3-2016

Disability visibility and stigma threat: Effects on the performance, stress, and self-control of disabled workers

William Brice
Purdue University

Graduate School Form 30
Updated 1/15/2015

PURDUE UNIVERSITY
GRADUATE SCHOOL
Thesis/Dissertation Acceptance

This is to certify that the thesis/dissertation prepared

By William N. Brice

Entitled

Disability Visibility and Stigma Threat: Effects on the Performance, Stress, and Self-Control of Disabled Workers

For the degree of Master of Science

Is approved by the final examining committee:

Deborah E. Rupp
Chair

James M. Tyler

Alecia M. Santuzzi

To the best of my knowledge and as understood by the student in the Thesis/Dissertation Agreement, Publication Delay, and Certification Disclaimer (Graduate School Form 32), this thesis/dissertation adheres to the provisions of Purdue University's "Policy of Integrity in Research" and the use of copyright material.

Approved by Major Professor(s): Deborah E. Rupp

Approved by: Christopher R. Agnew 3/28/2016

Head of the Departmental Graduate Program Date

DISABILITY VISIBILITY AND STIGMA THREAT: EFFECTS ON THE PERFORMANCE, STRESS, AND SELF-CONTROL OF DISABLED WORKERS

A Thesis

Submitted to the Faculty

of

Purdue University

by

William Brice

In Partial Fulfillment of the

Requirements for the Degree

of

Master of Science

May 2016

Purdue University

West Lafayette, Indiana

TABLE OF CONTENTS

Page

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

Brice, William. M.S., Purdue University, May 2016. Disability Visibility and Stigma Threat: Effects on the Performance, Stress, and Self-Control of Disabled Workers. Major Professor: Deborah E. Rupp.

Having a stigmatized disability is a depleting experience. For those with a disability, there are many factors that contribute to potential performance decrements in any given situation. Visibility of the disability, and the stigma connected to the disability are two such factors—which I argue based on research on motivation, regulation, and stress, contributes to the regulatory depletion experienced by disabled individuals. I conducted an experimental study where participants took part in a workplace simulation. Participants were given an artificially simulated disability and both the visibility of the disability and the stigmatizing nature of the disability were manipulated. I found a significant effect of disability visibility, on performance and an interaction effect of stigma threat and disability visibility on self-control. The implications of these results for theory, practice, and future research are discussed.

INTRODUCTION

Disabled individuals face many social challenges in their efforts to gain and retain employment. Despite the passage of legislation designed to limit the adverse impact of organizational procedures, research has shown that mentioning a disability (even one completely irrelevant for work performance) has negative impacts for job applicants (Ravaud, Madiot, & Ville, 1992). There is strong evidence for the existence of organizational and social barriers for workers and job applications with disabilities beyond the actual limitations of the disability itself (Bruyère, 2000; Dixon, Kruse, & Van Horn, 2003; Schur, Kruse, & Blanck, 2005; Schur, Kruse, Blasi, & Blanck, 2009). Even in organizations actively committed to hiring employees with disabilities, there are negative outcomes for disabled employees. This implies that there is something beyond organizational policy impacting the employment outcomes of disabled workers. Organizational culture could be the culprit, creating attitudinal, behavioral, and physical barriers for workers and job applicants with disabilities (Schur et al., 2005).A survey of employers revealed that 20% felt that discrimination, prejudice, or employer reluctance to hire was the greatest barrier to disabled individuals finding employment (Dixon et al., 2003). Negative attitudes from supervisors and coworkers can affect the acceptance and integration of disabled employees, limiting their ability to become functioning members of an organization (Bruyère, 2000). It is important to

recognize that stereotypes influence how individuals with disabilities are perceived, potentially resulting in performance problems and group conflict within an organization (Jackson & Joshi, 2001).

Disabled individuals are likely to be associated with negative stereotypes such as being helpless, hypersensitive, inferior, depressed, distant, shy, unappealing, unsociable, bitter, nervous, insecure, dependent, unhappy, aloof, and submissive (Fichten & Amsel, 1986). Stereotypes and negative affect towards disabled individuals, lowered performance expectations, and expected co-worker strain has been provided as justifications for denying employment to disabled applicants for jobs requiring substantial responsibility (Stone & Colella, 1996). A consistent determinant of acceptance among coworkers is the perceived "performance impact," of the disability, or how it will impact performance (McLaughlin, Bell, & Stringer, 2004). Employees have shown a reluctance to work with disabled co-workers when they have a negative affect towards the disability and rewards are interdependent, or their performance could be negatively affected by working with a disabled co-worker (Colella, DeNisi, & Varma, 1998). I propose that all of these factors can affect the subjective experience of a disabled individual. Strong environmental and social factors create a threatening environment for those with a disabled status. In this paper, I argue that the level of stigma associated with a disability and the visibility of a disability have impacts on the performance of disabled workers. I further propose that there is an interaction between the level of stigma associated with a disability and the visibility of the disability.

