, the applicant with Down syndrome received lower ratings on some qualification measures for the position than the applicant without. Memory recall of the applicant résumé did not differ based on disability status. Physiological responses did not appear to mediate the relationship between disability status and qualification ratings and between disability status and memory recall of the applicant résumé. However heart rate as measure in beats per minute (BPM) appeared to suppress the effect between the image stimuli and specific job qualification ratings. The findings represent a preliminary effort to identify the physiological mechanisms that influence discriminatory human resource practices.

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List of Abbreviations

ADA	Americans with Disabilities Act
ANCOVA	Analysis of Covariance
ANOVA	Analysis of Variance
ATDP	Attitudes toward Disabled Persons Scale
BPM	Beats per Minute
DJ	David Johnson
ECG	Electrocardiography
EDA	Electrodermal Activity
EEOC	Equal Employment Opportunity Commission
EMG	Electromyography
HF	High Frequency Heart Rate Variability
HIV	Human Immunodeficiency Virus
HR	Human Resources
HRV	Heart Rate Variability
IC	Impedance Cardiography
IDP	Interactions with Disabled Persons Scale
JW	James Williams
LF	Low Frequency Heart Rate Variability
MANOVA	Multivariate Analysis of Variance
MEMORE	Mediation and Moderation Analysis for Repeated Measures Designs

PEP	Pre-ejection Period
PWD	Persons with Disabilities
PWDS	Persons with Down Syndrome
PWOD	Persons without Disabilities
PWODS	Persons without Down Syndrome
RAPM	Raven's Advanced Progressive Matrices
RM	Repeated Measures
RSA	Respiratory Sinus Arrhythmia
SADP	Scale of Attitudes toward Disabled Persons
SCL	Skin Conductance Level
SCR	Skin Conductance Response
SONA	SONA Systems for Students Research Participation
VH	Very High Frequency Heart Rate Variability
VL	Very Low Frequency Heart Rate Variability

Persons with disabilities (PWD) unfairly experience isolation, segregation, and discrimination. As a result, PWD occupy an inferior place in American society and are disadvantaged socially, educationally, economically, and vocationally in comparison to persons without disabilities (PWOD) despite the enactment of several pieces of protective legislation such as the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990 (ADA; Butterworth, Migliore, Nord, & Gelb, 2012; EEOC, 2012). Employment statistics remain stubborn to change and continue to be a critical focus among civil rights activists, lawmakers, and researchers (Jans, Kaye, & Jones, 2012; National Council on Disability, 2013). The lag in progress may be due to interventions, like the ADA, that are developed without the underlying cause of disparate treatment clearly identified. Current research efforts have focused on measuring and changing employer attitudes toward PWD (Bruyere, 2000; Dixon, Kruse, & Van Horn, 2003; Stone & Colella, 1996). However attitudes are difficult to change with rational arguments and may not be the underlying determinant of discrimination. Rather attitudes are likely the result of physiological reactions to stimuli in the environment (Edwards, 1990).

Physiological reactions have been equated with implicit attitudes (Cacioppo & Tassinary, 1990). Unfortunately, only a handful of studies have measured physiological reactions when investigating attitudes toward disabilities (e.g., Blascovich, Mendes, Hunter, Lickel, & Kowai-Bell, 2001; Crawcour, 2010; Graves, Cassisi, & Penn, 2005; Heinemann, Pellander, Vogelbusch, & Wojtek, 1981; Kleck, Ono, & Hastorf, 1966; Madera & Hebl, 2012; Marinelli, 1974; Zych & Bolton, 1972). Of these physiological studies, negative implicit attitudes are pervasive in regards to persons with either physical (e.g., wheel chair bound, facial stigmas) or cognitive disabilities (e.g., stuttering, schizophrenia). The following research study aims to expand the current literature regarding stigma toward PWD in three ways—1) by investigating a specific disability

exemplar, Down syndrome, which bridges both physical and cognitive disability categories, 2) by investigating several physiological measures to identify activation patterns associated with emotional responding, and 3) by investigating the mediating effects of physiological responding between disability status and job qualification ratings. It is hoped that the study will illuminate possible mechanisms responsible for discriminatory practices prevalent in organizations and result in ideas to reduce discrimination.

ADA Effectiveness

The ADA is an extension of the Rehabilitation Act of 1973 that authorizes the use of government funding for the rehabilitation and independent living of PWD. It was assumed that the enactment of the ADA would increase the employment rate by expanding the rights of PWD covered under the Rehabilitation Act (Simpkins & Kaplan, 1991). Despite the expansion in rights, the ADA appears to be largely ineffective. A survey of 60,000 households conducted by the U.S. Bureau of Labor Statistics (2012) indicates that only 17.8% of PWD were employed compared to 63.6% of PWOD. Studies conducted in 1988, 1994, and 2000 found no significant increase in the percentage of employed PWD (Taylor, 2000). The U.S. Census Bureau's Survey of Income and Program Participation (2002, 2005, 2010; McNeil, 2000) found that the gap between employment rates between PWD and PWOD increased from 28.4 in 1991 to 38 percentage points in 2010. The unemployment rate of PWD remains twice as high as PWOD despite slow economic gains in the economy (National Council on Disability, 2012), and the wage differential between PWD and PWOD remains steady at around 72% (McNeil, 2000; U.S. Census Bureau, 2002, 2005, 2010). Finally, while 33% of PWD are employed part-time, only 19% of PWOD are employed part-time (U.S. Bureau of Labor Statistics, 2012). Taken

altogether, research findings indicate that the ADA has not met its intended goal of increasing the employment of PWD.

The ADA was enacted under the assumption that organizations would be motivated to be inclusive of PWD in order to avoid litigation. The Equal Employment Opportunity Commission (EEOC; 2012) states that to avoid litigation, organizations must establish standards, criteria, and methods of administration that eliminate discriminatory practices against qualified PWD. The premise of litigation avoidance is considered the most important factor in the reduction of discriminatory practices (Stone & Colella, 1996). However, litigation can also be counter-productive and may have unintended consequences. Stone and Colella (1996) warn that forcing change upon organizations may do little to change attitudes toward PWD and may even enhance negative attitudes as a result of psychological reactance. Reactance is the natural inclination for people to defy attempts by authority to restrict the freedom of thoughts or behaviors (Brehm, 1966). In essence, litigation alone will not reduce discrimination because it is not the root cause of the behavior. The underlying determinants that lead to discriminatory behavior toward PWD need to be identified before any progress can be made toward employment equality. Because behavior is related to attitudes, much of the research literature has focused on employer attitudes rather than litigation interventions as an underlying determinant (Stone & Colella, 1996).

Discrimination as a Function of Employer Attitudes

Employer self-report surveys indicate that negative attitudes by both employers and employees toward PWD are a significant barriers to employment (Bruyere, 2000; Dixon et al., 2003; Stone & Colella, 1996). An attitude is the psychological tendency to evaluate people or things as favorable or unfavorable (Eagly & Chaiken, 2007). Unfavorable evaluations indicate a negative attitude. Negative attitudes affect employers' performance expectations and evaluations

toward PWD, impact employees' desire to work with PWD, and can lead to discrimination (Schur, Kruse, & Blanck, 2005).

Employment discrimination occurs either by intentional, unequal treatment or through adverse impact (Cascio & Aguinis, 2007). Intentional treatment is the deliberate and explicit bias toward, or exclusion of, PWD while adverse impact is the unintentional and implicit discrimination resulting from employment practices and evaluation criteria that are not job relevant. Unintentional discrimination can occur by failing to recruit from diverse populations, using selection and training instruments that disadvantage a particular group, or from employers' negative, implicit attitudes (Aamodt, 2013).

Gazzaniga, Ivry, and Mangun (2009) report a decrease in explicit prejudicial attitudes toward protected classes since the enactment of the Civil Rights Acts; however discriminatory behavior is still pervasive and remains prevalent (Greenwald, McGhee, & Schwartz, 1998). Explicit and implicit attitudes do not always align. For example, employers explicitly state that they would hire PWD if research demonstrates satisfactory job performance, however employers have been slow to act despite the research findings that indicate satisfactory performance (Hartnett, Stuart, Thurman, Loy, & Batiste, 2011).

Attitudes toward PWDs. Employers tend to hold several negative, explicit attitudes toward PWD when it comes to job functions and performance. Explicit attitudes are direct reports by the person who holds and is consciously aware of the attitude (Eagly & Chaiken, 2007). According to employers, the integration of PWD into the workplace negatively affects an organization's bottom line even though research findings have not supported their assertions.

Employers claim that to determine the essential job functions for PWD with or without an accommodation employers need to conduct costly job analyses and draft job descriptions

(Janove, 2003). Additionally if accommodations are warranted, employers believe that they will bear the initial and reoccurring costs to maintain accommodations (Cimera, 2009), and that accommodations lead to feelings of inequality and resentment by PWOD (Stone & Colella, 1996). Employers also suggest that PWD will be hired because of their disability and as a result, performance and productivity of PWD will be less than that of PWOD (Hernandez & Keys, 2000; Lengnick-Hall, Gaunt, & Kulkami, 2008; Unger, 2002). To counter lost productivity, employers also believe that PWD will require more supervision and checks on quality control that will result in less time for other important facets of their jobs (Hernandez & Keys, 2000; Siperstein, Romano, Mohler, & Parker, 2006). Employers are also concerned that a person's disability will result in an increased number of absences, worker compensation claims, and both voluntary and involuntary turnover (Siperstein et al., 2006). Because PWD are seen as unqualified for employment and a hazard to the bottom line, employing PWD is risky and employers worry that they will be left with the choice to either retain a poor performing PWD or possibly face litigation for terminating a PWD (Lengnick-Hall et al., 2008). Even if a termination is justified, the cost of litigation for a dismissed case can still be prohibitive.

Research findings. Little research evidence exists to substantiate the claims by employers that PWD would have a substantial negative effect on organizations. Rather employers' claims are a product of negative attitudes toward PWD (Siperstein et al., 2006). In some cases, the employment of PWD may produce a greater net savings than PWOD (Cimera, 2009). However, in most cases, research demonstrates PWD are no different than PWOD when it comes to performance and productivity, absences, tenure, supervision, and turnover (Hernandez & McDonald, 2010; Lengnick-Hall et al., 2008). The only exceptions are in regards to worker compensation claims, cost of accommodations, and job analyses. In the case of worker's

compensations claims, there are few research studies to make a conclusive judgment (Hernandez & McDonald, 2010; Lengnick-Hall et al., 2008).

Ultimately, employers expect that PWD will cost more to the bottom line than employing PWOD; however research has demonstrated that these negative attitudes are generally unwarranted. Some employers may have to conduct expensive job analyses, but job analyses are not a requirement of the ADA and employers should already conduct job analyses and write job descriptions. Finally in some cases, accommodations do incur a cost to the employer, but the costs are minimal (Hartnett et al., 2011; Hernandez & McDonald, 2010).

The dissonance between employers' negative attitudes toward PWD and research findings that demonstrate the employment of PWD does not adversely impact organizations has led researchers to conclude that attitudes are a significant barrier (Bruyere, 2000; Dixon et al., 2003; Stone & Colella, 1996). Research investigating attitudes toward PWD is not new and have been around for over 50 years (see Yuker, Block, & Campbell, 1960). Measures of attitudes generally fall within two categories: direct and indirect measures.

Direct measures of attitudes. Direct measures of attitudes toward PWD require that participants are aware that attitudes are being assessed (Antonak & Livneh, 2000). Antonak and Livneh (2000) reviewed the disability research literature and identified three direct measurement scales that are well-known and frequently used: the Attitudes toward Disabled Persons (ATDP) scale, the Scale of Attitudes toward Disabled Persons (SADP), and the Interactions with Disabled Persons scale (IDP) (Vaughn, 2009). The ATDP and the SADP require participants to report their level of agreement to statements about the characteristics and treatment of PWD (Antonak, 1982; Pruett & Chan, 2006). The IDP measures the amount of discomfort participants

have with PWD and indirectly measures the underlying construct of general attitudes (Gething, 1994).

Although the preceding three rating scales are the most commonly used to measure attitudes toward PWD, all three measures, including the IDP to some degree, are subject to socially desirable responding (Gething, 1994; Hagler, Vargo, & Semple, 1987; Loo, 2001; Thomas, Vaughn, Doyle, & Bubb, 2014). Socially desirable responding occurs when participants endorse socially appropriate statements rather than their truly held attitudes (Strahan & Gerbasi, 1972). Acknowledgement of negative attitudes toward PWD is not desirable in a society trying to reduce stigma towards PWD. As a result, participants may feel compelled to adjust their responses when completing direct assessments of attitudes in order to meet cultural expectations. Additionally, legislation advocating against discriminatory human resource (HR) practices creates a unique culture where socially desirable responding may be more prevalent inside rather than outside the workplace (Haines & Sumner, 2006). Implicit attitudes remain unaffected because people are reluctant to admit prejudicial and socially unacceptable attitudes and/or they lack awareness of the non-conscious processes that influence behavior (Phelps & Thomas, 2003). Implicit attitudes represent non-conscious processes that reflect peoples' underlying knowledge of cultural norms, their group membership, and their personal experiences (Gazzaniga et al., 2009). To reduce the effect of socially desirable responding and obtain a more valid measure of attitudes, it is suggested that indirect measures be administered (Vaughn, 2009).

Indirect measures of attitudes. Indirect measures assess implicit attitudes outside of the participants' awareness (Antonak & Livneh, 2000; Greenwald & Banaji, 1995). The lack of awareness minimizes socially desirable responding (Himmelfarb, 1993). One type of indirect measures of attitudes is physiological measures. Physiological measures (e.g., heartbeats, skin

conductance, pupil dilation) record the involuntary and non-conscious reactions of participants and are considered the most straightforward techniques to assess implicit attitudes (Antonak & Livneh, 2000).

Because employers are likely to respond in a socially desirable way, explicit attitudes may not provide an accurate assessment of the perceived stigma toward PWD. Heinemann et al. (1981) explained that the positive explicit attitudes people portray toward PWD is inconsistent with the patterns of avoidance and discrimination that PWD experience. Employers make many workplace decisions non-consciously and are unaware of the implicit biases that may lead to discriminatory practices (Draper, Reid, & McMahon, 2011).

Research Investigating Physiological Measures and Disabilities

In an effort to measure and record people's attitudes toward PWD and avoid socially desirable responding, researchers have used physiological measures. Physiological measures are arguably the most straightforward measure of attitudes because participants have no voluntary control over them (Antonak & Livneh, 2000). It is suspected that physiological reactions are the result of non-conscious attitudes and that the magnitude of the reaction is directly related to intensity of the attitude (Antonak & Livneh, 1995). Indices used to infer attitudes toward PWD include electrodermal activity (EDA), cardiovascular measures including heart beats per minute (BPM), impedance cardiography (IC), and electrocardiography (ECG), eye tracking, voice modulations, and electromyography (EMG). In nearly all instances, physiological differences between PWD and PWOD have indicated negative responses toward PWD.

The most common physiological measure is EDA. Research on EDA has found mixed results. Kleck et al. (1966), Wesolowski & Deichmann, (1980), and Heinemann et al. (1981) found that participants' skin conductance responses (SCR) decreased when either interacting

face-to-face or viewing a video with persons in a wheelchair or walker. Zych and Bolton (1972) found that persons with low scores on the ATDP had SCRs that differed when viewing pencil drawings of PWD and PWOD. Unfortunately, the authors do not provide a direction of change. Crawcour (2010) reported higher skin conductance levels (SCL) when participants watched a video-taped presentation given by a stutterer than from a non-stutterer. However, not all researchers have found differences in EDA. Graves, Cassisi, and Penn (2005) found no difference in SCR when participants were presented with images of people with or without the words "has schizophrenia" typed above the images. However Graves et al. (2005) did find participants' BPM declined and EMG levels increased when presented with images implying schizophrenia. Both physiological measures indicated an aversive reaction to the label of schizophrenia.

Other researchers have also investigated BPM and cardiovascular measures and have also found mixed results. Crawcour (2010) found that BPM decreased when participants' watched presentations of stutterers as compared to non-stutterers; however when participants interacted with either a person with or without a facial scar, Marinelli (1974) found no difference in BPM. Additionally, no differences in BPM was found when participants viewed videotapes of PWD using wheelchairs and walkers and PWOD (Wesolowski & Deichmann, 1980). Blascovich et al. (2001) found a decrease in pre-ejection period (PEP), increase in cardiac output, and a decrease in total peripheral resistance. Blascovich et al. (2001) inferred from the responses that persons with a port-wine stain on their face was perceived as more threatening than persons without in face-to-face contacts. The previous findings portray a pattern of physiological reactions to PWD in comparison to PWOD.

Although the previous research has found differences in physiological reactions, a clear pattern of emotional experience has not emerged. Generally, the overall consensus is that participants are experiencing a threat (Blascovich et al., 2001), fear (Wesolowski & Deichmann, 1980), or disgust response (Crawcour, 2010) to PWD. A comprehensive literature review on autonomic nervous system activation patterns conducted by Sylvia Kreibig (2010) suggests that patterns of many physiological responses can better identify corresponding emotional responses. Unfortunately, the authors in previous studies only investigated three physiological measures at the most. Based on her review of the literature and previous researchers' limited measures, Kreibig might come to similar conclusions for any individual study. According to Kreibig's (2010) review, threat is characterized by sympathetic inhibition as measured by decreases in BPM and SCL, and sympathetic activation as measured by an increase in SCR. Fear is characterized by sympathetic activation as measured by increases in BPM, SCR, and SCL, and decreases in PEP. Disgust can be characterized in two ways: as contamination or mutilation. Disgust as contamination is people's reactions to stimuli such as fouls smells and images of maggot covered food, and disgust as mutilation is people's reactions to stimuli such as images of bloody injuries and bodily mutilations (Kreibig, 2010). Disgust as contamination is characterized by sympathetic and parasympathetic coactivation, shallow breathing, decreases in measured inspiration, and increases in measured BPM, SCR, and SCL and decreases in measured PEP (Kreibig, 2010; Sherwood, 1989). Mutilation on the other hand is characterized by sympathetic cardiac deactivation and parasympathetic activation as shown by decreases in measured BPM, low frequency heart rate variability (LF), high frequency heart rate variability (HF), LF/HF ratio, and PEP, and increases in measured SCR and SCL (Kreibig, 2010). However looking across the studies, the physiological pattern may suggest a different emotion of non-

crying sadness. Non-crying sadness is characterized by a decrease in sympathetic activation pattern as shown by decreases in measured BPM, SCR, and SCL (Kreibig, 2010). All of these emotions consist of a negative valence and may vary depending on the disability exemplar portrayed in the study.

Research Investigating Disability Type

Currently, research conducted on attitudes toward PWD focus on either investigating differing disability exemplars or categories of disabilities (i.e., physical, cognitive, or communicable). Individual disability exemplars are specific disability types such as paraplegia, AIDS, person in a wheelchair, mental illness, etc. The disability exemplars presented in the literature have focused on either physical (e.g., wheel chair bound, facial stigmas) or cognitive disabilities (e.g., stuttering, schizophrenia). These studies suggest that specific disabilities types are unidimensional and predictive of behavior. However Stone and Colella (1996) would argue that particular disabilities could vary in participant responses and Leone and Wingate (1991) have demonstrated additional empirical evidence to that effect.