I initially discuss the societal-level phenomenon by looking at the general effect of having a stigmatized identity and stigma threat. Next, I explore the costs of stereotype threat on a variety of behaviors. To round out the section on stigma, I talk about how the visibility of a stigma can result in different outcomes above and beyond other factors. I then follow with a series of proposed mechanisms that explains the expected outcomes incorporating motivation, self-regulation, and stress.

Stigma and Stereotypes

Stigma

In his early works, Goffman (1963) described stigma as "a situation where an individual is perceived as different from the norm or ideal in a negative way, resulting in being discounted or seen as a "tainted" individual. Today, a stigma is typically used to describe a personal attribute that, when known, tends to result in a variety of social outcomes (Bos, Pryor, Reeder, & Stutterheim, 2013). Stigmatized individuals can be seen as inferior, less valuable, or possibly a threat. On the other side of the coin they might be treated with compassion, assistance, or even acceptance. How individuals react to a stigma tends to be based on the following six characteristics: how the stigmatizing aspect was acquired; the consistency of its effects; visibility; disruptiveness; level of danger to others; and aesthetic unattractiveness of the characteristic (Jones et al., 1984). However, most of this information is not directly visible or known. Observers need to "fill in" any missing information about a stigma and they will do this based on currently existing schemas they hold about the stigma or what are typically referred to as stereotypes.

Stereotypes

Stereotypes are essentially "overgeneralized" beliefs about members of a particular group (Jones et al., 1984). When observers become aware of an individual's group membership they will proceed to activate any stereotypes (both positive and negative) associated with the group and relevant to the current situation. These activations can create an expectation that the stereotyped individual will behave in ways consistent with the activated stereotype. When an individual is placed in a situation where, as a result of their own actions, risks confirming a negative stereotype about their stereotyped group, they are considered to be under stereotype threat (Steele, Spencer, & Aronson, 2002). Regardless of stigmatized status, individuals experiencing stereotype threat tend to have reduced performance in the stereotyped domain (Aronson, Lustina, & Keough, 1999; Frantz, 2004). Further, even if there is not an established stereotype about group membership, simply being informed that there is a stereotype about one's group can result in reduced performance (Leyens, Desert, Croizet, & Darcis, 2000). There is strong evidence that stereotype threat has origins in unconscious neurological processes, contributing to reduced cognitive performance (Krendl et al., 2008). Brain scans have shown that participants under stereotype threat were unable to adjust their attention allocation based on the demands of the current task. Simple tasks were given a disproportionate level of attention, sometimes eclipsing that allocated to complex tasks (Derks, Inzlicht, & Kang, 2008). However a requirement of stereotype threat is that stigmatized individuals must believe that observers are aware of their stigmatized identity. In effect, an individual will only

activate the stereotypes and stigmas associated with the stigmatized identity if the stigmatized identity is known or made salient.

Stigma Visibility

Beatty and Kirby (2006) argued that stigmatizing factors are only applicable after considering the *visibility* of the stigmatized identity. For many, it is possible to conceal their stigmatized identity, or "pass" as a member of a non-stigmatized group, avoiding the associated stereotypes and stigmas. However, this is not as simple as it sounds. Concealing stigmatized information may lead to unique additional costs not shared by individuals with a visible stigma (Smart & Wegner, 2000). Passing is an active cognitive process, requiring a constantly changing level of attention dependent on the expected negative outcomes of being discovered. The level of distress caused by concealment varies based on the following four factors: the anticipated stigma should they be discovered, the centrality of the stigmatized identity to themselves, the salience of the stigmatized identity, and the cultural stigmatization of the identity (Quinn & Chaudoir, 2009). Keeping track of all of these variables can be very taxing. Goffman (1974) discussed the distracting role such concealment presents:

> The issue is not of managing tension generated during social contacts, but rather that of managing information about his failing. To display or not to display; to tell or not to tell; to let on or not let on; to lie or not to lie, and in each case, to whom, how, when, and where (p. 42).