Researchers have reduced the types of disabilities to over-arching categories rather than individual exemplars. A meta-analysis by Ren, Paetzold, and Colella (2008) investigated 31 empirical articles and identified several moderators including disability categories. Disability categories are exemplars categorized as physical, cognitive, or communicable disease. These studies suggest that all disability exemplars within a category are perceived the same however perception between categories may differ. For example, cognitive disabilities were found to have stronger negative effects on HR decisions than physical disabilities. As a result, attitude research, including research using physiological measures, has focused on using disabilities exemplars that

fall neatly within one of the three categories. However attitude research has yet to measure the physiological reactance to disability exemplars that span multiple categories.

Research on Attitudes and Stigma toward Persons with Down Syndrome

One exemplar that spans disability categories is Down syndrome. Down syndrome is the most commonly identified abnormality causing physical and intellectual disabilities in humans (Sherman, Allen, Bean, & Freeman, 2007). Persons with Down syndrome (PWDS) have distinct physical features that are immediately identifiable to most people. PWDS are characterized as having a protruding tongue, sloped forehead, flatter nose, shorter than usual limbs and elongated eyes (Woolfolk & Perry, 2012). In addition to the physical features, it is also known that PWDS have cognitive impairments that lead to delayed developmental milestones, such as walking and reduced cognitive functioning, that lead to diminished motor and mental abilities (Fidler, 2008; Woolfolk & Perry, 2012). The mental abilities of PWDS can lead to simpler responding to questions and telling of stories with little emotion than persons without Down syndrome (PWODS) (Santrock, 2009). The combination of both physical and cognitive components allows for Down syndrome to be a unique disability exemplar warranting investigation using physiological measures. Additionally, the stigma that is associated with the physical and cognitive deficits leads many people to underestimate the variability within the disability exemplar and mistakenly conclude that PWDS are limited in their occupational opportunities; when in reality, there is a wide range of variability in the physical and cognitive functioning of PWDS, as well as a wide range of occupational opportunities (Feldman, 2009). The misperception of PWDS' abilities may lead people to erroneously conclude that PWDS are less qualified for some employment positions resulting in increased discriminatory practices.

Research in the United States investigating the attitudes of people toward PWDS is limited. Despite the familiarity by PWODS with the characteristics of PWDS, explicit, negative attitudes toward PWDS remain prevalent (Pace, Shin, & Rasmussen, 2010). Nearly a third of respondents agreed that PWDS are a distraction in typical educational settings, a quarter of respondents agreed that PWDS should attend special schools, and nearly a third disagreed with the statement that PWDS should be able to work (Pace et al., 2010). Gilmore, Campbell, and Cuskelly (2003) found 40% of teachers felt PWDS should be in separate schools, 10% felt the parents were to blame, and 60% felt PWDS could not live and function independently. Another study found that 70% of teachers opposed integrated classes with PWDS, 60% were unaware of the different types of Down syndrome, and 95% failed to recognize the amount of variability in PWDS' functioning (Wishart & Manning, 1996). The lack of research investigating the attitudes, either explicit or implicit, of people toward PWDS and inclusion of multiple disability categories make Down syndrome a strong candidate for further empirical study.

Contributions of the Current Study

The following study intends to add to the growing literature investigating attitudes toward PWD that lead to discriminatory employment practices. This investigation is inclusive of more physiological measures and an additional disability exemplar that spans multiple disability categories. Previous research utilized no more than three physiological measures. The current study will measure EDA, respiratory sinus arrhythmia (RSA), and cardiovascular factors including BPM, IC, and ECG, and EMG.

Additionally, the following study will further the study of disability exemplars by investigating the physiological reactance toward PWDS. Previous physiological research has focused only on disability exemplars that represent either a physical disability or a cognitive

disability, but not both. Down syndrome is a commonly known and unique disability that spans both categories.

Finally with the exception of one study, previous research with physiological measures has neglected to sample HR decision makers and empirically investigate the mediating effect of physiological response between disability status and qualification ratings. Madera and Hebl (2012) was the lone article to do both and found that visual attention to the stigma mediated the relationship between the stigma and participants' memory recall which in turn reduced ratings of qualification for the person with the facial stigma. The current study extents the research by Madera and Hebl (2012) on employment decisions by including additional physiological measurements and investigating a disability exemplar that is not only physically noticeable, but also is commonly recognized as a cognitive disability.

Hypotheses for the Current Study

The primary purpose of the following exploratory study is to examine if physiological reactions between images of PWDS and PWODS, as measured by EDA, EMG, RSA, and other cardiovascular measures, create activation patterns associated with emotional responding (see Kreibig, 2010). Research has found changes in physiological states from a baseline are associated with attitudes of stigma (Büchel, Morris, Dolan, & Friston, 1998). It is anticipated that the current study will identify activation patterns among the physiological measures that will help isolated emotional states when participants are presented with images of PWDS as opposed to PWODS.

Hypothesis 1. There will be significant differences in the change in SCR, SCL, zygomatic and corrugator supercilii EMG, RSA, BPM, heart rate variability (HRV) measures and PEP when participants are presented with images of PWDS when compared to images of PWODS.

The patterns represented in the results will be interpreted and identified as emotional responding such as fear, disgust, or sadness.

A secondary purpose of the current study is to replicate findings found by Madera and Hebl (2012) except with PWDS rather than persons with facial stigmas. Madera and Hebl (2012) found persons with facial stigmas were rated lower than persons without facial stigmas. Because facial stigmas are protected and considered a disability under ADA, it is hypothesized that PWD such as Down syndrome will also be rated lower than a PWODS.

Hypothesis 2. PWDS will be rated by participants as less qualified than PWODS for grocery bagger position.

Because physiological measures are assumed to indirectly be related to a person's underlying attitudes (Cacioppo & Tassinary, 1990), it is expected that participants who view images of PWDS will have a physiological reaction that will in turn affect ratings of applicants (see Antonak & Livneh, 1995). It is anticipated that physiological reactions will mediate the relationship between applicant disability conditions and qualification ratings of applicants.

Hypothesis 3. The physiological responses as measured by SCR, SCL, zygomatic and corrugator supercilii EMG, RSA, BPM, HRV measures, and PEP will mediate the relationship between the applicant conditions (PWDS and PWODS) and the rating of the applicants on the grocery store bagger job tasks.

Madera and Hebl (2012) found that memory of applicant interviews were affected by a cognitive load. Research has found that persons with high cognitive loads use heuristics to rate applicants which in turns results in lower ratings for persons of protected classes than persons who are not protected (Bless et al., 1996; Bower & Forgas, 2000; Richeson et al., 2003). It is argued that HR decision makers are under a high cognitive load by the nature of their positions

(Nordstrom, Williams, & LeBreton, 1996). Similarly in the current study, it is anticipated that the recall of facts between PWDS and PWODS' résumés will be affected by the cognitive load of participants.

Hypothesis 4. Participants will have lower recall of facts from résumés of PWDS than PWODS.

Madera and Hebl (2012) also found a partial mediating effect of visual attention, as measured by eye-tracking, between facial stigmas (either have or do not have a facial stigma) and the recall of interview content. Similar findings are anticipated in the current study in that participants' physiological reactions will mediate the relationship between applicant disability conditions and recall of applicant résumés.

Hypothesis 5. The physiological response as measured by SCR, SCL, zygomatic and corrugator supercilii EMG, RSA, BPM, HRV measures, and PEP will mediate the relationship between the applicant conditions (PWDS and PWODS) and the recall of facts from résumés.

Methods

The current investigation consisted of a pilot study and a primary study. The pilot study assessed the psychometric properties of the measurement instruments developed for the study and tested the equivalency between the PWDS and PWODS images obtained for use in the primary study. The primary study investigated the hypotheses derived from the literature review.

Pilot Study

Participants. Undergraduate students (N = 81, 84% female, M_{age} = 20.79, SD_{age} = 1.46, age range: 19 – 25) from an introductory statistics course at Auburn University were recruited to participate in the pilot study. Most participants were identified as White/Caucasian (85%) followed by Black/African American (7%), Hispanic/Latin American (6%), and then all other

ethnicities (1%). Roughly a quarter of the participants (27%) reported either currently or previously having a documented disability. Most participants were employed (74.1%) with a median of 10.5 hours worked a week. Only three participants (4%) reported full-time employment. Additionally, 74% of the sample reported HR related experience in either an organization or for employment. Participants received extra-credit for their involvement in the pilot study.

Procedures. The pilot study tested image stimuli and résumés for equivalency. Additionally, a recall task and an applicant rating task were also tested for psychometric properties. The pilot study was conducted through Qualtrics, a web-based survey platform via the Internet during a computer lab session.

Participants were briefed on the purpose of the study and informed that their participation was voluntary. Participants then proceeded to the introduction screen on the workstation computers. The introduction screen contained an informed consent. All participants consented. A demographic survey was then presented with questions about sex, age, disability status, and HR experience (see Appendix A).

Participants then viewed a set of materials for one of two fictitious applicants. Each set of materials included a set of job tasks for a grocery store bagger position, a résumé, a rating task, a cognitive ability task, and then a recall task. The sets of materials were randomly assigned to participants in a between groups study design.

Presentation of the applicant materials began with a screen containing job tasks for a grocery store bagger position (see Appendix B). Participants had 1 minute to review the tasks. Participants then viewed and studied a résumé for an applicant for two minutes (see Appendix C) in preparation for a recall task later in the study. Following the display of the résumé,

participants completed an untimed rating task on the applicant (see Appendix D). Following the presentation of the rating task, participants had 8 minutes to complete the short form of the Raven's Advanced Progressive Matrices (RAPM) (see Appendix E for a sample item). Following the RAPM, participants completed an untimed résumé recall task (see Appendix F). The RAPM items were purposefully placed before the recall task to simulate the primary study. In the primary study, the RAPM was used as a cognitive depletion task before the recall task.

Following the presentation of applicant materials, untimed images of a PWDS and nine PWODS were randomly presented to participants one at a time in a within groups study design. Below each image, participants rated the characteristics of the image. Once the images were rated, participants were thanked for their time and dismissed.

Materials. The materials presented to participants in the pilot study included a demographic questionnaire, a set of job tasks, résumés, a rating task measure, a measure of cognitive ability, a recall task measure, image stimuli of applicants, and a measure for rating the characteristics of the images.

Demographic questionnaire. A self-report demographics questionnaire provided basic demographic information such as participants' sex, age, handedness, employment status, employment history in HR-related occupations, and disability status. The questionnaire is provided in Appendix A.

Job Tasks. A set of job tasks for an employed position was developed for the study. The position selected met two criteria: 1) a likely position that a qualified PWDS could obtain and 2) a likely position that a high school senior could obtain. The second criteria aligned with the image stimuli in the study. The image stimuli were high school senior yearbook photos. Lengnick-Hall et al. (2008) found that PWD are generally equally qualified for jobs requiring

less than a bachelor's degree. A person who is 16 years of age with less than a high school diploma meets the minimum qualification for a grocery store bagger position (job-applications.com, 2015). A bagger position was also selected because the position requires a high level of contact with customers. Positions with high customer contact are more likely to elicit discriminatory practices toward persons with visually noticeable disabilities (Stone & Colella, 1996). A job description for a Kroger Grocery bagger position was chosen for use in this study (job-applications.com, 2015) (see Appendix B).

***Résumés*.** Two résumés were developed for the pilot study. Each résumé was developed to portray equally qualified, yet fictitious applicants for a grocery store bagger position. Résumés included similar name and contact information as well as sections inclusive of a relevant employment objectives, experiences, coursework, interests, activities, skills and abilities. The names of applicants were selected based on the most common given names and surnames in the United States ("Most Common Names in America," n.d.). James Williams (JW) and David Johnson (DJ) were the names selected for the applicants. Applicant experiences, job tasks, skills, and abilities were derived from job analyses information available at O*Net.com for a retail shelf stocker, vehicle detailer, living community volunteer, teacher's aid, and dining attendant ("O*NET OnLine," n.d.). Résumés were developed to reflect the persons presented in the image stimuli—a minimally qualified entry-level applicant with less than a high school diploma (see Appendix C).

***Applicant rating task*.** An applicant rating task was developed to measure the participants' evaluation of the applicants for the grocery store bagger position. The rating task consisted of 26 items that measured 3 components of assessment. The three components included an applicant's specific qualifications for the grocery bagger position, general qualifications for

employment, and general recommendations for the grocery bagger position. The first component consisted of 13 items developed to assess each of the 13 job tasks for the grocery store bagger position. These 13 items represent a measure of job specific qualification and were measured on a 5-point Likert-type scale ranging from strongly disagree ("1") to strongly agree. The second component consisted of nine general qualification items measured using a 5-point Likert-type scale ranging from strongly disagree ("1") to strongly agree. Items on the general measure include "this applicant has strong qualifications" and "this applicant has impressive experiences" (Madera & Hebl, 2012). The measure is unidimensional with reported measures of internal consistency of 0.81 and 0.87 (Madera & Hebl, 2012). A composite of the nine items was used in the analysis of the current study. The third component consists of four items that measure participants' overall recommendation of the applicant for the specific grocery store bagger position. The items include an overall measure of job qualification, recommendation to proceed to an in-person interview and to be hired for the bagger position, and a recommended starting salary. The applicant rating task can be found in Appendix D.

Raven Advanced Progressive Matrices. The Raven Advanced Progressive Matrices (RAPM) was used in the study as a measure of participants' general cognitive ability and as a cognitive load task prior to the recall task of the applicant résumés. The RAPM is a general cognitive ability test that measures abstract reasoning or fluid intelligence (Raven, 1939). Each item in the test consists of a series of images. Participants detect the pattern in the images and select the correct tile to complete the pattern. Items increase in difficulty as participants' progress through the test. The advantages of the RAPM include its ease of use, theoretical base, and direct interpretability (Raven & Raven, 2003). However the drawback is the length of time to

administer. The full RAPM consists of 36 items and can take between 30 to 45 minutes to complete (Raven, Court, & Raven, 1985).

The short form of the RAPM developed by Arthur and Day (1994) was administered in the current study to reduce the time demands on participants. The short form consists of 12 items and takes 15 minutes on average to administer. The RAPM can also be used as a power test (Raven, Court, & Raven, 1985). In the current study, the RAPM was used as a power test and participants were given 8 minutes to complete as much as the RAPM as possible. RAPM items not completed in the time allotted were scored as incorrect. Scores on the RAPM are the sum of correct responses where higher scores indicate a higher level of cognitive ability. The RAPM short form has an adequate level of internal consistency reliability between 0.65 and 0.72 and a test-retest reliability of 0.75 (Arthur & Day, 1994). The short form correlates with the long form and also correlates to the Wonderlic Personnel Test and the Wesman Personnel Classification Test (Arthur & Day, 1994). An example of an RAPM item is provided in Appendix E.

Recall task. A recall task was developed to assess participants' memory of applicant résumés. The recall task consists of 30 multiple choice items developed specifically for this study (see Appendix F). Multiple choice items quiz the participant about each applicant's name, GPA, high school attendance, relevant coursework and experiences, honors, activities, skills, and abilities. Each item had a correct response and three distractors. Item responses were keyed as correct or incorrect.

Image stimuli. Nine image stimuli of potential job applicants were selected for the pilot study. The images were selected from a high school yearbook. Yearbook images are standardized and reduce possible confounding variables (see Phelps et al., 2000) such as different backgrounds, camera positions, clothing, and poses. One image stimuli consisted of a

PWDS. The other eight images represented PWODS and matched to the PWDS image based on clothing, hair style and color, and the background color of the image. The purpose of the pilot study was to test each of PWODS images to the PWDS image to determine equivalency for use in the primary study. The demographics of the persons in the images were white, male senior high school students wearing matching tuxedos. The demographics presented were selected to reduce physiological responding in participants that may confound measurements. Previous research has demonstrated that races other than white can induce greater autonomic responses (Cunningham, Raye, & Johnson, 2004; Phelps et al., 2000). Additionally, research has also demonstrated that female images can also elicit greater autonomic responses than images of males (Knutson, Mah, Manly, & Grafman, 2007).

***Image ratings*.** An image equivalency assessment measure was created for the study to determine if the PWDS and PWODS images presented to participants could be deemed similar. The assessment measure included 4 items on the image quality, 10 items on the characteristics of the person in the image, and one item was a manipulation check to determine if participants could correctly identify the disability status of the person in the image. Image quality items included lighting, sharpness, color, and contrast. Person characteristics items included face roundness, tilt angles of the head and body, hair color, degree of smiling and mouth openness, weight, height, the person's mood, and disability status. The assessment items were measured on 5-point scale of various anchors (see Appendix G) with the exception of height, weight, hair color, and disability status. Height and weight were open-ended responses and hair color and disability status were measured as categorical variables.

Pilot study results. The purpose of the pilot study was to assess materials developed for the main study. The applicant rating task was tested for internal consistency. Two résumés were

tested for equivalency. An applicant rating task was tested for psychometric properties, and nine image stimuli were tested for equivalency.

Applicant rating task. The rating task consisted of 26 items that measured 3 components of assessment. The three components included an applicant's specific qualifications for the grocery bagger position, general qualifications for employment, and general recommendations for the grocery bagger position. The specific qualifications component consisted of 13 items assessing specific job tasks for the grocery store bagger position. Cronbach's alpha of the assessment component demonstrated a satisfactory level of internal consistency ($\alpha = 0.84$) and suggested that a composite score of the 13 items would provide an adequate measure of an applicant's specific qualifications for the position.

The general qualifications component developed by Madera and Hebl (2012a) is a unidimensional construct consisting of nine items. The Cronbach's alpha in the current pilot study demonstrated a satisfactory level of internal consistency ($\alpha = 0.81$) and was comparable to the levels found by Madera and Hebl ($\alpha = 0.81$; $\alpha = 0.87$; 2012a).

The general recommendations component consisted of four items assessing recommendations for the overall position, for an in-person interview, for hiring, and for a starting salary. Cronbach's alpha of the component demonstrated an acceptable level of internal consistency for the three items assessing the recommendation for the overall position, in-person interview, and starting salary ($\alpha = 0.764$); however the recommended salary appeared to be unrelated as the item's inclusion reduced the measure of internal consistency to 0.524. As a result, the salary item was analyzed separately from the composite of the other three items.

Résumés. Two applicant résumés were created to be equivalent and randomly assigned to participants. The applicant rating task developed for the pilot study was used as a measure of

equivalency. The rating task contained 4 components: job specific qualifications, general qualifications, recommendation for position, and starting salary. A multivariate analysis of variance (MANOVA) assessed the equivalency between the two résumés versions on the four dependent variables from the applicant rating task. The four components demonstrated equal variance between résumé types. The MANOVA omnibus test indicated no differences between résumé means on the four components of the applicant rating task, Wilks' Lambda; $F(4, 76) = 0.98$, $p = 0.811$; $\eta^2 = 0.02$. The results of the MANOVA suggest that the résumés can be deemed equivalent.

***Recall task*.** A recall task of 30 multiple choice items was developed to assess participants' memory of the applicant résumés and assessed for test equivalency and psychometric properties for individual items (see Appendix F). Participants were randomly assigned to each résumé version. All participant scores exceeded chance levels (proportion correct ranged from 0.448 to 0.966) which suggests participants were diligent and demonstrated effort in recalling the résumés' content. With the exception of item 2, the responses for each item contained one correct response and three distractors (see Appendix F for item numbers). Item number 2 was dichotomous and was a manipulation check that asked participants if the applicant had a disability. All participants correctly indicated that the résumés did not contain any information to suggest an applicant disability. The manipulation check was not included in the following analyses.

An initial measure of equivalency found no difference in proportion of items answered correct between résumé Version A (JW; $M = 0.737$, $SD = 0.132$; $N = 41$) and Version B (DJ; $M = 0.686$, $SD = 0.108$; $N = 40$) on participants' memory of the applicants, $t(79) = 1.9$, $p = 0.061$; $d = 0.424$; 95% CI [-0.002, .104] and no difference in variability between the two résumé versions,

$F(1, 79) = 0.788$, $p = 0.377$. However there was a medium effect size indicating that even though there was no difference in proportion correct at the group level, there may be a practical difference at the individual participant level. Additional psychometric analyses identified problematic items that could potentially result in inequivalent versions of the recall task.

A chi-square test was performed on each of the individual test items. Items that were statistically different from each other were eliminated from recall task measure. Because multiple independent tests were performed, a Bonferroni adjustment was applied to decrease the Type I error rate of the tests ($\alpha_{adj} = 0.002$). The Chi-square analyses indicated that item 15 ($\chi^2(2) = 12.37$, $p < 0.001$), item 17 ($\chi^2(2) = 6.96$, $p < 0.002$), item 20 ($\chi^2(2) = 7.42$, $p < 0.001$), item 27 ($\chi^2(2) = 30.25$, $p < 0.001$), and item 30 ($\chi^2(2) = 43.18$, $p < 0.001$) were statistically different in proportion correct between the two versions. These items were eliminated from the recall task measure.

Following the Chi-square analysis, the remaining items were tested for item difficulty and item discrimination. An item difficulty analysis ensures that each item retains meaningful variability. Items too easy or too difficult result in little to no variability and do not discriminate between different groups of examinees (Thorndike, Cunningham, Thorndike, & Hagan, 1991). To maintain an adequate amount of variability, items with difficulty indices below 0.20 and above 0.80 were removed from the recall task. Item 4 (0.83), item 5 (0.96), item 6 (0.98), item 7 (0.90), item 9 (0.86), and item 18 (0.81) exceeded the criteria of 0.80 and were removed.

The item discrimination indices ensure that items included in a measure discriminate between those who remember (top 33% of scores) and those who do not remember (bottom 33% of scores) the résumé content. Items with a discrimination index below 0.20 are considered poor and either need major revision or should be removed (Ebel & Frisbie, 1986). An item

discrimination analysis of the recall task items indicated that item 22 (0.19), item 23 (0.19), item 26 (0.19), and item 29 (0.12) fell below 0.20 criteria and were removed.

Finally, a content analysis determined if the remaining 14 items adequately covered the content of the résumés, minimized differences between résumés, and remained job relevant to the position. The content analysis indicated that out of the remaining 14 items, 8 items were demographic specific (i.e., name, address) and only 6 items were job relevant (i.e., job and volunteer experiences). To balance the recall task measure to ensure less emphasis on demographics and more on job relevancy, two demographic items were removed and three job relevancy items were included. It was deemed that item 3 (What state is the applicant from?) and item 11 (In what city does the applicant live?) maintained a large proportion of difference between résumés (0.179 and 0.16 difference respectively) and had little job relevancy to the position. These two items were removed. Although items 5, 18, and 29 had either high difficulty or low discrimination indices, they also had high job relevance and minimal differences in recall between résumés (0.074, 0.119, and 0.056 difference respectively). These three items were re-incorporated back into the recall task measure.

The final recall task measure contained 15 items: 1, 5, 8, 10, 12, 13, 14, 16, 18, 19, 21, 24, 25, 28, and 29 (see Appendix F bolded items). An independent samples *t*-test and Levene's test of homogeneity of variance indicated no difference in proportion of items answered correct between résumé Version A (JW; $M = 0.719$, $SD = 0.168$; $N = 41$) and Version B (DJ; $M = 0.693$, $SD = 0.147$; $N = 40$) on participants' memory of the applicants, $t(79) = 0.723$, $p = 0.472$; $d = 0.157$; 95% CI [-0.044, .095] and no difference in variability between the two résumé versions, $F(1, 79) = 0.142$, $p = 0.708$. Additionally, the size of the effect is small at the individual

participant level. Finally, item 2 measuring disability status of the applicant was also retained as a manipulation check.

***Image ratings*.** An image of a PWDS and eight images of similar PWODS were selected from a high school yearbook. The eight images of PWODS were compared for equivalency to the image of a PWDS on 14 items measuring image quality (lighting, color, contrast, and sharpness), person characteristics (face roundness, smile, mouth, perceived weight, height, pleasantness, and arousal, head and body tilt, and hair color), and perceived disability. The purpose of the pilot study was to reduce the number of images for the primary study to a matching pair of PWDS and PWODS.

An inspection of the dataset prior to analysis indicated one ambiguous response for all items identifying disability across the nine images for one participant and 37 missing data points (0.4%). A participant indicated all persons in the nine images had a disability. Because only one image contained a person with a disability and the participant indicated in the comments that she "could not tell," all response to the nine images was changed to indicate no disability.

A principal components analysis reduced the number of variables to several main components. Those components were used with a multiple regression analysis to replace missing values. A sensitivity analysis comparing the component patterns indicated minor variations in component loadings with and without the imputed data; however, the interpretation of the component pattern remained the same. As a result, the dataset with the imputed missing values was used in the subsequent analyses.

A principal components analysis with oblimin rotation was used on the imputed dataset to reduce the 13 variables to a smaller set of components. The hair color variable was a categorical variable and not included in the principal components analysis. The K1 rule

suggested 4 components with eigenvalues greater than one. However a parallel analysis (see Lautenschlager, 1989) indicated two components could be extracted at a greater than chance level. An interpretation of the component patterns of two, three, and four extracted components concluded that the three component pattern made the most substantive sense. The three component solution accounted for 54.11% of the variability of the original variables and variables with loadings greater than 0.40 were retained on a component. The first component was Affect and consisted of the mouth, smile, pleasantness, and arousal variables ($\alpha = 0.841$). The second component was Characteristics and consisted of the weight, height, face roundness, and lighting variables ($\alpha = 0.41$), and the third component was Picture Quality and consisted of the sharpness, color, and contrast variables ($\alpha = 0.434$). The head tilt and body tilt variables were not interpretable in the factor structure and were analyzed separately. Likewise hair color was categorical and was also analyzed separately.

Table 1

Component Loadings for Principal Components Analysis with Oblimin Rotation of Image Equivalency Measure

Variable	Affect	Characteristics	Picture Quality
Picture Lighting	-.238	**-.453**	.022
Picture Sharpness	.266	.116	**.579**
Picture Color	-.158	-.048	**.675**
Picture Contrast	.244	.032	**.617**
Face Roundness	-.045	**.849**	.098
Smile	**.837**	.076	.041
Mouth	**.578**	.371	-.132
Weight	.333	**-.575**	-.328
Height	.130	**.431**	-.280
Pleasantness	**.893**	-.021	.107
Arousal	**.814**	-.108	.107

Note. Component loadings > 0.40 are in boldface.

A series of repeated measures analysis of variance tests (RM ANOVA) were conducted to determine the equivalency of the images on each of the three components and the head tilt and body tilt variables. Only six of the PWODS images were analyzed to PWDS image. Images 2 and 5 were removed because the manipulation check indicated that greater than 5% of participants incorrectly identified the persons in the images as having a disability (6% and 7% respectively). The PWDS image's disability status was correctly identified by 85% of participants. To control for multiple independent statistical tests, a Bonferroni correction was applied to correct for Type 1 errors ($\alpha_{adj} = 0.01$).

A Greenhouse-Geisser RM ANOVA when sphericity is not assumed ($\chi^2(27) = 113.357$, $p < 0.001$) on the Affect component indicated significant differences among the images, $F(4.788, 383.032) = 387.783$, $p < 0.001$; $\eta^2 = 0.829$. All PWODS images were different from the PWDS image except for image 8 ($p = .778$). A RM ANOVA when sphericity is assumed ($\chi^2(27) = 45.948$, $p = 0.013$) on the Characteristics component indicated significant differences among the images, $F(7, 560) = 215.566$, $p < 0.001$; $\eta^2 = 0.729$. All PWODS images were different from the PWDS image except for image 8 ($p > .999$). A Greenhouse-Geisser RM ANOVA when sphericity is not assumed ($\chi^2(27) = 71.514$, $p < 0.001$) on the Picture Quality component indicated significant differences among the images, $F(5.592, 447.362) = 16.343$, $p < 0.001$; $\eta^2 = 0.17$. All PWODS images were no different from the PWDS image except for images 4 ($p < .001$) and 8 ($p < .001$). A Greenhouse-Geisser RM ANOVA when sphericity is not assumed ($\chi^2(27) = 146.166$, $p < 0.001$) on the head tilt variable indicated significant differences among the images, $F(5.064, 405.152) = 256.62$, $p < 0.001$; $\eta^2 = 0.762$. All PWODS images were different from the PWDS image (*p's* < .001). A Greenhouse-Geisser RM ANOVA when sphericity is not assumed ($\chi^2(27) = 113.292$, $p < 0.001$) on the body tilt variable indicated significant differences

among the images, $F(4.753, 380.251) = 136.55$, $p < 0.001$; $\eta^2 = 0.631$. PWODS images 3 ($p > .999$), 4 ($p = .29$), 7 ($p = .04$), 8 ($p = .111$), and 9 ($p = .074$) were no different from the PWDS image. A Chi-square analysis on the hair color variable indicated significant differences among the images, $\chi^2(21) = 526.907$, $p < 0.001$. Only image 7 was no different than the PWDS image. Overall PWODS images 7 and 8 appear to be the most similar to the PWDS image; however image 7 has important differences with the PWDS on components of Affect and Characteristics that are not easily addressed. Image 8 on the other hand, is no different from the PWDS image on Affect and Characteristics, but is different in photo quality. Because photo quality can be manipulated in Adobe Photoshop, PWODS image 8 was chosen as the best match to the PWDS image.

Primary Study

Participants. Undergraduate students ($N = 54$, 74% female, $Mdn_{age} = 19$, age range: 18 – 39) were recruited through the Department of Psychology's SONA Systems for Students Research Participation (SONA) and class presentations in the Department of Human Development and Family Studies at Auburn University. SONA is an on-campus web-based human subject pool management software system. Most participants were identified as white/Caucasian (70%) followed by black/African American (26%), and then all other ethnicities (4%). Roughly a quarter of the participants (22%) reported either currently or previously having a documented disability. Most participants were employed (81.48%) with a mean of 12.93 hours worked a week. Only one participants (2%) reported full-time employment. Additionally, 57.41% of the sample reported HR related experience in organizational settings, 66.67% of the sample reported HR related experience in employment settings, and 38.89% reported HR experience in both organizational and employment settings. Only 14.81% of the sample reported

no HR related experience. Participants received extra-credit toward their courses and a gift card for $10 US for their involvement in the study.

Procedures. In the primary study, participants viewed images of PWDS and PWODS as potential applicants, and reviewed job tasks and résumés. After viewing images, job tasks, and résumés, participants rated the applicants, received a cognitive depletion task, and recalled specific information from the applicant résumés. Participants' physiological state was monitored and recorded throughout the study. The administration of the study lasted less than one hour.

The study was conducted in a research lab. Once in the lab, participants were consented by a research assistant who also recorded the humidity and temperature in the room and the participants' height and weight. Participants then took a seat in front of a computer monitor. The activities for the study were presented electronically through the computer monitor. A research assistant reminded participants about the basic procedures for the study and informed them about the physiological electrode placements. Participants had the opportunity to place the electrodes themselves with the research assistant's guidance if it helped them feel more comfortable. However all participants requested that the research assistant attach the electrodes.

After providing the basic procedural information, the research assistant attached 12 electrodes to the participants' skin and placed a respiration belt around the torso of the participant. Two electrodes were placed on the upper right collar bone, toward the sternum, and left side of the participant on the lower ribs to record ECG. Nuprep scrub was used to exfoliate the skin and the area was wiped clean with a paper towel prior to electrode placement. Additionally, conductive gel was applied prior to the adhesion of the electrodes. Two electrodes were placed on the back of the neck along the backbone and two electrodes were placed on the lower back to record IC. Similarly to the ECG placements, the area was exfoliated with Nuprep

scrub and conductive gel was applied prior to electrode placement. The distance between the lower electrode on the neck and the upper electrode on the back was measured and recorded in centimeters. A respiratory belt was snuggly fit around the torso of the participant just below the bottom of the sternum. An electrode was placed on the tip of the index finger and another electrode was placed on the tip of the ring finger on the left hand, regardless of hand dominance, of the participant to measure EDA. Both finger tips were cleaned with a wet wipe and conductive gel was applied to the electrodes prior to placement. Finally, two electrodes were placed on the left corrugator supercilii muscle (brow) and left zygomaticus muscle (cheek) of the participant to measure EMG. Similar to the EDA electrode placement, the brow and cheek areas were cleaned with a wet wipe and conductive gel was applied prior to placement. Once all the physiological measures were in place on the participant, the participant was asked to smile and scowl repeatedly and also take a deep breath, hold it for a second, and then release while the research assistant monitored the signal on the Acqknowledge 4.2 output screen to ensure that the physiological equipment was working and recording properly prior to the start of the study. If a signal was not obtained, then the physiological equipment placements were adjusted. If a clean signal for any of the physiological measures could not be obtained within 30 minutes then the experiment proceeded with the best signals obtained.

Once fitted with the physiological equipment, participants were presented with several tasks displayed on the computer screen (see Appendix H for procedure diagram). Participants proceeded to a demographic survey screen. Following the demographic survey, participants were presented with a practice trial in preparation for the main task. The practice trial simulated the main task and consisted of a set of job tasks for an administrative assistant position, an image of a PWODS, a résumé, and a rating task. The image used in the practice trial was different than the

images used in the primary study. Following the practice trial, participants participated in a résumé content analysis task that served as a distraction to allow acclimation to the physiological equipment (see Appendix I).

Following the distraction task, participants proceeded to the main task that followed the same format as the practice trial. Participants first viewed the job tasks for a grocery store bagger position for 1 minute. Following the job task presentation, participants viewed an image of either a PWODS or a PWDS as an applicant for the bagger position for 30 seconds. After the image presentation, participants then viewed both the image of the applicant and a corresponding résumé. The image was placed in the upper left hand corner. Participants were instructed to study each résumé carefully and informed that they will be quizzed on the résumé content later in the study. The image and résumé appeared on the screen for 4 minutes. Following the résumé study period, participants then rated the qualification of the applicant based on the job tasks for the bagger position, the overall qualification of the applicant in regards to both the specific position and generally, and provided a recommendation to proceed to an interview, for hire, and for a starting salary.

Following the rating task, participants then completed the RAPM short form. The RAPM served two functions—it provided a measure of cognitive ability, but also served as a cognitive depletion task before the recall task. The RAPM was presented as a power test for 8 minutes. Participants completed as many of the RAPM items as they could in the allotted time. There were to versions of the RAPM. Following the cognitive distraction task, participants then completed a recall task of the résumé.

After the recall task, participants proceeded to a second administration of the résumé content analysis task to return their physiological responses toward baseline. Following the

categorization task, participants were presented with another set of job tasks, the remaining applicant image (either PWDS or PWODS), a résumé with the applicant's image, a rating task, a version of the RAPM, and another recall task. The order of the applicant image presentation was counterbalanced (PWODS-PWDS or PWDS-PWODS). Additionally, the pairing of the images with the two different résumés and the two versions of the RAPM was also counterbalanced.

Finally, participants completed the IDP (see Appendix J). The IDP was developed to measure the amount of contact that a participant may have with PWD. In particular, the IDP measures the level of discomfort with PWD (Gething, 1994). Additionally, the amount of contact is a predictor of prejudicial attitudes. Those with more contact with PWD are less likely to endorse prejudicial attitudes (Reinke, Corrigan, Leonhard, Lundin, & Kubiak, 2004).

Participants were unobtrusively monitored electronically throughout the study from a lab control room, separate from the data collection room. A microphone piped sound from the data collection room to the control room and a computer monitor displayed participants' progress throughout the study in real time. No visual monitoring of the participants occurred. A research assistant identified noises that may have disrupted physiological signals (e.g., coughs, sniffles, and loud noises from movement) and monitored the computer screen for participant effort in responding (e.g., responding that suggested reading of survey items, following page instructions, not skipping items). A second research assistant recorded noises as flags in the Acqknowledge 4.2 software in real time. No participants were deemed by the research assistants to have put forth less than a reasonable effort in responding.

Following the completion of the computer tasks, a research assistant entered the data collection room and removed the electrodes and respiration belt. The participant was then

debriefed and thanked for their participation and time. A research assistant then presented the participant with a gift card and escorted them out of the research lab.

Materials. The materials presented to participants included a demographic questionnaire, a résumé content analysis, sets of job tasks, image stimuli of applicants, résumés, a rating task measure, a measure of cognitive ability, a recall task measure, and a measure of interaction with PWD.

Demographic questionnaire. The demographic questionnaire was the same questionnaire that was used in the pilot study. The only change was to the item specifying prior HR experience. Instead of only one box per HR task, two boxes were present: one for organizational experiences and another for employment experiences. The questionnaire is provided in Appendix A.

Résumé content analysis task. A résumé content analysis task (Ellingson, Heggestad, & Makarius, 2012) was used as a distraction task to allow participants to acclimate to the physiological measuring devices and to allow for a standardized baseline measurement (see Appendix I). The content analysis task required participants to rate the degree, on a 4-point Likert type scale (1 = Not at all; 4 = Considerable), to which 18 ability and skill items are found within applicants who have a degree in a job related field of study: an associate's degree and a bachelor's degree. Overall there are 36 items in the scale (18 x 2). The content analysis task is reported to result in low-to-no arousal and has been characterized as "mundane" and "boring" (E. Hack, personal communication, April 3, 2015).

Image stimuli. There were three image stimuli used to represent job applicants in the study. One image of a PWODS was used in the practice trial. The other two images were used in the primary study. Each image stimuli in the primary study consisted of a person identified as either a PWDS or PWODS. Both images were pilot tested and found to be equivalent on affect

and characteristics, but not on photo quality and head tilt. Head tilt remained unaddressed, but photo quality was adjusted using Adobe Photoshop. Images were adjusted to be more similar on lighting, shading, and sharpness.