Individuals with a hidden stigmatized condition must constantly take in information about their surroundings, access a record of past information, and predict responses to their stigmatized identity with the goal of minimizing negative outcomes.

By engaging in concealing behaviors related to a stigmatized identity, individuals with an invisible or concealed stigma may experience additional cognitive difficulties such as preoccupation, vigilance, and suspiciousness, which are not necessarily experienced by individuals with similar, but non-concealable characteristics. The desire to conceal the stigmatized identity can result in obsessive thinking about the subject, potentially consuming the individual's daily life (Lane & Wegner, 1995; Wenzlaff & Wegner, 2000). These preoccupations can contribute to negative affective states, behavioral difficulties, and negative self-evaluation. Concealment of a stigmatized identity has been linked to higher levels of anxiety, depression, low self-esteem, social isolation, distress, physical illness, symptom severity, risky health behaviors, and mental health outcomes (Beatty & Kirby, 2006; Chaudoir & Quinn, 2010; Frable, Platt, & Hoey, 1998; Mak, Poon, Pun, & Cheung, 2007; Quinn & Earnshaw, 2011) Individuals have been shown to actively engage in short-term self-destructive behaviors (e.g., increasing their efforts to hide their stigmatized status) when it is perceived as required to be accepted by the majority group (Rawn & Vohs, 2011). Even if individuals are aware that concealing their stigmatized condition is causing them harm, they often prefer to be perceived as a member of a non-stigmatized group. Ironically, individuals who actively engaged in hiding their condition have reported reduced feelings of belongingness and were less

liked by observers, resulting in reduced feelings of acceptance and inclusion (Newheiser & Barreto, 2014).

Above and beyond the challenges faced by those concealing an invisible stigmatized identity, individuals with concealable disabilities must deal with the additional burden of (if they choose to disclose) proving that their claims are legitimate (to employers, co-workers, and to themselves). Research has shown that the legitimacy of invisible disability claims is often questioned by supervisors and co-workers (Colella, 2001; Paetzold et al., 2008). Those with invisible disabilities must not only face the stereotypes and stigma of being disabled, but due to the potential for accommodation or "special treatment," may feel a need to evidence the legitimacy of their claims. Thus there is cost whether or not they disclose their disability. To understand how this unique set of burdens impacts performance, the literature on self-regulation and regulatory depletion is relevant.

Underlying Mechanisms

Self-Regulation

For the purposes of this paper, self-regulation is defined as "engaging in self-correcting processes to stay on track for the purposes being served" (Carver & Scheier, 2011). One of the underlying assumptions of self-regulation is that at any given time an individual has a fixed number of regulatory resources (Muraven & Baumeister, 2000). All other variables held constant, as an individual becomes more depleted, they are less likely to engage in further acts of self-regulation. In addition, when an individual is expecting future regulatory demands they have been shown to ration available

resources in anticipation of meeting those future demands (Baumeister & Vohs, 2007; Muraven, Shmueli, & Burkley, 2006; Tyler & Burns, 2009).

However, there are several factors that can moderate this relationship. In particular, when the underlying desire or motivation to engage in self-control is strong enough, individuals may be able to maintain their current level of self-regulation (Muraven & Slessareva, 2003). Mood, cognitions, and other changes can result in an increased ability to self-regulate, possibly cancelling out any current depletion effects (Martijn, Tenbült, Merckelbach, Dreezens, & de Vries, 2002; Tice, Baumeister, Shmueli, & Muraven, 2007; Webb & Sheeran, 2003). In addition, individuals can show symptoms of regulatory depletion in response to situations where no depletion took place (Baumeister, DeWall, Ciarocco, & Twenge, 2005). Therein lies the issue with the conservation of resources approach to self-regulation. Conservation implies that resources are being actively spent, but are being spent at a slower rate than normal. An analog would be a car continuing to move, but slower, in order to use less fuel. If the "fuel" for self-regulation is resource dependent, then being empty should prevent all further behaviors. If a car is out of gas it will not move for any reason. How could motivation increase the availability of the necessary resource?

Motivation

To try and understand how motivation plays into self-regulation one might consider motivation intensity theory (Brehm & Self, 1989). This theory loosely states that before engaging in a behavior, individuals will compare the costs of engaging in a behavior to the expected benefits of engaging in that behavior. If the ratio is favorable, they will begin a process known as *resource mobilization*. Resource mobilization

occurs when an individual mobilizes resources to engage in some task or behavior. Going back to the car analogy, the car is at rest unless pressure is applied to the gas pedal. The amount of pressure determines how much gas is being used at any given time.