Job tasks. Two sets of job tasks were selected for the study. The first set of job tasks was for an administrative assistant position (job-applications.com, 2015) and was used for the practice trial. The second set of job tasks was for a grocery store bagger position and was the same set as presented in the pilot study (see Appendix B).

Résumés. Three résumés were developed for the study. One résumé will be used during the practice trial (see Appendix C). The other two résumés were developed to be equally qualified for a grocery store bagger position and were the same résumés as presented in the pilot study. The résumés for the practice trial were created similarly to the résumés presented in the practice trial. The name of applicant was selected based on the most common given and surnames in the United States ("Most Common Names in America," n.d.) and applicant experiences, job tasks, skills, and abilities listed on the résumés were derived from job analyses information available at O*Net.com for an administrative assistant position ("O*NET OnLine," n.d.).

Physiological measures. Several physiological measures were used to assess the physiological responses of participants. Specifically, participants' ECG, IC, respiration, EDA, and EMG were recorded. Psychological research demonstrates that physiological responses are linked to emotional arousal in humans (Antonak & Livneh, 2000; Prokasy & Raskin, 1973).

ECG was measured using a pair of disposable electrodes (EL503), BIOPAC MP150WSW hardware outfitted with an ECG100CMRI amplifier and recorded with

AcqKnowledge 4.2 software. Electrodes were attached to the right collar bone and the left side, in line with the sternum, of participants.

IC was measured using four disposable electrodes (EL506), BIOPAC MP150WSW hardware outfitted with an ECG100C amplifier and recorded with AcqKnowledge 4.2 software. Four leads were used to collect IC data (BIOPAC LEAD130). Two electrodes were attached to the back of the neck, approximately 0.5" from each other. The other two electrodes were attached to the lower back, approximately 0.5" from each other. The distance between the lower electrode on the neck and the upper electrode on the lower back were measured and recorded.

Respiration was measured using a respiration belt placed around the participant's upper abdomen with the transducer on the left side. BIOPAC MP150WSW hardware outfitted with an RSP100C amplifier and AcqKnowledge 4.2 software was also used with the respiratory measurement.

EDA is the most widely used measure of autonomic activity, and it is assumed that affective reactions or negative attitudes result in changes in skin conductance (Antonak & Livneh, 2000). EDA for this study was measured with a pair of reusable electrodes (1cm diameter), BIOPAC MP150WSW hardware outfitted with an EDA100C-MRI (electro-dermal activity) amplifier and recorded with AcqKnowledge 4.2 software. Electrodes were attached to each participant's distal index finger and the ring finger volar surfaces on the left hand. The flow of electrical current between the electrodes provided a measurement of SCR and SCL.

EMG for this study was measured with a pair of reusable electrodes, BIOPAC MP150WSW hardware outfitted with an EMG100C (EDA activity) amplifier and recorded with AcqKnowledge 4.2 software. Two electrodes were attached to each participant's left corrugator

supercilii muscle (near the brow) and left zygomaticus muscle (cheek). The flow of electrical current between each pair of electrodes provided a measurement of muscle contraction.

All physiological data were recorded and collected by a high-end HP6570b notebook PC with Windows 7 professional, AcqKnowledge BIOPAC Software 4.2, mobile Intel HM76 chipset, 8 GB 1600MHz DDR3 SDRAM, and a 500GB7200rpm SATA hard drive. AcqKnowledge 4.2 is a data acquisition software program used for recording and collecting psychophysiological data. Data were transferred using an Ethernet cable (up to 400KDz).

Applicant rating task. The applicant rating task was the same rating task that was presented in the pilot study. The applicant rating task can be found in Appendix D.

Recall task. Participants' memory of applicant résumés will be tested using a 15-item multiple choice measure developed specifically for this study (see Appendix F). The 15-item measure was reduced from the 30-item measure from the pilot study.

Raven Advanced Progressive Matrices. The RAPM is a general cognitive ability test that measures abstract reasoning or fluid intelligence (Raven, 1939) and is the same measure that was used in the pilot study. An example of an RAPM item is provided in Appendix E.

Interaction with Disabled Persons Scale. The IDP measures participants' level of discomfort when interacting with PWD (Gething, 1991). The IDP is a multidimensional measure of social discomfort, empathy, and fear of having a disability (Thomas, Palmer, Coker-Juneau, & Williams, 2002). The IDP consists of 20 items measured on a 6-point Likert-type scale. Scores on individual items were averaged to form a composite score. An example item is "I feel unsure because I do not know how to behave." Composite scores of the IDP can range from 1 to 6 where higher scores indicate more discomfort and less interaction with PWD. Internal

consistency reliability for the measure is reported as adequate ($\alpha = 0.75$; Nordstrom, Huffaker, & Williams, 1998). The IDP is provided in Appendix J.

Results

The results of the current study focused on five hypotheses. The first hypothesis suggested a difference in various physiological responses of participants when presented with an image of a PWDS and a PWODS. The second hypothesis suggested that PWDS would be rated lower on several indices of job qualification. The third hypothesis suggested that the physiological responses of participants would mediate the relationship between the image type (PWDS or PWODS) and the applicant job qualification ratings. The fourth hypothesis suggested that a cognitive load would lead to lower recall of résumé facts for PWDS than PWODS. Finally, the fifth hypothesis suggests that participants' physiological responses will mediate the relationship between the image type (PWDS or PWODS) and participants' recall of the job applicant résumés.

Manipulation Check

Prior to the analysis of the hypotheses, a manipulation check was performed to verify participants' recognition of the disability status of the applicant images. During the recall task, participants were asked if the applicant in the image had a disability. For the PWDS image, only 59% of participants identified the applicant as having a disability. Of those who identified the applicant as having a disability, 84% ($N = 27$) correctly identified the disability as Down syndrome, 6% ($N = 2$) identified the disability as a mental handicap or challenge, and 9% ($N = 3$) did not fill in the open-ended response box. The percentage of participants identifying the applicant as having a disability in the primary study was statistically lower than the identification by participants reported in the pilot study (85%), $\chi^2(1) = 11.56$, $p < 0.001$. This difference is

surprising given the clarity of the disability in the image. However, three participants during debriefing voluntarily defended their response by stating they knew the applicant had Down syndrome however their HR training informed them to ignore the disability and focus on the content of the résumé. This finding suggests that the incorrect identification of PWDS image may be due to a conscious suppression by participants based on their level of training. This possible explanation will be explored further in the discussion section. For the PWODS image, 100% of participants correctly identified the applicant in the image as not having a disability.

Additional checks were performed to investigate the order effects of images, résumé equivalency, and researcher effects. The order of images were counterbalanced (PWDS then PWODS or PWODS then PWDS). A MANOVA and two ANOVA analyses compared the order of image presentation to the difference scores on the physiological measures in the analysis. No order effect was found for the EMG, RSA, and cardiovascular measures, Wilks' Lambda; $F(9, 43) = 0.644$, $p = 0.754$; SCL, $F(1, 35) = 0.461$, $p = 0.502$; and SCR, $F(1, 43) = 0.116$, $p = 0.735$. The order of résumé presentation (JW then DJ or DJ then JW) with the order of images were completely counterbalanced; however a RM MANOVA was conducted to verify résumé equivalency on each of the applicant evaluation ratings. The results indicated that the résumés were equivalent, Wilks' Lambda; $F(4, 50) = 1.522$, $p = 0.21$. Finally, four researchers interacted with and prepared participants for the study. Once participants were prepared for the study, the researchers left the room. The participants then had a practice trial and a content analysis task to acclimate to the physiological measuring devices. Given the time to acclimate between measurement device placement and the first image manipulation, no differences in participants' physiological responses between researchers were expected. A MANOVA and two ANOVA analyses verified that there were no differences for the EMG, RSA, and cardiovascular measures,

Wilks' Lambda; $F(27, 120.383) = 1.013$, $p = 0.457$; SCL, $F(1, 35) = 0.584$, $p = 0.63$; and SCR, $F(1, 43) = 0.409$, $p = 0.748$.

Hypothesis 1

The first hypothesis in the study stated that there would be differences in EDA, EMG, RSA, and cardiovascular measurements. Physiological measures were analyzed using AcqKnowledge 4.4 software. During data acquisition, participant movement (e.g., sneezing, coughing) were flagged. Because sudden participant movements create abnormalities in data acquisition, physiological responses following the flagged event were removed from analysis. Focus areas were then selected corresponding to the presentation of the job task screen and the image screen for both PWDS and PWODS. The focus area for each of the two job task screens was 1 minute in duration and the focus area for each of the image screens were 30 seconds in duration for a total of 4 blocks. Physiological responses were then analyzed according to the standards posted for the following physiological measures on the BIOPAC knowledge-base website (BIOPAC Systems Inc., 2016) and are described below.

EDA. Two measures of EDA were obtained from participants to measure SCR and SCL. Increases in SCR and SCL indicate sympathetic arousal (Kreibig, 2010). BIOPAC hardware was set to a gain of 5, low pass filter of 10 Hz, and the high pass filters were set to DC. A channel was set in the AcqKnowledge 4.4 software to reflect the raw skin conductance signal. The raw signal displays both slow tonic changes (SCL) and the fast phasic changes (SCR). A second channel was set to isolate and locate SCRs by controlling the tonic signals. SCL was measured in microseimens (μS) and averaged over each focus area. The number of SCR events were counted and reported for each focus area. EDA measures were obtained for both the job task screen and the image stimuli. The job task screen was identical for both the PWDS and PWODS conditions

and served as a control. The job task screen was presented immediately prior to the image stimuli.

Job task. Participants saw the same list of job tasks for the bagger position regardless of the image they were shown on the screen that followed. Because of instrument temperament where no data was recorded, complete results were obtained for only 40 of the original 54 participants. A RM MANOVA compared the job task screen prior to viewing either an image of a PWDS or PWODS on SCL (M_{PWDS} = 3.715, SD_{PWDS} = 3.084; M_{PWODS} = 3.837, SD_{PWODS} = 3.07) and on average SCR (M_{PWDS} = .70, SD_{PWDS} = .938; M_{PWODS} = .667, SD_{PWODS} = 0.883). The results of the omnibus RM MANOVA indicated no differences between the two measures of EDA, Wilks' Lambda; $F(2, 38) = 0.827$, $p = 0.445$, $\eta^2 = 0.042$. However there was a small-to-moderate effect size indicating low statistical power due to a small sample size. An examination of the individual variable effect sizes indicated both measures were small effects, suggesting neither measure was practically different between job task conditions: SCL, $F(1, 39) = 1.486$, $p = 0.23$, $\eta^2 = 0.037$ and SCR, $F(1, 39) = 0.359$, $p = 0.553$, $\eta^2 = 0.009$. The findings suggest that prior to viewing the images, participants' EDA was equivalent.

Image stimuli. Participants were shown both the PWDS and PWODS image stimuli in counterbalanced order. Because of instrument temperament, complete results were obtained for only 37 of the original 54 participants. A RM MANOVA compared PWDS to PWODS on SCL (M_{PWDS} = 3.764, SD_{PWDS} = 3.253; M_{PWODS} = 3.958, SD_{PWODS} = 3.407) and SCR (M_{PWDS} = .634, SD_{PWDS} = 0.904; M_{PWODS} = .656, SD_{PWODS} = 0.878). The results of the omnibus RM MANOVA indicated at least one significant difference between the two physiological measures, Wilks' Lambda; $F(2, 35) = 3.267$, $p = 0.05$, $\eta^2 = 0.157$. In addition to the hypothesis test, there was also a large effect size indicating sufficient statistical power to detect a difference. The individual RM

ANOVAs indicated when the image was a PWDS, the SCL was lower than when the image was a PWODS, $F(1, 36) = 6.72$, $p = 0.014$. The effect size was also large, $\eta^2 = 0.157$. The measure of SCR was no different and had a small effect size, $F(1, 36) = 0.387$, $p = 0.538$, $\eta^2 = 0.011$. The findings partially supported the hypothesis that there would be a difference in EDA measures. However, only SCL demonstrated a discrepancy in arousal when participants were presented with an image of a PWDS in comparison to a PWODS.

***Covariates*.** Several variables were identified as possible covariates and explored through intercorrelations with the independent variable and dependent variables. Difference scores were calculated between PWDS and PWODS images on the two EDA variables. The difference scores were then correlated with the room temperature and humidity, image presentation order, and participant gender, disability status, age, hours employed, HR experience, IDP scores, and cognition scores. The analysis indicated that the IDP ($r = -0.401$, $p = 0.014$) and the psychological disorder status of the participant ($r_{pb} = 0.383$, $p = 0.019$) were correlated with SCL. The correlation among these variables suggests that lower SCL difference scores between viewing images of PWDS and PWODS are associated with fewer positive interactions with disabled people, and with participants who do not have a psychological disorder. The IDP and the psychological disorder variable were used as covariates when testing differences in SCL. The only other correlation was with cognitive scores on the RAPM and SCR ($r = -0.369$, $p = 0.013$). This correlation suggests that lower SCR difference scores, where a PWDS image results in fewer SCRs than PWODS image, are associated with higher cognitive scores. Cognitive scores were used as a covariate for the SCR variable.

Table 2

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
1. SCL	-.19(.45)											
2. SCR	.229	-.03(.23)										
3. BrowEMG	-.090	.127	2.34(13.40)									
4. CheekEMG	.191	-.242	.235	-2.44(11.44)								
5. RSA	.034	-.286	.147	.035	.21(1.28)							
6. BPM	.120	.271	.068	-.077	-.109	-1.89(4.33)						
7. VL	-.067	.012	.241	.036	.371 **	-.336 *	16.41(132.35)					
8. LF	-.063	-.022	.239	.043	.392 **	-.391 **	.993 **	105.86(626.77)				
9. HFF	-.011	-.078	.219	.047	.421 **	-.432 **	.936 **	.965 **	446.30(1715.63)			
10. VH	.149	-.175	.150	.094	.349 **	.018	.514 **	.508 **	.590 **	51.61(477.76)		
11. PEP	-.119	-.109	-0.28 *	-.104	-.130	.088	-.081	-.135	-.227	-.093	.004(.01)	
12. Temp	.098	-.146	-.120	-.091	-.106	.048	-.175	-.163	-.116	-.213	.155	71.65(1.5
13. Humidity	-.083	-.124	-.263	-.065	-.137	.068	-.011	-.028	-.015	.095	.164	.247
14. Female	-.242	-.061	.001	.018	.000	-.175	.107	.111	.122	.100	.028	-.083
15. Age	.172	-.052	-.195	-.056	.128	-.078	-.057	-.058	-.092	-.181	-.038	.220
16. DisAble	.047	.075	-.099	-.236	-.002	.055	-.010	-.021	-.025	-.027	.045	.161
17. DisOrd	.383 *	.087	-.003	-.210	.038	.200	-.040	-.049	-.034	.045	.161	.208
18. Hrs_Emp	-.274	-.161	-.229	.062	.249	-.127	-.110	-.091	-.072	.025	.140	.133
20. Exp_E	-.225	-.045	-.118	.123	.206	-.204	.090	.116	.136	-.071	.088	.123
21. Exp_O	.011	-.055	-.233	-.064	-.158	-.110	-.072	-.058	-.052	-.044	.199	-.088
22. Img_Ord	.114	-.052	-.192	-.001	-.214	.118	-.146	-.147	-.125	-.022	-.093	-.153
23. Res_Ord	.192	-.046	-.064	.118	.271 *	-.065	-.215	-.191	-.181	-.127	-.238	.021
24. IDP	-0.4 *	-.126	.080	-.213	-.121	-.004	-.023	-.017	.029	.109	-.262	-.129
25. RAPM	-.140	-0.37 *	-.179	.035	.112	-.023	-.181	-.159	-.095	.041	.145	.003

	13	*14*	*15*	*16*	*17*	*18*	*19*	*20*	*21*	*22*	*23*	*24*
13. Humidity	40.46(7.89)											
14. Female	.224	--										
15. Age	-.196	-.199	20.2(3.46)									
16. DisAble	-.019	.043	.037									
17. DisOrd	.149	-.044	-.001	.341 *	--							
18. Hrs_Emp	-.101	-.079	.185	-.206	-.128	10.54(9.94)						
20. Exp_E	-.054	.003	.139	.146	.121	.416 **	--					
21. Exp_O	.067	.209	-.073	-.045	.135	.070	.026	--				
22. Img_Ord	-.080	-.147	-.148	-.076	.173	-.030	.069	.105	--			
23. Res_Ord	-.071	.106	.219	.052	-.018	.098	-.006	.105	-.038	--		
24. IDP	.042	.152	-.171	.207	-.213	-.143	-.255	-.069	.096	.005	3.37(.56)	
25. RAPM	.163	.089	-.254	.036	-.084	.138	.100	.188	.203	.019	.120	10.57(3.86)

Note: *p < .05; **p < .01. Means and standard deviations are presented in the diagnol where appropriate. Standard deviations are in parentheses. Physiological measures are difference scores where a 0 means no difference between PWDS and PWODS. Negative values indicate PWDS has a lower mean than PWODS. Positive value indicate that PWDS has a higher value than a PWODS. SCL = skin conductance level; SCR = skin conductance response; Brow EMG = electromyography measured above the eyebrow; CheekEMG = electromyography measured on the cheek; RSA = Respiratory Sinus Arrythmia; BPM = heart beats per minute; VL = very low frequency; LF = low frequency; HFF = High frequency; VH = Very high frequency; PEP = Pre-ejection period; Temp = temperature of lab space; DisAble = participant has a disability; DisOrd = participants has a psychological disorder; Hrs_Emp = number of hours participant is employed a week; Exp_E = participant has human resource related experience in employmenet settings; EXP_O = participants has human resource experience for an organization; IMG_Ord = the order presentation of the PWDS and PWODS images; RES_Ord = the order of resume presentation; IDP = Interactions with Disabled persons scale; RAPM = Raven's Advanced Progressive Matrices.

RM ANCOVAs. Two RM ANCOVAs were used to analyze differences in SCL and SCR between images of PWDS and PWODS when controlling for the IDP, psychological disorders, and cognitive scores. When the IDP and participants with psychological disorders were used as covariates, there was no difference between PWDS and PWODS images, $F(1,34) = 2.272$, $p =$

0.141, $\eta^2 = 0.063$. However there was still a moderate effect indicative of low power. Additionally, both the IDP ($p = 0.033$) and the participants' psychological disability status ($p = 0.046$) interacted with the difference in SCL scores. These findings suggest that much of the difference in SCL can be attributed to the moderating effect of participants' IDP and psychological disability status. Participants with fewer positive interactions with PWD had lower SCL when viewing the PWDS image than the PWODS image. Participants who indicated that they have or have had a psychological disorder had higher levels of skin conductance than participants without a psychological disorder. It is possible the image of the PWDS made participants self-aware of their disorder as they both share a cognitive communality which may have resulted in feelings of empathy for the PWDS in the image.

When the RAPM scores were used as a covariate, there were fewer SCRs when participants viewed the image of a PWDS than when viewing a PWODS, $F(1, 43) = 4.714$, $p = 0.035$, $\eta^2 = 0.099$. There was also a moderate effect size and an interaction with cognitive scores ($p = 0.013$). Although it is unclear why cognitive scores would be a covariate to an autonomic response such as SCR, the moderate effect size and the significant decrease in SCR suggest participants' with higher cognitive ability have fewer SCRs when viewing an image of a PWDS than a PWODS. One possible explanation may be that viewing images of PWDS leads to a cognitive load that is similar to the load experienced when completing a cognitive ability task.

EMG. Two measures of EMG were obtained from participants to measure corrugator supercilii and zygomaticus muscle contractions. Corrugator supercilii muscle contractions are associated with negative valance emotions (e.g., scowling) and zygomaticus muscle contractions are associated with positive valance emotions (e.g., smiling; Cacioppo, Martzke, Petty, & Tassinary, 1988). The BIOPAC hardware were set to a gain of 1000, low pass filter of 500 Hz,

and the a high pass filter was set to 10 Hz. Two channels were set in the AcqKnowledge 4.4 software to reflect the raw EMG signals—one for the corrugator supercilii responses and the other for zygomaticus muscle responses. These data were analyzed with a low-pass 10-Hz filter. The median frequency was recorded for every 1 second epoch and then averaged and recorded for each focus area. The median frequency was recorded because the data was positively skewed. EMG measures were obtained for both the job task screen and the image stimuli. The job task screen was identical for both the PWDS and PWODS conditions and served as a control. The job task screen was presented immediately prior to the image stimuli.

Job task. A RM MANOVA compared the job task screen prior to viewing either an image of a PWDS or PWODS on median brow response (M_{PWDS} = 23.218, SD_{PWDS} = 18.890; M_{PWODS} = 22.689, SD_{PWODS} = 19.294) and median cheek response (M_{PWDS} = 29.48, SD_{PWDS} = 22.540; M_{PWODS} = 31.542, SD_{PWODS} = 22.825). The results of the omnibus RM MANOVA indicated no differences between the two measures of EMG, Wilks' Lambda; $F(2, 52) = 1.189$, $p = 0.313$, $\eta^2 = 0.044$. However there was a small-to-moderate effect size indicative of low statistical power. An examination of the individual variable effect sizes indicated both measures were small effects, suggesting neither measure was practically different between job task conditions: corrugator supercilii muscle, $F(1, 53) = 0.165$, $p = 0.687$, $\eta^2 = 0.003$ and zygomaticus muscle, $F(1, 53) = 1.978$, $p = 0.165$, $\eta^2 = 0.036$. The findings suggest that prior to viewing the images, participants' measures of EMG were equivalent.

Image stimuli. Participants were shown both the PWDS and PWODS image stimuli in counterbalanced order. A RM MANOVA compared the median corrugator supercilii (brow) response (M_{PWDS} = 21.865, SD_{PWDS} = 20.116; M_{PWODS} = 19.526, SD_{PWODS} = 17.877) and median zygomatic (cheek) response for the image comparison (M_{PWDS} = 29.139, SD_{PWDS} = 22.472;

M_{PWODS} = 31.574, SD_{PWODS} = 22.881). The results of the omnibus RM MANOVA indicated no differences between the two measures of EMG, Wilks' Lambda; $F(2, 52) = 2.612$, $p = 0.083$, $\eta^2 = 0.091$. However, there was also a moderate-to-large effect size indicative of low statistical power. The individual RM ANOVAs indicated no differences in the median corrugator supercilii response and a small effect size, $F(1, 53) = 1.645$, $p = 0.205$, $\eta^2 = 0.030$. The median zygomatic response measure also demonstrated no difference, but had a moderate effect size, $F(1, 53) = 2.445$, $p = 0.124$, $\eta^2 = 0.044$. However, the practical difference in zygomatic response suggests that participants may have experienced less positively valenced emotions when viewing the PWDS image than the PWODS image.

***Covariates*.** Several variables were identified as possible covariates and explored through intercorrelations. Difference scores were calculated between PWDS and PWODS images on the two EMG variables. The difference scores were then correlated with the room temperature and humidity, image presentation order, and participant gender, disability status, age, hours employed, HR experience, IDP scores, and cognition scores. No correlations were found with any of the possible covariates.

RSA. RSA was obtained from participants for both the job task screen and the image stimuli. RSA is associated with parasympathetic activation and is an index of vagal control of the heart (Berntson, Cacioppo, & Grossman, 2007). The larger the RSA value, the stronger the parasympathetic activation (IJzerman et al., 2003). The BIOPAC hardware were set to a gain of 1000, the mode was normal, the low pass notch filter was set to 35 Hz, and the high pass filter was set to 1 Hz. A multi-epoch RSA spectral analysis was set for adult human subjects and analyzed for each focus area. The RSA value–difference between the minimum R-R interval and the maximum R-R interval—was recorded for each focus area. The job task screen was identical

for both the PWDS and PWODS conditions and served as a control. The job task screen was presented immediately prior to the image stimuli.

Job task. A RM ANOVA compared the job task screen prior to viewing either an image of a PWDS or PWODS on RSA (M_{PWDS} = 6.138, SD_{PWDS} = 1.64; M_{PWODS} = 6.186, SD_{PWODS} = 1.951). The results of the omnibus RM ANOVA indicated no difference in RSA between the two conditions, Wilks' Lambda; $F(1, 53) = 0.032$, $p = 0.86$, $\eta^2 = 0.001$. Additionally, there was no practical effect. The findings suggest that prior to viewing the images, participants' RSA was equivalent.

Image stimuli. Participants were shown both the PWDS and PWODS image stimuli in counterbalanced order. A RM ANOVA compared PWDS to PWODS on RSA (M_{PWDS} = 6.1, SD_{PWDS} = 1.877; M_{PWODS} = 5.886, SD_{PWODS} = 1.433). The results of the RM ANOVA indicated no difference in RSA between the two images, $F(1, 53) = 1.504$, $p = 0.225$, $\eta^2 = 0.028$. Additionally there was no practical effect. The findings suggest that participants' RSA was equivalent when viewing the images.

***Covariates*.** Several variables were identified as possible covariates and explored through intercorrelations. Difference scores were calculated between PWDS and PWODS images on the RSA variable. The difference scores were then correlated with the room temperature and humidity, image presentation order, and participant gender, disability status, age, hours employed, HR experience, IDP scores, and cognition scores. No correlations were found with any of the possible covariates.

Cardiovascular Measures. Several cardiovascular measures were obtained from participants to measure BPM, HRV, and PEP. The BIOPAC hardware were set to a gain of 1000, the mode was normal, the low pass notch filter was set to 35 Hz, and the high pass filter was set

to 1 Hz. Heart rate was calculated as BPM by ECG interval extraction. A multi-epoch HRV analysis was set for adult human subjects and analyzed for each focus area. Heart rate variability calculations included VL (0-0.04 Hz), LF (0-04.015 Hz), HF (0.15-0.40 Hz), and VH (0.4-3 Hz). HF and VH are measures of parasympathetic activity and LF and VL are influenced by both parasympathetic and sympathetic activation (Billman, 2013). Shorter PEP is associated with sympathetic activation and is the time interval in milliseconds between the ventricular contraction and the opening of the aorta valve (IJzerman et al., 2003). The BIOPAC hardware were set to a low pass Z of 10 Hz and the high pass Z was DC. The frequency selected was 50kHz. Two channels were set in the AcqKnowledge 4.4 software to reflect the raw PEP signal in Ohms and another to display the derivative of the raw PEP signal Ohmns/sec. Cardiovascular measures were obtained for both the job task screen and the image stimuli. The job task screen was identical for both the PWDS and PWODS conditions and served as a control. The job task screen was presented immediately prior to the image stimuli.

Job task. A RM MANOVA compared PWDS to PWODS on BPM (M_{PWDS} = 83.708, SD_{PWDS} = 11.595; M_{PWODS} = 83.252, SD_{PWODS} = 10.737), very low frequency (VL; M_{PWDS} = 68.11, SD_{PWDS} = 81.307; M_{PWODS} = 86.117, SD_{PWODS} = 119.749), low frequency (LF; M_{PWDS} = 430.930, SD_{PWDS} = 629.557; M_{PWODS} = 508.686, SD_{PWODS} = 754.275), high frequency (HF; M_{PWDS} = 1240.184, SD_{PWDS} = 2308.147; M_{PWODS} = 1013.494, SD_{PWODS} = 1085.347), very high frequency (VH; M_{PWDS} = 261.2323, SD_{PWDS} = 651.039; M_{PWODS} = 203.76, SD_{PWODS} = 337.522), and PEP (M_{PWDS} = .085, SD_{PWDS} = 0.019; M_{PWODS} = .0874, SD_{PWODS} = 0.027). The results of the omnibus RM MANOVA indicated no differences between the six physiological measures, Wilks' Lambda; $F(6, 47) = 0.909$, $p = 0.585$, $\eta^2 = 0.091$. However there was a moderate-to-large effect size indicating low statistical power due to a small sample size. An examination of the

individual variable effect sizes indicated all small effects, suggesting no individual physiological measure was practically different between image conditions: BPM, $F(1, 52) = 0.467$, $p = 0.497$, $\eta^2 = 0.009$, VL, $F(1, 52) = 1.908$, $p = 0.173$, $\eta^2 = 0.035$, LF, $F(1, 52) = 0.782$, $p = 0.381$, $\eta^2 = 0.015$, HF, $F(1, 52) = 0.862$, $p = 0.358$, $\eta^2 = 0.016$, VH, $F(1, 52) = 1.034$, $p = 0.314$, $\eta^2 = 0.02$, and PEP, $F(1, 52) = 0.913$, $p = 0.344$, $\eta^2 = 0.017$. The findings suggest that prior to viewing the images, participants' physiological arousal was equivalent.

Image stimuli. Participants were shown both the PWDS and PWODS image stimuli in counterbalanced order. A RM MANOVA compared PWDS to PWODS on BPM (M_{PWDS} = 79.155, SD_{PWDS} = 10.968; M_{PWODS} = 81.079, SD_{PWODS} = 10.29), VL (M_{PWDS} = 65.705, SD_{PWDSS} = 138.392; M_{PWODS} = 48.949, SD_{PWODS} = 60.549), LF (M_{PWDS} = 352.823, SD_{PWDS} = 675.04; M_{PWODS} = 244.122, SD_{PWODS} = 290.23), HF (M_{PWDS} = 1190.954, SD_{PWDS} = 1970.292; M_{PWODS} = 731.431, SD_{PWODS} = 962.623), VH (M_{PWDS} = 258.155, SD_{PWDS} = 393.681; M_{PWODS} = 203.168, SD_{PWODS} = 422.621), and PEP (M_{PWDS} = .0825, SD_{PWDSS} = 0.015; M_{PWODS} = .0865, SD_{PWODS} = 0.022). The results of the omnibus RM MANOVA indicated at least one significant difference between the six physiological measures, Wilks' Lambda; $F(6, 47) = 2.515$, $p = 0.034$, $\eta^2 = 0.243$. In addition to the hypothesis test, there was also a large effect size indicating sufficient statistical power to detect differences. Physiological measurements when the image was a PWDS were significantly lower than when the image was PWODS given the individual RM ANOVAs and moderate and large effects for BPM, $F(1, 52) = 10.318$, $p = 0.002$, $\eta^2 = 0.166$, and PEP, $F(1, 52) = 5.018$, $p = 0.029$, $\eta^2 = 0.088$. Physiological measurements were significantly higher and there was a moderate effect size when the image was a PWDS rather than a PWODS for HF, $F(1, 52) = 3.743$, $p = 0.058$, $\eta^2 = 0.067$, and there were no differences and small effects for VL, $F(1, 52) = 0.834$, $p = 0.365$, $\eta^2 = 0.016$, LF, $F(1, 52) = 1.566$, $p = 0.216$, $\eta^2 = 0.029$, and VH, $F(1, 52) =$

0.691, $p = 0.41$, $\eta^2 = 0.13$. The findings support the hypothesis that some cardiovascular measurements differ when participants are exposed to the applicant images.

***Covariates*.** Several variables were identified as possible covariates and difference scores were calculated between PWDS and PWODS images on the six cardiovascular variables. The difference scores were then correlated with the room temperature and humidity, image presentation order, and participant gender, disability status, age, hours employed, HR experience, IDP scores, and cognition scores. No correlations were found with any of the possible covariates.

Hypothesis 2

The second hypothesis stated that PWDS would be rated significantly lower by participants as less qualified than PWODS for the grocery store bagger position.

Results. Mixed support was found in the form of effect sizes for the second hypothesis. A RM MANOVA was used to test the hypothesis. The RM MANOVA compared PWDS to PWODS on job specific qualifications ($M_{PWDS} = 5.059$, $SD_{PWDS} = 0.598$; $M_{PWODS} = 5.247$, $SD_{PWODS} = 0.691$), general job qualification ($M_{PWDS} = 3.399$, $SD_{PWDS} = 0.529$; $M_{PWODS} = 3.425$, $SD_{PWODS} = 0.525$), recommendation for the position ($M_{PWDS} = 4.185$, $SD_{PWDS} = 0.571$; $M_{PWODS} = 4.367$, $SD_{PWODS} = 0.579$), and starting salary ($M_{PWDS} = 8.608$, $SD_{PWDS} = 0.406$; $M_{PWODS} = 8.636$, $SD_{PWODS} = 0.368$). The results of the omnibus RM MANOVA indicated no differences between disability status on the four applicant rating variables, Wilks' Lambda; $F(4, 50) = 1.465$, $p = 0.227$, $\eta^2 = 0.105$. However there was a moderate-to-large effect size indicating low statistical power due to a small sample size. An examination of the individual variable effect sizes indicated a moderate effect for job specific qualifications, $F(1, 53) = 4.212$, $p = 0.045$, $\eta^2 = 0.074$), no effect for overall general job qualification, $F(1, 53) = 0.106$, $p = 0.746$, $\eta^2 = 0.002$), a moderate effect for recommendation for the position, $F(1, 53) = 3.296$, $p = 0.075$, $\eta^2 = 0.059$),

and no effect for starting salary, $F(1, 53) = 0.338$, $p = 0.564$, $\eta^2 = 0.006$). The findings suggest participants felt the PWDS could not perform the specific job tasks for this specific position and did not recommend the PWDS further. Interestingly though, participants felt the PWDS was equally qualified as the PWODS in general, just not for the grocery store bagger position. This conclusion may reflect the following hiring attitude toward PWD, "I believe that persons with disabilities are equally qualified, but just not for the position I am looking to fill in my organization." This interpretation will be explored further in the discussion. The no difference in salary between the two images may be due to the response format selected for data collection. Participants responded with a slider set half way between the lower and upper bound of the suggested starting salary. Many participants chose not to move the slider from the middle position. Future studies would want to replace the slider with an open-ended format where participants need to decide within the range on their own rather than being influenced by the measurement device.

Covariates. Several variables were identified as possible covariates and explored through intercorrelations. Difference scores were calculated between PWDS and PWODS images on the four applicant rating variables. The difference scores were then correlated with the image presentation order, résumé order, and participant gender, disability status, age, hours employed, HR experience, IDP scores, and cognition scores. The analysis indicated that the IDP was significantly correlated with all four applicant rating variables: job specific qualifications ($r = -.437$, $p = 0.001$), general qualifications ($r = -.291$, $p = 0.033$), recommendation for the position ($r = -.314$, $p = 0.021$), and starting salary ($r = -.261$, $p = 0.057$). The correlation among these variables suggest that the fewer positive experiences with PWD, the more likely participants are

to rate PWODS higher than PWDS. The IDP will be used as covariate when testing the second hypothesis. No other correlations were found.

RM ANCOVAs. A RM MANCOVA indicated no differences between the two images on the four applicant rating variables when the IDP was entered as a covariate, Wilks' Lambda; $F(4, 49) = 1.694$, $p = 0.167$, $\eta^2 = 0.121$. However there was a large effect size indicating low statistical power. An examination of the individual variable effect sizes indicated a moderate-to-large effect for job specific qualifications, $F(1, 52) = 5.473$, $p = 0.023$, $\eta^2 = 0.095$), a moderate effect for overall general qualification, $F(1, 52) = 3.527$, $p = 0.066$, $\eta^2 = 0.064$), a small effect for recommendation for the position, $F(1, 52) = 0.687$, $p = 0.411$, $\eta^2 = 0.003$), and a small effect for starting salary, $F(1, 52) = 1.499$, $p = 0.226$, $\eta^2 = 0.028$). The findings suggest when controlling for contact with PWDS that even though participants found the PWDS as less qualified for the job tasks of the grocery store bagger position and in overall general job qualifications, they were equally likely to recommend the PWDS as they would a PWODS for the position. This finding suggests either a "norm to be kind" response or socially desirable responding. Both responses will be explored in the discussion section.

Hypothesis 3

The third hypothesis suggested that the physiological responses of participants as measured by EDA, EMG, BPM, HRV, and RSA will mediate the relationship between the applicant conditions (PWDS and PWODS) and the rating of the applicants on the grocery store bagger job tasks. A principal components analysis reduced the 11 physiological measures to several main components. The components were then entered into a multiple mediation analysis for each of the four rating tasks.

Principal components analysis. A principal components analysis with oblimin rotation was used on the imputed dataset to reduce 9 of the 11 physiological measures to a smaller set of components. The two EDA variables were not included in the principal components analysis because they had several missing observations. Principal components analysis uses listwise deletion. Keeping the EDA variables in the analysis would have reduced the number of observations retained in the analysis and impacted the results. The EDA variables were entered into a mediation model separately from the other components. Both the K1 rule and a parallel analysis (see Lautenschlager, 1989) indicated 3 components. An interpretation of the component patterns of two and three extracted components concluded that the three component pattern made the most substantive sense. The three component solution accounted for 69.01% of the variability of the original measures and measures with loadings greater than 0.40 on components were retained. The first component consisted of the four HRV and the RSA variable ($\alpha = 0.660$). The second component consisted of the PEP and two EMG variables ($\alpha = 0.282$), and the third component consisted of only the BPM variable and was analyzed separately from the other two components. The two components, BPM variable, and the EDA variables resulted in four mediation models for each of the four rating tasks.

Table 3

Component Loadings for Principal Components Analysis With Oblimin Rotation of Physiological Measures

Variable	Component 1	Component 2	Component 3
BPM	-.144	-.052	**.896**
VL	**.907**	-.030	-.255
LF	**.901**	.005	-.302
HFF	**.902**	.047	-.299
VH	**.766**	-.015	.316
PEP	-.016	**-.667**	.067
RSA	**.586**	.047	.177
Brow EMG	.203	**.687**	.245
Cheek EMG	-.127	**.683**	-.091

Note. Component loadings > 0.40 are in boldface.

Mediation analyses. Four mediation analyses were conducted for each of the four rating tasks for a total of 16 models. There are four criteria that should be met to establish mediation (Preacher & Hayes, 2008). First, the predictor should be significantly related to the outcome (*path c*). Second, the predictor should be significantly related to the mediator *(path a)*. Third, the mediator should be significantly related to the outcome when controlling for the predictor (*path b*), and finally, the predictor should not be significantly related to the outcome when controlling for the mediator (*path c'*). Path c and c' prime will be reported below.