At any given time, an individual has a maximal amount of resources that they are willing to allocate to any given task, which is known as his or her *potential motivation* (Tops, Schlinkert, Tjew-A-Sin, Samur, & Koole, 2015). If the behavior requires more resources than have been allocated, individuals won't perform the behavior, if it requires less, they will perform the behavior. The minimal level of resources required of individuals to engage in a behavior is known as their *potential motivation threshold (PMT).* To try and understand what contributes to an individual's PMT at any given point I look to the PRISM model.

PRISM

Protective Inhibition of Self-Regulation and Motivation (PRISM) marries self-regulation, motivation, and protective inhibition into one model (Tops et al., 2015). PRISM proposes that when an individual engages in a specific regulatory behavior they are keeping a tally of past, present, and future resource mobilization demands. This is actively being compared to past, present, and future rewards. As such, an individual's PMT is in constant flux, reacting to resource mobilization and rewards in a constant loop.

Further, PRISM proposes that as an individual engages in a regulatory behavior over time, more active attention will be drawn to the resource demands of engaging in that behavior, making the costs more salient. This increased awareness of resource

expenditure can lower the potential motivation threshold, reducing the likelihood of engaging in a behavior. According to the PRISM model, resources are still limited. However, PRISM considers the short-term observed effects of being depleted as a shift in motivation away from a specific type of arousal, towards a task that is less arousing (or that provides a different type of arousal).

Referring back to the previous research on stigma threat and stereotype threat, it is evident that individuals must engage in different strategies when confronting sigma threat and stereotype threat based on the visibility of the condition. When the individual has the option to be/remain part of a non-stigmatized group, the desire to be accepted is argued to present such a strong motivational factor that the individual will willingly expend additional regulatory resources to avoid the social rejection associated with their stigmatized condition. Those with visible stigmatized identities are expected to expend extra effort to distance themselves from negative stereotypes associated with the stigmatized identity. For those with invisible stigmatized identities, extra effort is required to weight the pros and cons of passing, and if concealment is chosen, attempting to maintain their status as a non-stigmatized member of society. As such, I propose that individuals will experience increased regulatory depletion in response to increased stigmatization of their disability, especially when the disability is invisible, and that this depletion will manifest in a number of ways.

Stress

One manifestation is stress. For the purposes of this paper, *stress* is operationalized as the physiological response that occurs in response to situational demands that exceed the individual's available resources for coping (Pruessner &

Baldwin, 2015). Stress has a complicated relationship with performance. Where stress is directly related to the current task, there is an inverse u-shaped relationship between stress and performance where increasing stress actually improves performance until a certain point. However, when the acute stressor is unrelated to the given task, stress decreases performance (Plessow, Fischer, Kirschbaum, & Goschke, 2011). How individuals perceive the situation will have a significant impact on how their performance is impacted by an acute stressor. Research has suggested that stressful situations prime the brain for increased processing of cues, particularly unpleasant cues, in the environment (Weymar, Schwabe, Löw, & Hamm, 2012). As a result, stress may create the conditions for increased attention toward threat that may exacerbate both anxiety and later responses to stress-inducing situations (MacLeod, Rutherford, Campbell, Ebsworthy, & Holker, 2002). Indeed, it has been observed that stressed individuals selectively allocate cognitive resources toward threat stimuli and will devote more resources towards highly threatening stimuli compared to low threat stimuli (MacLeod, Dodd, Sheard, Wilson, & Bibi, 2003; Mogg, Mathews, Bird, & Macgregor-Morris, 1990; Mogg, Millar, & Bradley, 2000).

Stress also has significant impacts on decision-making. When stressed, people will adopt an intuition approach to the appraisal of future consequences rather that approaching it rationally (Starcke & Brand, 2012). Stressed individuals make decisions faster, and emphasize short-term benefits (Gray, 1999). Acute stress can increase the reward sensitivity strength of a reward and the resulting decision-making processes (Cavanagh, Frank, & Allen, 2011). These increases can result in a preference for options that potentially offer both high rewards and high punishments (Starcke, Wolf,

Markowitsch, & Brand, 2008). In particular, acute stress has been found to decrease sensitivity to punishment-sensitive behavior and increase sensitivity to reward in situations that contain high potential rewards (Putman, Antypa, Crysovergi, & van der Does, 2010). This change in reward sensitivity can result in participants neglecting long-term consequences, resulting in a number negative social or health outcomes. In essence stress can alter the PMT of any given set of behaviors based on the above criteria.