Because the predictor in the models is a within-groups variable, traditional mediation analysis with between-groups data was not sufficient for the analyses. An SPSS macro developed by Montoya and Hayes (in press) specifically for mediation and moderation analyses in RM designs (MEMORE) was utilized for the analyses. MEMORE provides estimates for the direct, indirect, and total effects in two-condition within-groups designs (Montoya & Hayes, in press).

Specific job task ratings. The hypothesis that participants' physiological responses would mediate the relationship between applicant image and specific job task ratings relationship was not supported. The applicant images had a significant total effect on specific job task ratings, $t(53) = -2.052$, $p = 0.045$. However, the direct effect remained significant with the BPM

mediator, $t(51) = -2.593$, $p = 0.012$, the HRV and RSA mediators, $t(43) = -2.524$, $p = 0.015$, and the PEP and EMG mediators, $t(46) = -2.227$, $p = 0.028$. The EDA mediator results were similar. The applicant images had a significant total effect on specific job task ratings, $t(36) = -3.176$, $p = 0.003$. However, the direct effect remained significant with the EDA variables, $t(32) = -3.114$, $p = 0.004$. All indirect effects were statistically non-significant, although the indirect effect for the BPM mediator (0.066) was significant when the conditions were relaxed to a 90% confidence interval [.004, 0.154]. It is possible that with more observations a significant effect would be found which would indicate that BPM is either a suppressor variable or that there is a moderator missing from the model.

Table 4

Mediation Effects of Physiological Measures on the Relationship Between Disability Status and Specific Job Qualification

		Total					Direct					Indirect				
			95% CI		90% CI			95% CI		90% CI			95% CI		90% CI	
Criterion	Physio Measure	*b*	Lower	Upper	Lower	Upper	*b*	Lower	Upper	Lower	Upper	*b*	Lower	Upper	Lower	Upper
Job Specific	BPM	-0.188	-0.371	-0.004	-0.341	-0.035	-0.254	-0.45	-0.057	-0.418	-0.09	0.067*	-0.004	0.191	0.004	0.164
	Model	-0.188	-0.371	-0.004	-0.341	-0.035	-0.295	-0.53	-0.059	-0.491	-0.098	0.107	-0.211	0.333	-0.099	0.604
	VL											-0.738	-3.611	0.658	-2.9	0.395
	LF											1.242	-0.375	2.19	-0.203	4.147
	HF											-0.436	-1.742	0.173	-1.41	0.082
	VH											0.05	-0.109	0.227	-0.075	0.2
	RSA											-0.012	-0.194	0.039	-0.15	0.025
	Model	-0.191	-0.378	-0.004	-0.347	-0.035	-0.239	-0.45	-0.028	-0.415	-0.063	0.047	-0.038	0.133	-0.026	0.111
	PEP											0.046	-0.054	0.092	-0.041	0.08
	EMG_B											0.004	-0.022	0.043	-0.016	0.036
	EMG_C											0.027	-0.038	0.133	-0.018	0.057
	Model	-0.304	-0.498	-0.11	-0.465	-0.142	-0.319	-0.528	-0.111	-0.493	-0.146	0.016	-0.092	0.154	-0.073	0.123
	SCL											-0.002	-0.094	0.092	-0.072	0.071
	SCR											0.018	-0.041	0.118	-0.029	0.093

Note: *p < .10; **p < .05. BPM = heart beats per minute; VL = very low frequency; LF = low frequency; HFF = High frequency; VH = Very high frequency; RSA = Respiratory Sinus Arrythmia; PEP = Pre-ejection period; EMG_B = Brow EMG; EMG_C = Cheek EMG; SCL = skin conductance level; SCR = skin conductance response.

General qualification ratings. The hypothesis that participants' physiological responses would mediate the relationship between applicant image and general qualification ratings was not supported. The applicant images had no total effect on general qualification ratings, $t(53) = -0.325$, $p = 0.746$, and the direct effect remained non-significant with BPM mediator, $t(51) = -0.367$, $p = 0.716$, the HRV and RSA mediators, $t(43) = -0.077$, $p = 0.428$, and the PEP and EMG mediators, $t(46) = -0.203$, $p = 0.840$. The EDA mediator results were similar. The applicant images had no effect on general qualification ratings, $t(36) = -0.644$, $p = 0.523$, and the direct effect remained non-significant with the EDA variables, $t(32) = -0.684$, $p = 0.499$. All indirect effects were statistically non-significant.

Table 5

Mediation Effects of Physiological Measures on the Relationship Between Disability Status and General Job Qualification

		Total					Direct					Indirect				
			95% CI		90% CI			95% CI		90% CI			95% CI		90% CI	
Criterion	Physio Measure	*b*	Lower	Upper	Lower	Upper	*b*	Lower	Upper	Lower	Upper	*b*	Lower	Upper	Lower	Upper
General Qualification	BPM	-0.026	-0.184	0.133	-0.158	0.107	-0.032	-0.206	0.142	-0.177	0.114	0.006	-0.072	0.08	-0.051	0.066
	Model	-0.026	-0.184	0.133	-0.158	0.107	-0.077	-0.27	0.117	-0.238	0.085	0.051	-0.214	0.245	-0.159	0.214
	VL											-0.303	-2.365	0.549	-1.61	0.273
	LF											0.365	-0.618	3.083	-0.307	2.265
	HF											-0.011	-1.235	0.504	-0.819	0.352
	VH											0.01	-0.059	0.21	-0.034	0.148
	RSA											-0.01	-0.128	0.02	-0.102	0.134
	Model	-0.018	-0.179	0.143	-0.152	0.116	-0.018	-0.201	0.164	-0.171	0.134	<0.001	-0.077	0.073	-0.062	0.058
	PEP											0.013	-0.048	0.09	-0.037	0.067
	EMG_B											-0.008	-0.043	0.026	-0.036	0.017
	EMG_C											-0.004	-0.057	0.032	-0.044	0.022
	Model	-0.059	-0.243	0.126	-0.212	0.095	-0.069	-0.276	0.137	-0.241	0.103	0.011	-0.103	0.141	-0.082	0.11
	SCL											0.012	-0.103	0.142	-0.084	0.112
	SCR											<0.001	-0.03	0.03	-0.027	0.026

Note: *p < .10; **p < .05. BPM = heart beats per minute; VL = very low frequency; LF = low frequency; HFF = High frequency; VH = Very high frequency; RSA = Respiratory Sinus Arrythmia; PEP = Pre-ejection period; EMG_B = Brow EMG; EMG_C = Cheek EMG; SCL = skin conductance level; SCR = skin conductance response.

Recommendation for position. The hypothesis that participants' physiological responses would mediate the relationship between applicant image and recommendation for the position was not supported. The applicant images had no total effect on recommendation for the position, $t(53) = -1.816$, $p = 0.075$, and the direct effect remained non-significant with BPM mediator, $t(51) = -1.094$, $p = 0.279$, the HRV and RSA mediators, $t(43) = -01.564$, $p = 0.125$, and the PEP and EMG mediators, $t(46) = -1.470$, $p = 0.149$. The EDA mediator results were different in that the applicant images had a significant total effect on the recommendation for the position, $t(36) = -2.848$, $p = 0.007$. However, the direct effect remained significant with the EDA variables, $t(32) = -2.176$, $p = 0.037$. All indirect effects for the physiological measures were statistically non-significant.

Table 6

Mediation Effects of Physiological Measures on the Relationship Between Disability Status and Position Recommendation

		Total					Direct					Indirect				
			95% CI		90% CI			95% CI		90% CI			95% CI		90% CI	
Criterion	Physio Measure	*b*	Lower	Upper	Lower	Upper	*b*	Lower	Upper	Lower	Upper	*b*	Lower	Upper	Lower	Upper
Recommendation	BPM	-0.182	-0.383	0.019	-0.35	-0.014	-0.12	-0.341	0.1	-0.304	0.064	-0.062	-0.187	0.025	-0.149	0.008
	Model	-0.182	-0.383	0.019	-0.35	-0.014	-0.199	-0.455	0.058	-0.413	0.015	0.017	-0.286	0.274	-0.194	0.216
	VL											-0.404	-2.592	0.714	-1.833	0.406
	LF											0.645	-0.728	3.823	-0.495	2.8
	HF											-0.277	-1.609	0.383	-1.215	0.213
	VH											0.051	-0.114	0.365	-0.064	0.262
	RSA											0.002	-0.122	0.102	-0.097	0.066
	Model	-0.186	-0.391	0.02	-0.357	-0.015	-0.163	-0.386	0.06	-0.349	0.023	-0.023	-0.135	0.051	-0.121	0.039
	PEP											-0.019	-0.1	0.065	-0.094	0.048
	EMG_B											-0.004	-0.045	0.037	-0.039	0.025
	EMG_C											<0.001	-0.089	0.031	-0.07	0.022
	Model	-0.32	-0.548	-0.092	-0.509	-0.13	-0.279	-0.54	-0.018	-0.496	-0.062	-0.041	-0.135	0.084	-0.119	0.05
	SCL											-0.036	-0.124	0.088	-0.109	0.052
	SCR											-0.005	-0.093	0.054	-0.059	0.043

Note: *p < .10; **p < .05. BPM = heart beats per minute; VL = very low frequency; LF = low frequency; HFF = High frequency; VH = Very high frequency; RSA = Respiratory Sinus Arrythmia; PEP = Pre-ejection period; EMG_B = Brow EMG; EMG_C = Cheek EMG; SCL = skin conductance level; SCR = skin conductance response.

Salary. The hypothesis that participants' physiological responses would mediate the relationship between applicant image and recommendation for salary was not supported. The applicant images had no total effect on salary, $t(53) = -0.581$, $p = 0.564$, and the direct effect remained non-significant with the BPM mediator, $t(51) = -0.681$, $p = 0.499$, and the PEP and EMG mediators, $t(51) = -0.681$, $p = 0.499$. However there was a significant direct effect when HRV and RSA were entered as mediators, $t(43) = -1.945$, $p = 0.058$, which suggests either a suppression effect or a missing moderator. The EDA mediator results also showed no difference in the total effect relationship between the applicant images and recommended salary, $t(36) = -0.849$, $p = 0.402$, and the direct effect remained non-significant with the EDA variables, $t(32) = -1.000$, $p = 0.325$. All indirect effects for the physiological measures were statistically non-significant.

Table 7

Mediation Effects of Physiological Measures on the Relationship Between Disability Status and Salary Recommendation

		Total					Direct					Indirect				
			95% CI		90% CI			95% CI		90% CI			95% CI		90% CI	
Criterion	Physio Measure	*b*	Lower	Upper	Lower	Upper	*b*	Lower	Upper	Lower	Upper	*b*	Lower	Upper	Lower	Upper
Salary	BPM	-0.028	-0.125	0.069	-0.109	0.053	-0.036	-0.144	0.071	-0.126	0.053	0.008	-0.042	0.053	-0.126	0.053
	Model	-0.028	-0.125	0.069	-0.109	0.053	-0.108	-0.22	0.004	-0.201	-0.015	0.08	-0.047	0.202	-0.027	0.174
	VL											-0.143	-1.101	0.344	-0.78	0.201
	LF											0.143	-0.617	1.492	-0.418	1.065
	HF											0.058	-0.443	0.487	-0.319	0.362
	VH											0.006	-0.029	0.135	-0.018	0.1
	RSA											0.016	-0.07	0.037	-0.05	0.032
	Model	-0.024	-0.122	0.074	-0.106	0.058	-0.037	-0.137	0.064	-0.12	0.047	0.013	-0.043	0.068	-0.035	0.056
	PEP											-0.018	-0.068	0.015	-0.057	0.009
	EMG_B											0.006	-0.015	0.024	-0.008	0.022
	EMG_C											0.024	-0.005	0.072	<0.001	0.06
	Model	-0.041	-0.14	0.058	-0.124	0.041	-0.056	-0.169	0.058	-0.15	0.039	0.014	-0.045	0.053	-0.027	0.041
	SCL											0.017	-0.016	0.058	-0.009	0.048
	SCR											-0.002	-0.055	0.015	-0.038	0.011

Note: *p < .10; **p < .05. BPM = heart beats per minute; VL = very low frequency; LF = low frequency; HFF = High frequency; VH = Very high frequency; RSA = Respiratory Sinus Arrythmia; PEP = Pre-ejection period; EMG_B = Brow EMG; EMG_C = Cheek EMG; SCL = skin conductance level; SCR = skin conductance response.

Hypothesis 4

The fourth hypothesis stated that participants would have a significantly lower recall of résumé facts for the PWDS condition than for the PWODS condition for the grocery store bagger position.

Results. The fourth hypothesis was not supported. A paired sample *t*-test found no difference between participants' recall of résumés when the applicant was a PWDS (M_{PWDS} = .743, SD_{PWDS} = 0.113; M_{PWODS} = .716, SD_{PWODS} = 0.122) as opposed to a PWODS, $t(53) = 1.577$, $p = 0.121$, $d = 0.215$. Additionally, the difference scores on the recall task and the RAPM scores were uncorrelated, $r(52) = .088$, $p = 0.525$. The statistical findings were accompanied by a small effect indicated little practical difference as well. It appears that neither the RAPM nor the images produced a cognitive load that affected the recall of participants of applicant résumés.

Covariates. Several variables were identified as possible covariates and explored through intercorrelations. Difference scores were calculated between participants recall of résumé facts when PWDS and PWODS images were presented. The difference scores were then correlated with the image presentation order, résumé order, RAPM test order, and participant gender, disability status, age, hours employed, HR experience, IDP scores, and cognition scores. The analysis indicated that none of these variables correlated with quiz scores. No covariates were used when analyzing hypothesis 4.

Hypothesis 5

The fifth hypothesis suggested that the physiological responses of participants as measured by EDA, EMG, BPM, HRV, and RSA will mediate the relationship between the applicant conditions (PWDS and PWODS) and the recall of facts from the résumés. The

components from the principal components analysis from hypothesis three were entered into the mediation analysis for the recall task.

Mediation Analyses. Four mediation analyses were conducted for the recall of résumés task. Because the predictor in the models is a within-groups variable, the SPSS macro developed MEMORE (Montoya & Hayes, in press) was used again for this analysis.

Résumé recall task. The hypothesis that participants' physiological responses would mediate the relationship between applicant image and résumé recall was not supported. The applicant images had no total effect on résumé recall, $t(53) = 1.577$, $p = 0.121$, and the direct effect remained non-significant with BPM mediator, $t(51) = 0.940$, $p = 0.352$, the HRV and RSA mediators, $t(43) = 0.935$, $p = 0.355$, and the PEP and EMG mediators, $t(46) = 0.986$, $p = 0.8330$. The EDA mediator results were similar. The applicant images had no total effect on general qualification ratings, $t(36) = 1.015$, $p = 0.317$, and the direct effect remained non-significant with the EDA variables, $t(32) = 0.915$, $p = 0.367$, All indirect effects were statistically non-significant.

Table 8

Mediation Effects of Physiological Measures on the Relationship Between Disability Status and Résumé Recall

		Total					Direct					Indirect				
			95% CI		90% CI			95% CI		90% CI			95% CI		90% CI	
Criterion	Physio Measure	*b*	Lower	Upper	Lower	Upper	*b*	Lower	Upper	Lower	Upper	*b*	Lower	Upper	Lower	Upper
Recall	BPM	0.027	-0.007	0.062	-0.002	0.056	0.018	-0.02	0.056	-0.014	0.05	0.009	-0.008	0.03	-0.004	0.024
	Model	0.027	-0.007	0.062	-0.002	0.056	0.02	-0.023	0.063	-0.016	0.056	0.007	-0.026	0.053	-0.017	0.044
	VL											-0.034	-0.299	0.132	-0.217	0.108
	LF											0.042	-0.253	0.393	-0.201	0.304
	HF											<0.001	-0.129	0.15	-0.101	0.12
	VH											-0.002	-0.023	0.032	-0.019	0.024
	RSA											0.001	-0.012	0.025	-0.009	0.019
	Model	0.025	-0.01	0.06	-0.004	0.054	0.018	-0.019	0.056	-0.013	0.049	0.007	-0.008	0.03	-0.006	0.024
	PEP											0.007	-0.004	0.026	-0.003	0.022
	EMG_B											-0.001	-0.008	0.004	-0.007	0.003
	EMG_C											0.001	-0.009	0.01	-0.006	0.008
	Model	0.022	-0.022	0.065	-0.014	0.058	0.023	-0.028	0.073	-0.019	0.064	<0.001	-0.035	0.017	-0.026	0.013
	SCL											-0.002	-0.035	0.015	-0.026	0.011
	SCR											0.001	-0.011	0.012	-0.008	0.008

Note: *p < .10; **p < .05. BPM = heart beats per minute; VL = very low frequency; LF = low frequency; HFF = High frequency; VH = Very high frequency; RSA = Respiratory Sinus Arrythmia; PEP = Pre-ejection period; EMG_B = Brow EMG; EMG_C = Cheek EMG; SCL = skin conductance level; SCR = skin conductance response.

General Discussion and Conclusion

The current study investigated the physiological reactance of participants when presented with images of applicants with differing disability statuses and the subsequent qualification ratings and résumé recall of the applicants for a grocery store bagger position. An interpretation of the results suggest that PWDS and PWODS elicit differing levels of physiological responding and that PWDS are given lower qualification ratings for a job in comparison to PWODS. However for the most part, it does not appear that physiological responses mediate the relationship between disability status and qualification ratings. Additionally, it appears that recall of résumé facts do not differ between disability statuses nor mediated the relationship between disability status and qualification ratings.

The first hypothesis was mostly supported. There was no difference in physiological responses between PWDS and PWODS during the job task screen prior to the presentation of the images. When viewing an image of a PWDS, participants had lower physiological responses in SCR, SCL, zygomatic EMG, BPM and PEP than when viewing an image of a PWODS, higher physiological responses for HF, and no physiological differences for corrugator supercilii EMG, RSA, VL, LF, and VH. Lower SCRs for PWDS than PWODS were similar to findings by Heinemann et al. (1981), Kleck et al. (1966), and Wesolowski & Deichmann, (1980), and lower PEP values for PWDS than PWODS were similar to Blascovich et al. (2001).

Although the physiological findings coincided with previous studies, the interpretation of the emotion associated with the responses differs. Previous studies suggest threat, fear, and disgust as underlying emotions that are associated with the physiological differences. However, those interpretations were based on no more than three physiological measures. The comprehensive review by Kreibig (2010) is inclusive of additional measures and allow for an

interpretation of physiological patterns. The pattern of physiological responses found in the current study best matches the pattern for the emotion of sadness, in particular non-crying sadness. Kreibig's review of the emotion of sadness suggests a decrease in sympathetic activation characterized by decreases in BPM, SCR, and SCL. The pattern of physiological responding found in the current study is similar to the suggested findings for sadness by Kreibig as demonstrated by decreases in SCR, SCL, BPM, and PEP, and no difference in RSA. Measures of EMG, VL, LF, HF, and VH were not included in Kreibig's review. Based on the findings of the current study, raters of job applicants may experience sadness as a result of feelings of pity or sorrow when viewing images of PWDS and not threat, fear, or disgust. A pattern of threat would have required increases in SCR and SCL. A pattern of fear would have included an increase in BPM, SCR, and SCL and a decrease in HRV, and a pattern of disgust would be marked by an increase in BPM, SCR, and SCL. These three patterns did not match the results of the current study.

Partial support was also found for the second hypothesis. Disparities exist for PWDS in employment opportunities. The current study found that equally qualified PWDS were rated as less qualified and had a lower recommendation for the grocery store bagger position than PWODS, although PWDS were rated as no different in overall general qualifications. The pattern of responding suggests that PWDS are generally perceived as no different in qualification as a PWODS as long as the position is more distal rather than more proximal. In other words, "Persons with Down syndrome would be equally qualified in most positions at other organizations, they just are not as qualified for this position at my organization." Potential employers may consciously or non-consciously perceive inequalities in application materials between PWDS and PWODS that do not actually exist. These perceived inequalities may then

become justification for rating PWDS lower that PWODS. Interestingly, this interpretation may be partially driven by the level of discomfort people have when interacting with PWD.

When controlling for comfort levels with PWD, PWDS were rated lower for job specific and general qualifications, but were rated no different for recommendations to proceed to an interview or to be hired. This pattern of responding suggests a "norm to be kind" response. Hastorf, Northercraft, and Picciotto (1979) suggest that for some people the best way to help a PWD is to provide rewards. Even though PWDS were perceived as less qualified for the specific position or for positions in general, people were just as willing to overlook the perceived inequality and recommend the PWDS for an interview or for the position as they would for a PWODS. Although in the current study the applicants were equivalent, this pattern of responding suggests that lesser qualified rather than equally qualified applicants could get further along in the hiring process than they should. This can be problematic as hiring unqualified or lesser qualified applicants can lead to higher turnover and confirmation biases that perpetuate the stigma toward PWD.

Despite the support for the first two hypotheses, the third hypothesis was largely unsupported. For the most part, physiological responding did not mediate the relationship between disability status and rating. The mediation analyses yielded inconsistent results which may suggest missing moderators, or other mediators. Most physiological measures yielded no mediation effects, yet BPM may partially mediate the relationship between disability status and specific job recommendation when the analysis has adequate power. Additionally, BPM may result in a suppression effect for the relationship between disability status and specific job recommendation.

Three factors may have contributed to the no finding for this hypothesis. The first may be the errors inherit in the measures. Of the physiological data, BPM had the least amount of statistical noise. The other measures did not provide as clean of a reading. The second factor was a lack of power. Although 50 observations are sufficient to find differences with physiological measures alone, adding mediators requires more statistical power and thus more observations. According to Fritz and MacKinnon (2007), an anticipated medium effect in *path a* and *path b* in a mediation model would require a sample size of at least 90 participants at a statistical power of .8. An additional semester of sampling would be necessary to increase the statistical power of this study and average out measurement error.

A review of the analyses from the current study suggests that interactions with PWD and socially desirable responding may be moderators. Scores on the IDP were used as a covariate between disability status and qualification ratings. Participants with more positive interactions with PWD tended to rate PWDS higher than those with fewer positive interactions. This interaction is similar to the interaction between the ATDP scale and SCR found by Zych and Bolton (1972) and Blascovich et al. (2001). It is possible that physiological responses may mediate the relationship between those with fewer positive interactions and their rating of PWDS. A mediated moderation analysis may be appropriate. Additionally, socially desirable responding may also be a moderator between physiological responding and qualification ratings. Although people may experience a physiological reaction or sadness, those with higher levels of socially desirable responding may still rate a PWDS higher than a PWODS to meet social expectations. A moderated mediation analysis may be appropriate. In other words, more complex models should be investigated.

The last two hypotheses for the current study focused on memory recall of résumés. It was hypothesized that the physiological responses to PWDS would serve as a cognitive load and disrupt the recall of facts from applicants' résumés. Previous research has found that physiological responses mediated the relationship between stigmatized applicant statuses and memory functions (Madera & Hebl, 2012). However, these hypotheses were not supported in the current study. The type of emotion experienced by participants may explain the non-finding in regards to memory recall. Research has demonstrated that a fear response will often impair cognitive function whereas a negative mood state or an emotion of sadness, may increase cognitive functions (Bower & Forgas, 2000). The pattern of physiological responding in this study suggests an emotion of sadness was elicited which in turn may have enhanced memory of the résumés resulting in a finding of no difference rather than decreased memory function for résumés when the applicant was a PWDS. Future research should investigate the use of disability exemplar such as HIV or some other communicable disease that may result in a different emotion such as fear rather than sadness, and consequently result in lower memory recall and a possible mediation effect.

Limitations and Suggestions for Future Research

As with any research study, there were several limitations to the current study. One limitation was the choice of participants in the study. Undergraduate students deviate from an HR decision maker population is several ways. Students tend to be younger, unemployed or employed only part-time, have fewer HR related work experience because of their age, and have less formal HR training. These differences make generalizing from a student sample to an HR decision maker population a common concern (see Arvey & Campion, 1982; Stevenage & McKay, 1999); however the concern was mitigated by recruiting students with HR-related

decision making experience. Bell and Klein (2001) found that nearly half of their student sample had hiring experience. Additionally, the meta-analytic findings by Ren et al. (2008) demonstrated no statistical difference between field experiments using employee samples and lab experiments using student samples on real or mock hiring decisions. In the current study, 85% of participants reported HR-related experience. Despite the high level of reported experience, the median age of students was 19 years of age and 98% of the sample was employed less than full-time which suggests limited long-term experience making HR decisions. Additionally, formal training on making HR decisions with protected classes was likely limited. Future research should investigate populations who work full-time in a position that primarily requires HR-related decisions to see if the findings of the current study hold. Extended experience or formal training on discrimination will likely reduce discriminatory responding.

Another limitation to the study was the use of image stimuli for manipulating the disability status of applicants. Viewing an image is quite a different experience than performing an in-person interview or even a video recorded interview. In addition to better simulating an actual hiring experience, in-person and video interviews are more likely to elicit physiological responses and differing patterns among the physiological measures. A more realistic mock hiring setting may amplify differences in physiological responding between PWD and PWOD thus making it easier to detect mediating and moderating relationships that may be present.

Another limitation to the study was the use of only one disability exemplar. A PWDS is likely to elicit a very different response both emotionally and physiologically than an amputee, a person with schizophrenia, or a person with human immunodeficiency virus (HIV; Stone & Colella, 1996). Furthermore, research findings are contradictory for disability exemplars. Disability exemplars can be problematic due to the variability within a single exemplar. For

example, two persons with an amputated limb could have any single or combination of amputation of an arm, hand, fingers, leg above the knee, leg below the knee, foot, or toes. How people respond to each combination may vary. A person with schizophrenia or HIV may elicit physiological responding more similar to fear than sadness. A fear response may serve as a cognitive load that may impact memory of an applicant's qualification therefore resulting in lower job qualification ratings. Future research should investigate multiple exemplars that cover a diverse array of components related to disability statuses and interpret the differing physiological patterns.

Future studies should also include a measure of socially desirable responding. A measure of socially desirable responding was not used in the current study but could have been used either as a potential covariate or even moderator. Nearly half of participants (41%) indicated that the PWDS did not have a disability even though the image clearly depicted a person with a disability. Three respondents voluntarily indicated that their training overrode their natural inclination to identify the PWDS as such. This failure to identify the disability status of the applicant may have been common among those who did not identify the disability status correctly and suggests participants responded in a socially desirable way. Additionally, the qualification ratings used as dependent variables in the study and the IDP are also subject to socially desirable responding (see Thomas et al., 2014). Although differences in qualification ratings were found in the present study, the mediation hypotheses were not supported. Socially desirable responding may be an important explanatory moderator in the mediation relationship.

Future studies should also obtain a self-report measure of participants' emotional responding. Kreibig's (2010) review of physiological responding and emotion and previous research by Blascovich et al. (2001), Wesolowski and Deichmann (1980), and Crawcour (2010)

come to different conclusions about the emotion that participants may be experiencing. Participants could rate the extent they are feeling several types of emotions as they look at the image of a PWD and PWOD. The physiological measures and the self-report measure could be correlated to see if the emotional state inferred matches the reported emotional state.

One final limitation of note is the research design of the study. A within group design was used in the current study to minimize between subjects variability. Physiological responses vary widely between participants, however they vary much less within participants. However, the statistical analyses available for within subjects designs are currently limited. Mediation analyses for RM designs are a specific example. Only recently have statistical packages such as SPSS and SAS been able to analyze RM mediation analyses (Judd, McClelland, & Kenny, 2001; Montoya & Hayes, in press). More complex RM models such as mediated moderation and moderated mediation are still in development (Montoya & Hayes, in press). Future research may investigate more complex moderated mediation or mediated moderation models using a between groups design or using a within groups design once appropriate methodologies have been advanced. However, a large sample size would be needed to maintain adequate statistical power with a between groups design.

Practical Applications and Conclusions

The current study found that PWDS elicited differing physiological responses and qualification ratings than a PWODS in a lab setting and using only images of applicants. The findings demonstrated that under these limited conditions that equally qualified PWDS were discriminated against. The findings suggest in a more broad context, equally qualified PWD are likely to experience more discriminatory behavior when it comes to employment decisions than they would in mock hiring situations. Although it could not be verified in the current research,

differing levels of physiological arousal between disabilities status may mediate those discriminatory behaviors. If a mediating link for physiological responses can be found between disability status and qualification ratings, then how HR training is conducted in response to protected classes may need to be reviewed. Training programs emphasizing more positive interactions with PWD in addition to education may be warranted. Research studies in social psychology have found that interactions with protected classes of equal status lead to reduced stereotyping (Pettigrew & Tropp, 2006). Similar results could be likely for interactions with PWD. The current research study demonstrated a greater willingness to rate a PWDS higher if the rater had more positive interactions with PWD. Habituation studies would also suggest that increased positive contact would also reduce emotional reactions and physiological responding (Feldman, 2009). Overall, understanding when discrimination occurs and the underlying physiological mechanisms that lead to it is the first step to reduce discrimination toward equally qualified PWD.

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Appendix A: Demographics Questionnaire

Instructions: Please answer the following demographic questions.

1. Are you male or female?
2. What is your age?
3. Do you either have a documented disability or believe you have an undocumented disability?

   ___ Yes

   ___ No
4. Have you been diagnosed or sought a diagnosis for a psychological disorder?

   ___ Yes

   ___ No
5. Which hand do you prefer to use for common tasks such as writing?

   ___ Right hand dominant

   ___ Left hand dominant
6. How many hours a week are you typically employed or work for a volunteer organization?
7. Do you currently perform or have you ever performed any of the following job tasks either while employed or part of a volunteer organization? Mark all that apply.

   ___ Recruit potential employees or organization members

   ___ Interview potential employees or organization members

   ___ Hire employees or organization members

___ Select employees or organization members for work groups or teams

___ Train new employees or organization members

___ Conduct performance evaluations on subordinates or organization members

___ Make decisions on employee or organization member promotions

___ Terminate employees or organization members

___ Other, please specify _____

Appendix B: Practice Job Tasks for an Administrative Assistant Position

Administrative Assistants perform a variety of job duties. They:

- Answer telephones, direct calls, and take messages
- Maintain filing, mailing, and database systems using a computer
- Communicate with customers and employees to disseminate or explain information
- Open, sort, and route incoming correspondence
- Type, format, and proofread documents
- Manage calendars and arrange appointments
- Deliver messages and run errands
- Process and prepare documents and reports
- Prepare meeting agendas, attend meetings and record minutes

Primary Study Job Tasks for Grocery Store Bagger Position

Baggers at Kroger perform a variety of job duties. They:

- Quickly pack items into grocery bags
- Carefully pack items into grocery bags without damaging goods
- Carefully pack items into grocery bags without overloading bags
- Assist customers with loading groceries into their vehicles
- Provide prompt customer service
- Provide friendly customer service
- Retrieve shopping carts from parking lot

- Return unwanted merchandise to store shelves
- Direct customers to product locations
- Unload deliveries to the store
- Stock shelve during slow periods
- Are reliable
- Have a strong work ethic

Appendix C: Résumés

Practice Résumé

24 Lincoln Way, Summertown, TX 82001 • 734-858-1569 • t_lawrence@gmail.com

Timothy Lawrence

Objective

To secure an office manager position at an established organization that provides opportunities for personal and professional growth.

Employment and Experience

Office Assistant at Advantage Inc. 2006 to Present

- Provided administrative and executive support within busy office
- Managed executive team's calendar
- Planned client meetings
- Prepared reports, spreadsheets, and presentations
- Managed records and administered database

Receptionist at Teletech Agency 2004 to 2006

- Operated telephones to answer, screen, forward calls, take messages, and schedule appointments
- Greeted persons entering agency and directed them to specific destinations
- Filed and maintained records
- Transmitted information and documents to customers and employees
- Processed and prepared memos, correspondence, and other documents

Skills and Abilities

MS Word, Excel, PowerPoint
Active listener
Service orientated
High interpersonal skills

Activities and Interests

Marketing Club member
Cross-country running
Photography

Education

Holten Community College, Perry, Texas — Office Management Certificate GPA: 3.62 — 2009

Relevant Courses: Office and Computer Systems, Interpersonal Relations, Project Management, Business Communications

References are available on request

Résumé 1

862 Cinder Lane, Kettle Falls, WA 99141 • 509-728-6407 • j_williams@gmail.com

James Williams

Objective

To obtain employment that will help me gain experience and provide learning opportunities that will benefit my career development.

Employment and Experiences

Dining Attendant at The Balcony Café — Summer 2015

- Wipe tables and seats with dampened cloth
- Stack dirty dishes and carry to kitchen for cleaning
- Stock silverware, glassware, dishes, and trays

Groundskeeper at Green Lawn Services — Summer 2014

- Mow lawns using mower
- Rake yard clippings
- Gather and remove yard clippings

Volunteer at Renew and Reuse Thrift Store

- Sort items to be stocked at the delivery dock
- Move donated items to store shelves
- Mark donated items with identification stickers

Volunteer at City Library

- Retrieve books from return shelves to librarian for re-shelving
- Organized returned books into location categories
- Apply identification tags to new books and materials

Skills and Abilities

Friendly and outgoing
Quick learner
Dedicated team player

Activities and Interests

High school drama club
D.A.R.E. campaign
Landscape painting

Education

Washington High School, Evans, Washington — High School Diploma, GPA: 3.24 — Expected June 2016

Relevant Courses: Public Speaking, Consumer Math and Science, Sociology, Life Skills

References are available on request

Résumé 2

285 Park Drive, Kettle Falls, WA 99141 • 509-734-3080 • d_johnson@gmail.com

David Johnson

Objective

To find a position that provides me with valuable experiences in life and organization skills, which may assist me in starting a career.

Employment and Experiences

Stock Hand at Asseco Warehouse — Summer 2015

- Unpack items to be stocked on shelves in warehouse
- Store items in an orderly and accessible manner
- Mark stock items using identification tags

Vehicle Detailer at MidState Auto — Summer 2014

- Clean and polish vehicle windows
- Wash and shine vehicle tires
- Vacuum vehicle interiors

Volunteer at Parkview Senior Living Community

- Sort, count, and mark clean linens and store them in linen closet
- Carried lines, towels, and toilet items using wheeled carts
- Empty wastebaskets and transport trash to disposal area

Volunteer Teacher's Aid in High School

- Prepare bulletin board displays
- Type, file, and duplicate materials
- Stock teaching materials and supplies

Skills and Abilities

Works well with others
Strong listening skills
Responsible and reliable

Activities and Interests

High school yearbook committee
Boy Scouts of America
Short story writing

Education

Lincoln High School, Marcus, Washington — High School Diploma, GPA: 3.22 — Expected June 2016

Relevant Courses: Practical Math, Psychology, Speech, Economics, Service Learning

References are available on request

Appendix D: Applicant Rating Tasks

Practice Rating Tasks

Instructions: Please rate how likely the applicant will be able to perform the following job tasks using a 7-point scale (1 = very unlikely, 2 = unlikely, 3 = somewhat unlikely, 4 = undecided, 5 = somewhat likely, 6 = likely, 7 = very likely):

- Answer telephones, direct calls, and take messages
- Maintain filing, mailing, and database systems using a computer
- Communicate with customers and employees to disseminate or explain information
- Open, sort, and route incoming correspondence
- Type, format, and proofread documents
- Manage calendars and arrange appointments
- Deliver messages and run errands
- Process and prepare documents and reports
- Prepare meeting agendas, attend meetings and record minutes

Instructions: Please rate how qualified the applicant is in general using a 5-point scale (1 = strongly disagree, 2 = disagree, 3 = neither disagree nor agree, 4 = agree, 5 = strongly agree):

- This applicant has strong qualifications
- This applicant has impressive experiences
- This applicant would make a good employee
- The applicant will receive many job offers
- I am not impressed by this applicant (R)

- I feel that his applicant will have a hard time finding a job (R)
- I don't think this applicant has enough job experiences (R)
- This applicant seems smart
- This applicant is suitable for a low-level entry position (R)

Instructions: Please rate your level of recommendation of the applicant using a 5-point scale (1 = strongly disagree, 2 = disagree, 3 = neither disagree nor agree, 4 = agree, 5 = strongly agree):

- Overall, how qualified is the applicant for the administrative assistant position?
- To what degree would you recommend that this applicant be invited to an interview?
- To what degree would you recommend that this applicant to receive a job offer for the administrative assistant position?

The typical administrative assistant position salary ranges from $11 to $20 an hour depending on factors such as experience and education. Assuming the applicant is offered the position, what should be his starting salary?