Study Overview and Hypotheses

One of the core tenants of self-regulation theory is that the resources of choice, active response, and self-regulation draw on a deplete-able inner resource (Baumeister, Bratslavsky, Muraven, & Tice, 1998). Research has shown that many individuals with invisible, highly stigmatized disabilities choose to "manage" their disabilities themselves even at the expense of performance (Jans, Kaye, & Jones, 2012). As such by engaging in resource mobilization to conceal, and maintain the concealment of ones' disabled status, participants are expected to drain regulatory resources that will result in a higher PMT for subsequent tasks (e.g., job demands). To this end, I argue that (all else equal) individuals with invisible disabilities will show incrementally higher stress and lower performance compared to those with visible disabilities due to the increased regulatory demands described above.

Specifically, in the current study, I sought to isolate the regulatory impacts of disability visibility and stigma threat. That is, I sought to show that *ceteris paribus,* invisible disabilities cause more regulatory depletion than visible disabilities due to the additional burden placed on potential concealment---and even more drain when stigma

threat is enhanced within the work environment. I sought to evidence regulatory depletion by exploring both increases in physiological stress responses, and decreased performance on both simulated work related tasks, as well as utilize a more direct measure of regulatory depletion (i.e., self-control). My hypotheses are as follows:

Hypothesis 1: A main effect of disability visibility on a) performance, b) self-control, and c) stress, such that individuals in an invisible disability condition will show lower performance, lower self-control, and greater stress compared to individuals within a visible disability condition.

Hypothesis 2: A main effect of stigma threat on a) performance, b) self-control, and c) stress, such that individuals in an invisible disability condition will show lower performance, lower self-control, and greater stress compared to individuals within a visible disability condition.

Hypothesis 3: A two-way interaction effect of disability visibility and stigma threat on a) performance, b) self-control, and c) stress, such that the main effect of disability visibility on performance, self-control, and stress will be significantly stronger when stigma threat is high.

METHOD

Participants

Participants (N = 127) were students enrolled in the introductory psychology course at a large Midwestern university. For their participation, participants received research credit towards their course completion requirements.

Design

This study employed a 2 (disability invisible vs. visible) x 2 (stigma threat high vs. low) factorial design. As will be explained below, participants participated in a workplace simulation where they engaged in work tasks for a simulated organization. Within this simulation, aspects relevant to the independent variables were manipulated.

Independent Variables/Manipulations

Disability Visibility

For the purpose of this study, all participants in the experimental conditions were given a disabled status. The disability used in this experimental context needed to fulfill four criteria. First, it needed to be a disability that could manifest itself in both visible and invisible forms, but where both forms would create parallel levels of impairment. Second, the disability needed to be one that could have resulted from either stigmatizing or non-stigmatizing behaviors. Third, the disability needed to be one that could be held by a working professional who could carry out basic job tasks

with or without accommodation. Fourth, the disability needed to one that could be simulated in the lab among student participants, on a temporary basis. Finally, the disability needed to cause impairment without necessarily causing pain or discomfort (such that research participants were not temporarily or permanently harmed).

In considering possible disabilities to create and manipulate in the lab, mental disorders were disqualified because most lack an obvious visible analog. Conversely, a majority of physical disabilities were disqualified for lacking an invisible parallel (in terms of impairment level, visibility, and stigma). After consulting with a number of health professionals and disability specialists, a condition known as Reactive Arthritis was identified that met all of the criteria.

Reactive arthritis is an inflammatory joint condition that causes specific joints to swell in reaction to specific bacteria that have transferred from the point of infection to the joints. Reactive arthritis is typically caused by the bacteria associated with the Sexually Transmitted Disease (STD) Chlamydia, or food poisoning such as salmonella (for a comprehensive introduction to this condition, see Appendix C). The current experiment focused on the limited joint mobility in the hands that is a symptom of this condition—which was expected to significantly impact an employee's ability to type efficiently (and qualifies as a disability under the Americans with Disabilities Act, 1990). In both conditions, participants were informed that for the experiment, they would be working through a workplace simulation where they would be carrying out the work tasks of an employee who has this particular disability. They were provided with information about the disability, as described below in the Procedures section.

Visible disability condition. To simulate the limited mobility in the visible condition, Arthritis Simulation Gloves were used (see Appendix D). The Arthritis Simulation Glove was developed by Cambridge University to test if products are useable by individuals dealing with the restricted hand functions common to a majority of arthritis conditions. The gloves come in two sizes and are fully adjustable, allowing identical placement across all participants while maintaining a consistent impairment. These gloves not only restrict movement in the ways necessary to simulate the disability, but also resembled a brace-like medical apparatus (which individuals with this condition might wear), making the visibility of the simulated condition salient.

Invisible disability condition. For the invisible disability condition, participants were provided the same information as the participants in the visible disability condition (i.e., informed about their role and their disability), however, the performance decrement caused by their disability would not be visible to others (as the hand braces were in the visible condition). In order to create the same performance decrement as the arthritis gloves, but in a non-visible way, participants' ability to type was inhibited through software to a point that was equal to the decrement caused by the gloves. To do this, participants would experience a delay between the typing of text and its display on the screen. Participants could continue to input information, however, regardless of their natural typing speed, only one input would be displayed after a predetermined amount of time. This forced participants to either slow down their typing speed to match the rate of display, or wait for all their past key strokes to appear before making any changes.

In order to equate the performance decrement between the visible and invisible conditions, pilot tests were conducted where participants engaged in two typing tasks. Both typing tasks involved typing a block of text into a text window through an electronic interface. To measure typing speed, the number of keystrokes the individual completed in the allotted time was measured. All participants completed the task twice, once unhindered and once while wearing the arthritis simulation gloves. Analyses of the typing speed data indicated that a typing limitation of .3 seconds between keystrokes would accurately simulate the typing impairment found once individuals had adjusted to the gloves.

Stigma Threat (High vs. Low)

As described in the Procedure section below, participants were informed of their disability and were given a modified pamphlet about reactive arthritis from the American College of Rheumatology. To manipulate stigma threat, the information provided about the disability varied by condition. Specifically, information varied according to components argued to contribute to stigma threat (Jones et al., 1984): How the stigmatizing characteristic was acquired; the consistency of its effects; disruptiveness; and level of threat to others. The pamphlet informed participants in both conditions that while the condition never goes away, individuals can use over-the-counter medication to remove the pain associated with this condition, and that at present, there is nothing that can be done about the limited joint mobility associated with the symptoms of this condition.

Low stigma threat. The pamphlet provided to participants in the low stigma threat condition explained that reactive arthritis is the result of common bacteria

spreading from the intestines to the joints in the hands and fingers; that the bacteria responsible for reactive arthritis are already present in a majority of the population; that a specific genetic factor is the primary difference in those who suffer and those who do not; that the condition is not contagious; and that while the condition never goes away, the symptoms are acute and predictable (see Appendix E).

High stigma threat. The pamphlet provided to participants in the high stigma threat condition explained that reactive arthritis is the result of the bacteria involved in Chlamydia (i.e., sexually transmitted) infection that has spread to the joints in the individual's hands and fingers; that the bacteria responsible for reactive arthritis is only transmitted via unprotected sexual intercourse; that the condition is highly contagious; that one's behaviors are the primary differentiator in determining if one will contract the condition or not; that only a small proportion of the population contracts the condition; and that the condition is chronic rather than acute (see Appendix F).

Control Condition

A control condition was included in order to better understand the function of the work simulation and the level of impairment caused by the disability conditions compared to a no-disability baseline. Participants assigned to the control condition were not provided information about a disability. In place of the information about reactive arthritis (including the pamphlet), control group participants received information about applicant rights and protections provided by the Equal Employment Opportunity Commission. The information provided was modified to be as mundane as

possible so as not to create any confounds to the hypotheses tests, and be the same length and format as the reactive arthritis information (see Appendix G).

Dependent Variables/Measures

Task Performance

To measure performance, participants were engaged in three performance tasks (see Appendix H). The tasks were presented in the same order for all participants. Each participant received a set of instructions, were given a block of tasks, and allotted an amount of time to complete each task. Each task was designed to take significantly longer than the allotted time to complete. Once participants started any individual task, they could work on that task until directed to begin the next task.

For the first task ("transcription"), participants were given 30 seconds to review the instructions and pull out the folder marked "Task 1". They were given a number of printed company documents. They were then presented with a page number and section heading. They had five minutes to identify and find the correct sections of text, and then transcribe as much text as possible in the five minutes allocated. The second work task ("demographics") consisted of data entry, where participants were responsible for taking printed employee information and entering it into an employee database. Information included demographic information, address, supervisor, position and any special file notes for various employees. Once the first entry was completed, participants would click "submit" and the screen would clear, allowing them to enter the next entry. They were given approximately five minutes for this task, with the task ending upon submission of the first entry post five minutes. The third work task ("meeting minutes") required participants to take meeting notes from two different

sources and merge the information into a unified set of minutes within the company database. The first log was organized by bill number. It contained information about bill number, bill author, and votes. The second log was organized by the time that the bill was voted on. This would have bill number, bill author, and the time the bill was voted on. Participants were required to input the bill number, bill author, votes, and time. This required that participants checked between the documents to input all of the relevant information. Once the first entry was completed, participants would click "submit" and the screen would clear, allowing them to enter the next set of minutes. Participants were given the option complete four full entries, or if they could not, then the task would end following the first submission after five minutes had passed.