Primary Study Applicant Rating Task

Instructions: Please rate your agreement to how likely the applicant will be able to perform the following job tasks using a 5-point scale (1 = strongly disagree, 2 = disagree, 3 = neither disagree nor agree, 4 = agree, 5 = strongly agree):

- Quickly pack items into grocery bags
- Carefully pack items into grocery bags without damaging goods
- Carefully pack items into grocery bags without overloading bags
- Assist customers with loading groceries into their vehicles
- Provide prompt customer service
- Provide friendly customer service

- Retrieve shopping carts from parking lot
- Return unwanted merchandise to store shelves
- Direct customers to product locations
- Unload deliveries to the store
- Stock shelves during slow periods
- Be reliable
- Have a strong work ethic

Instructions: Please rate how qualified the applicant is for the grocery store bagger position using a 5-point scale (1 = strongly disagree, 2 = disagree, 3 = neither disagree nor agree, 4 = agree, 5 = strongly agree):

- This applicant has strong qualifications
- This applicant has impressive experiences
- This applicant would make a good employee
- The applicant will receive many job offers
- I am not impressed by this applicant (R)
- I feel that his applicant will have a hard time finding a job (R)
- I don’t think this applicant has enough job experiences (R)
- This applicant seems smart
- This applicant is suitable for a low-level entry position (R)

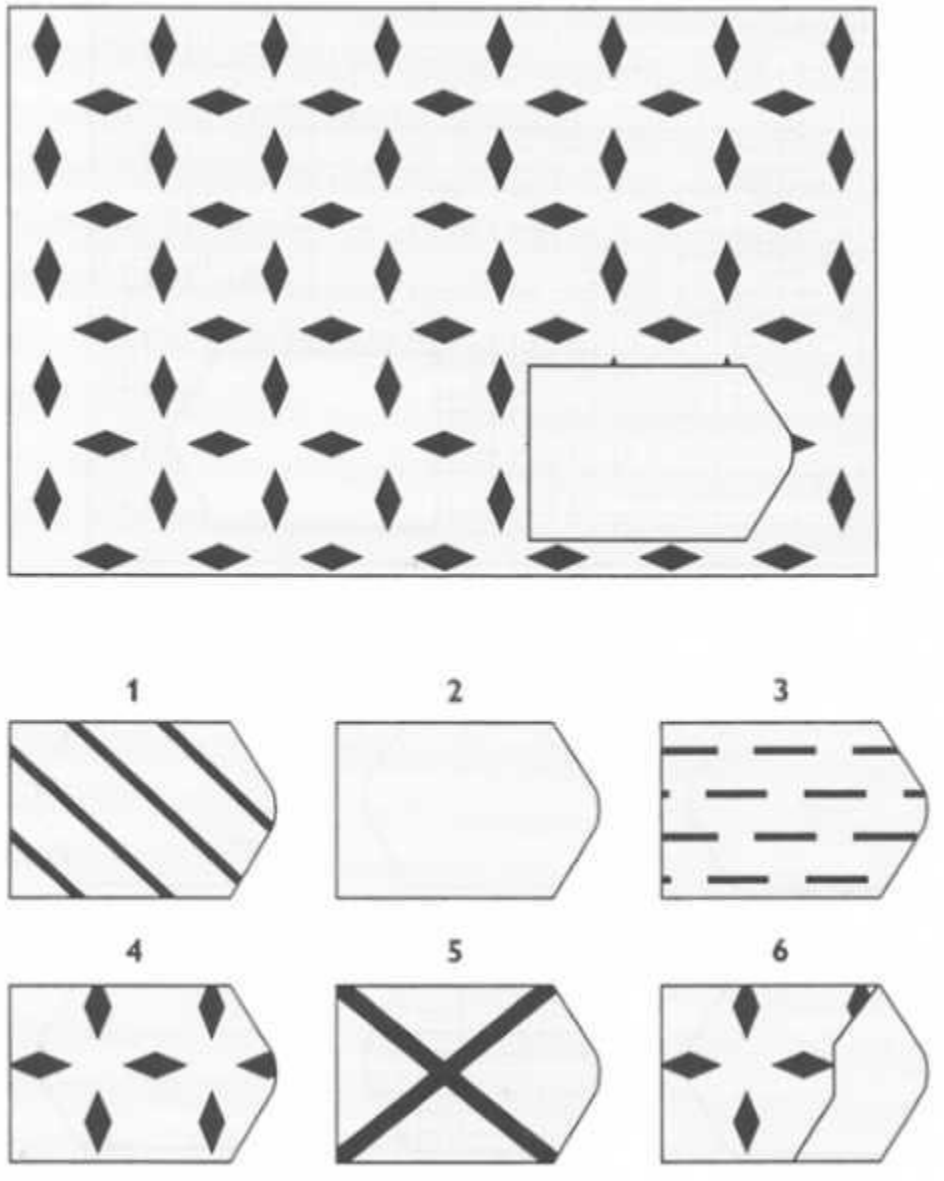
Instructions: Please rate your level of recommendation of the applicant using a 5-point scale (1 = strongly disagree, 2 = disagree, 3 = neither disagree nor agree, 4 = agree, 5 = strongly agree):

- Overall, how qualified is the applicant for the grocery store bagger position?
- To what degree would you recommend that this applicant be invited to an interview?

- To what degree would you recommend that this applicant to receive a job offer for the grocery store bagger position?
- The typical grocery store bagger position salary ranges from $8 to $10 an hour depending on factors such as experience and education. Assuming the applicant is offered the position, what should be his starting salary?

Appendix E: Raven Advanced Progressive Matrices Example Item

Instructions: The following items are meant to assess your ability to perceive and think clearly. You will be presented with a pattern with a bit cut out of it. Look at the pattern, think about which piece is needed to complete the pattern. Then find the right piece out of the eight bits presented below the pattern. Only one of the bits is perfectly correct.



An example item from the Raven Progressive Matrices.

Appendix F: Recall Task

Instructions: We would like to assess your memory of the application that you just reviewed. Please answer the following questions to the best of your ability (**Bolded items** represent the final 15-item recall task measure)

1. **What is the name of the applicant?**
    a. James Williams
    b. David Johnson
    c. John Davis
    d. Michael Smith
2. Does the applicant have a disability?
    a. No
    b. Yes, please type the disability below
3. What state is the applicant from?
    a. Washington
    b. North Dakota
    c. Indiana
    d. Georgia
4. What is the applicant's objective?
    a. To obtain employment that will help me gain experience and provide learning opportunities that will benefit my career development.

   b. To find a position that provides me with valuable experiences in life and organization skills, which may assist me in starting a career.
   c. To gain valuable experience, build skills, and pursue a career in business, specifically in the grocery and food service industry
   d. To seek employment in which I can utilize my professional skills and expand within the company and embrace the company's vision

5. Which of the following was an employment experience listed by the applicant?

   a. Dining attendant at The Balcony
   b. Stock Hand at Asseco Warehouse
   c. Caddy at Hill's Country Club
   d. Camp Counselor at Camp Hubert

6. Which of the following was an employment experience listed by the applicant?

   a. Groundskeeper at Green Lawn Services
   b. Vehicle Detailer at MidState Auto
   c. Food Service Worker at Gillian's
   d. Lifeguard at Earlywine Aquatics

7. Which of the following was a volunteer experience listed by the applicant?

   a. Volunteer at Renew and Reuse Thrift Store
   b. Volunteer at Parkview Senior Living Community
   c. Volunteer at Big Brothers / Big Sisters
   d. Volunteer at Annual Run for Life Event

8. Which of the following was a volunteer experience listed by the applicant?

   a. Volunteer at City Library

b. Volunteer as Teacher's Aid in High School

c. Volunteer at Rowan Development Center

d. Volunteer as Youth Group Leader

9. Which season did the applicant have employment experience?

a. Summer

b. Fall

c. Winter

d. Spring

10. On what street does the applicant live?

a. Cinder Lane

b. Park Drive

c. Dogwood Avenue

d. Maple Street

11. In what city does the applicant live?

a. Kettle Falls

b. Marcus

c. Evans

d. Colville

12. In what city did the applicant attend high school?

a. Evans

b. Marcus

c. Kettle Falls

d. Colville

13. What high school did the applicant attended?

a. Washington High School

b. Lincoln High School

c. Kennedy High School

d. Jefferson High School

14. Which of the following is a skill listed by the applicant?

a. Friendly

b. Works well with others

c. Dependable

d. Efficient with time

15. Which of the following is a skill listed by the applicant?

a. Outgoing

b. Listening

c. Organized

d. Articulate

16. Which of the following is a skill listed by the applicant?

a. Quick Learner

b. Responsible

c. Calm in stressful situations

d. Adaptive to new surroundings

17. Which of the following is a skill listed by the applicant?

a. Dedicated team player

b. Reliable

c. Productive

d. People-orientated

18. What is the GPA of the applicant?

a. 3.24

b. 3.22

c. 3.27

d. 3.29

19. Which of the following is a course completed by the applicant?

a. Public Speaking

b. Practical Math

c. Theater

d. Natural Resource Systems

20. Which of the following is a course completed by the applicant?

a. Consumer Math

b. Psychology

c. French Language

d. World History

21. Which of the following is a course completed by the applicant?

a. Consumer Science

b. Speech

c. Physics

d. Debate

22. Which of the following is a course completed by the applicant?

a. Sociology

b. Economics

c. Art History

d. Dance

23. Which of the following is a course completed by the applicant?

a. Life Skills

b. Service Learning

c. Welding

d. Earth Science

24. Which of the following is an activity listed by the applicant?

a. High School Drama Club

b. High School Yearbook Committee

c. High School Color Guard

d. High School Student Council

25. Which of the following is an activity listed by the applicant?

a. D.A.R.E. Campaign

b. Boy Scouts of America

c. Building Tomorrow

d. United Way

26. Which of the following is an activity listed by the applicant?

a. Landscape Painting

b. Short Story Writing

c. Digital Photography

d. Book Reading

[The following questions are asked of each of the specific applicants]

James Williams

27. The applicant was a dining attendant at The Balcony Café. All of the following were job tasks listed ***except***:

    a. Wipe tables and seats with dampened cloth

    b. Stack dirty dishes and carry to kitchen for cleaning

    c. Stock silverware, glassware, dishes, and trays

    d. Serve ice water, coffee, rolls, and butter to patrons

28. The applicant was a groundskeeper at Green Lawn Services. All of the following were job tasks listed *except*:

    a. Mow lawns using mower

    b. Rake yard clippings

    c. Gather and remove yard clippings

    d. Prune and trim trees, shrubs, and hedges

29. The applicant was a volunteer at Renew and Reuse Thrift Store. All of the following were job tasks listed *except*:

    a. Sort items to be stocked at the delivery dock

    b. Move donated items to store shelves

    c. Mark donated items with identification stickers

    d. Answer customer's questions about merchandise

30. The applicant was a volunteer at City Library. All of the following were job tasks listed ***except***:

    a. Retrieve books from return shelves to librarian for re-shelving
    b. Organized returned books into location categories
    c. Apply identification tags to new books and materials
    d. Repair books using mending tape

David Johnson

27. The applicant was a stock hand at Asseco Warehouse. All of the following were job tasks listed ***except***:

    a. Unpack items to be stocked on shelves in warehouse
    b. Store items in an orderly and accessible manner
    c. Mark stock items using identification tags
    d. Move stock items to and from storage and production areas

28. The applicant was a vehicle detailer at MidState Auto. All of the following were job tasks listed *except*:

    a. Clean and polish vehicle windows
    b. Wash and shine vehicle tires
    c. Vacuum vehicle interiors
    d. Inspect vehicles for cleanliness

29. The applicant was a volunteer at Parkview Senior Living Community. All of the following were job tasks listed *except*:

    a. Sort, count, and mark clean linens and store them in linen closet

b. Carried lines, towels, and toilet items using wheeled carts

c. Empty wastebaskets and transport trash to disposal area

d. Help residents move in and out of beds and wheelchairs

30. The applicant was a volunteer teacher's aid. All of the following were job tasks listed ***except***:

a. Prepare bulletin board displays

b. Type, file, and duplicate materials

c. Stock teaching materials and supplies

d. Type, file, and duplicate materials

Appendix G: Image Equivalency Assessment

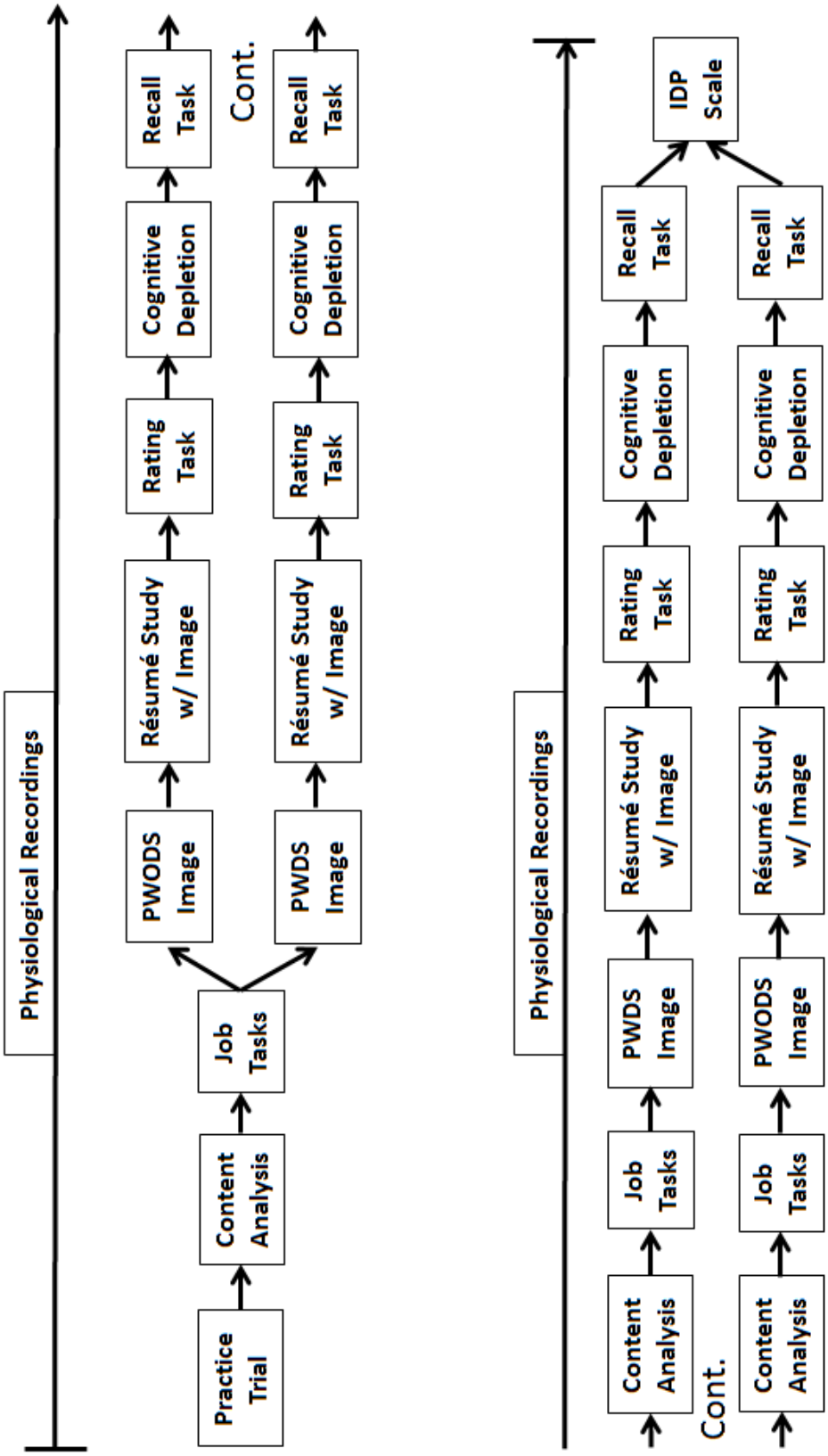
Instructions: Please rate the overall quality of the image on the following dimensions.

- Lighting (how light or dark the image appears)
- Sharpness (how blurred or grainy the image appears)
- Color (how saturated the color in the image appears)
- Contrast (how well objects in the image are distinguishable from each other)

Instructions: Please rate the person in the image on the following dimensions.

- The roundness of the person's face
- The tilt angle of the person's head
- The tilt angle of the person's body
- The person's hair color
- The degree to which the person is smiling
- The degree to which the person's mouth is open
- How much do you think this person weighs?
- How tall do you thing this person is?
- Please rate this person's mood in pleasantness and arousal.
    - Pleasantness
    - Arousal
- Does this person have a disability?
    - If yes, identify the disability.

Appendix H: Study Procedure Diagram



Appendix I: Résumé Content Analysis Task

Instructions: The following questions are designed to elicit information about how you evaluate résumé content. Each question will present you with information commonly found on a résumé. You will be asked to judge how that content represents specific attributes including individual abilities, work style characteristics, and skills. Each page asks you to do the same thing, but for different résumé content. The résumé content of interest will appear in bold face type in each question.

When listed on a résumé, to what degree does having earned [**an associate's degree, bachelor's degree, master's degree, degree in a job-related field of study]** mean that the applicant has the following abilities? (1 = Not at all, 2 = Somewhat, 3 = Moderate, 4 = Considerable)

- Verbal Ability—the ability to comprehend spoken and written words, and communicate information so that others will understand
- Idea Generation and Reasoning Ability—the ability to generate ideas, identify and solve problems, and use reason and logic to organize information
- Quantitative Ability—the ability to do mathematical operations, and understand and solve math related problems
- Memory—the ability to remember information such as words, numbers, pictures and procedures

- Perceptual Ability—the ability to quickly make sense of and organize information, and identify and compare patterns, objects, or numbers.
- Spatial Ability—the ability to know one's location in relation to the environment, and imagine how something will look after it is rearranged or moved
- Attentiveness—the ability to concentrate and not be distracted while performing a task, and to efficiently shift back and forth between activities
- Practical intelligence—the ability to generate useful ideas, think things through logically, innovate, and think analytically
- Achievement Orientation—setting and seeking to attain personal goals, and striving to be competent in one's work
- Social Influence—having the capacity to impact others, and display energy and leadership
- Interpersonal Orientation—being pleasant, cooperative, and sensitive to others
- Adjustment—being mature, poised, and flexible, and having the capacity to cope with pressure, stress, and criticism
- Conscientiousness—being dependable, trustworthy, accountable, and attentive to details
- Technical Skills—skill in areas such as design, operations, analysis, programming, operating and maintaining equipment, and troubleshooting
- Job Knowledge—awareness of a specific work content or occupation
- Resource Management Skills—skill in managing time, financial resources, material resources, and personnel resources
- Social Skills—skill in coordinating, persuading, negotiating, and instructing others, having social perceptiveness and a service orientation

- System Skills—skill in areas of system analysis including envisioning and positioning, initiating change, and considering long-term outcomes

Appendix J: Interaction with Disabled Persons Scale

Instructions: Here is a list of statements that some people have said describe how they feel when they have contact with a person with a disability. How we respond to people depends on how well we know them as individuals. However, we would like to know how you feel in general toward persons with a disability. Please read each statement carefully and indicate how much it describes how you feel.

1. It is rewarding when I am able to help.
2. It hurts me when they want to do something and can't.
3. I feel frustrated because I don't know how to help.
4. Contact with a disabled person reminds me on my own vulnerability.
5. I wonder how I would feel if I had this disability.
6. I feel ignorant about disabled people.
7. I am grateful that I do not have such a burden.
8. I try to act normally and to ignore the disability.
9. I feel uncomfortable and find it hard to relax.
10. I am aware of the problems that disabled people face.
11. I can't help staring at them.
12. I feel unsure because I don't know how to behave.
13. I admire their ability to cope.
14. I don't pity them.
15. After frequent contact, I find I just notice the person not the disability.
16. I feel overwhelmed with discomfort about my lack of a disability.
17. I am afraid to look at the person straight in the face.

18. I tend to make contacts only brief and finish them as quickly as possible.

19. I feel better with disabled people after I have discussed their disability with them.

Interaction with Disabled Persons Scale (Cont.)

20. I dread the thought that I could eventually end up like them.