To obtain a participant's final score I created an equally weighted composite score from the three performance tasks. Scores were a combination of accuracy on a specific task, as well as their efficiency on completing specific activities. Accuracy was calculated by taking the total number of keystrokes required for a correct entry and subtracting the total number of keystrokes required to correct a participant's submission (to a minimum of 0). For efficiency each entry within a task was scored separately. To score Task 1(Transcription) I took the total number of characters correctly divided by the total number of characters possible. To score Task 2 (Demographics), and Task 3 (Meeting Minutes), I calculated a participant's average time per submitted entry by taking the amount of time spent on the task and dividing by the number of submitted entries. I then divided the average time spent on a task by the accuracy score to obtain a participant's final score on Tasks 2 and 3. After

obtaining participants final scores on Tasks 1-3, I standardized the scores on each task separately before averaging them to get a participant's final score.

Stress

Galvanic stress response (GSR) was used as a measure of stress. All participants were fitted with a GSR sensor (see Appendix I). As a participant's stress increased, the sweat glands in the hand open up and release sweat (although typically not to the level of creating obvious moisture). By sending slight electrical pulses through a participant's fingers, a GSR sensor allows for the detection of subtle changes in participant skin conductivity, which represents a physiological stress response. The GSR sensor used collects 52 readings per second, and send the data via Bluetooth to website that populates an excel file. To calculate a participant's stress levels, stress data were sent through a median filter and a Savitzky-Goley filter. Any additional locations of error not corrected by the two filters were then addressed. Participants' data points were then converted into within subject standardized scores. An example output can be seen in Appendix J.

Regulatory Depletion/Self-Control

Regulatory depletion (self-control) was measured via a classic cognitive control measure: The Stroop task. Cognitive control is essentially the ability to recognize relevant information and exclude irrelevant information (Norman & Shallice, 1986). To measure differences in cognitive control, I employed a variant of the Stroop task designed for use with online survey platforms (Barnhoorn, Haasnoot, Bocanegra, & van Steenbergen, 2014). Participants were presented with one of four words (red, blue, yellow, or green), shown in one of four colors (red, blue, yellow, or green). Participants

were told to type the first letter of the color of the word, not the word itself (r, g, b, or y). So, if the word “red” was colored green participants should hit “g”. There were a total of 96 trials, of which 48 had the word matched the color. The page had a white background and the words were presented in a 50-point font size. Before each presentation of a word, the participants saw a small centered fixation cross where the words would appear for 500 MS before seeing a blank screen. The words would then be presented until the participant hit one of the appropriate letters. Once the participant responded, they would receive accuracy feedback in the form of a “CORRECT” or “INCORRECT” displayed for 500 MS in a black 30-point font. This task was expected to take five minutes (depending on individual reaction times) per session. An example of the sequence can be seen in Appendix K. Participants were presented with this task before and after the three work tasks presented above. The difference between the congruent correct reaction times and the incongruent correct reaction times served as a measure of cognitive interference for that condition, which was used as proxy for regulatory depletion.

Additional Measures

Manipulation Checks/Exploratory Measures

At the end of the experiment, participants were required to complete a disability impact assessment which included both my manipulation checks, as well as a series of exploratory questions. To ensure that our manipulations were successful participants, were given manipulation check questions pertaining to each independent variable. To check the effect of the disability visibility manipulation, participants were asked if they believed observers would be aware of their disability without disclosure. As a check

on the stigma threat manipulation, I took items from an established stigma measure (Struening et al., 2001), which were modified to fit the current study's context.

In addition to my manipulation checks I included some exploratory measures that asked how participants felt their disability impacted their ability to work, if they were interested in discussing their disability with the hiring coordinator, and if they would like to disclose their disability to the client organization (See Appendix L).

PROCEDURE

The entire experiment was set in a simulated organizational setting. Upon arrival to the lab, each participant was escorted to a small office where he/she was asked to be seated. Once seated, and upon consenting to the experiment, participants were asked to read through the introductory documents explaining the experiment's cover story. They read that Future First Consulting (FFC) is piloting a new internship screening and selection program in collaboration with the Industrial and Organizational (I/O) Psychology program at the university. It was explained that the I/O Psychology program was allowing FFC to test out aspects of the program using the psychology subject pool. It was explained that although the assessment was still under development, it was expected to become a core offering soon—and would be sold to a number of organizational clients. It was explained that for this study, FFC is using an assessment developed for Crescent Education Systems (CES). Following this, participants were presented with an example of what an assessment performance report might look like (see Appendix M). Those not in the control condition were informed that as part of the testing process, it was necessary to see if and how the assessment impacted the disabled population. For participants in the visible disability condition, the glove-based arthritis simulation was then presented. For participants in the invisible disability condition, the computer-based arthritis simulation was presented. Participants

were told to notify the experimenter when they had read through all of the introductory documents and if they wished to continue.

At that point, participants were fitted with a GSR sensor. The GSR receiver was strapped around their left wrist and two sensors were placed on their ring and index fingers with leads facing downwards. In the visible disability condition, they would also have their arthritis simulation gloves strapped to their wrists and fingers. Participants were then presented with a condition-specific pamphlet containing information about reactive arthritis and the stigma manipulation. Participants were asked to review the information, and were told that they would be tested on this information at the end. Once they advanced to the next page, they completed a series of questions about the causes and effects of their disability (see Appendix N). To raise participant awareness of the potential for stigmatization to occur, the experimenter then took the participants to have their photo taken for their assessment file/ID. Participants were taken into the hallway and told to stand with their back to a white screen and arms crossed. The experimenter would take their picture and show the picture to the participants. They would ask if the participant would like to have their picture retaken. Once participants were satisfied with their photo, they would return to their work stations.

Participants were informed that CES was not aware of their disabled status and would only have the information directly available from the assessment performance report. They then proceeded to complete the first Stroop task, the three performance tasks, and the second Stroop task. Following the second Stroop task, they were prompted to complete survey containing manipulation check and exploratory items,

followed by a brief questionnaire about demographics and employment history (Appendix O). After completing all of the questionnaires, participants were instructed to notify the experimenter that they were done. Then, the experimenter would remove any devices the participants were wearing, debriefed them, and thanked them for their participation.

RESULTS

Manipulation Checks and Data Preparation

As a preliminary check on my two experimental manipulations, I explored responses to the manipulation check items. Any participants in the visible disability condition (n = 4) who stated that they disagreed with the statement "I believe that CES will be aware of my disabled status, even without disclosure" were removed from analyses as it showed a failure of the visibility manipulation for those participants. Following the removal of these participants I performed an independent t-test on the remaining participants. This confirmed that participants in the visible condition thought their disability was more obvious than those in the invisible condition ($t(86) = 2.212$, $p = .03$)

Next, I checked my stigma manipulation by using the modified Struening et al. (2001) measure. Each of the 5 items was scored from -2 to 2 with -2 signifying stigma, 0 no sigma, and +2 opposite of stigma, giving a possible final score of -10 to 10. Any participants (n = 7) in the high stigma condition who scored greater than a zero were removed from the complete dataset as this represented a failure of the stigma manipulation. An independent t-test confirmed that those in the high stigma condition expected more stigma than those in the low stigma condition ($t(80) = 2.391$, $p = .019$).

Several issues pertaining to technical limitations of the experimental procedures, as well as errors in the survey process resulted in the removal of ten additional participants either fully, or partially from the dataset. First, due to the tasks allowing participants to complete the current entry before advancing to the next task, there was a slight variation in the total time spent on each task for each subject. A technical issue resulted in some participants advancing at incorrect intervals, resulting in some participants having a significantly longer or shorter amount of time to complete a task. Because this would have affected participants' experience within the performance simulation, I elected to completely remove any participants whose time spent on any task was not within two standard deviations of the average time taken per task (n = 7).

Second, a data recording error resulted in some participants having excessively large or small self-control scores. Two participants scored more than three standard deviations from the mean. After comparing the total amount of time that would have been necessary to complete the self-control task given the average reaction time to the actual amount of time spent on that task, I was able to confirm that it was indeed a scoring error as the required time exceeded the amount of time required for those reaction times. As a result, I elected to only remove the self-control data for those participants, keeping them in the dataset for other remaining measures.

Third, for my stress measure, there were a series of technical, as well as experimenter issues that occurred. Experimenters forgot to create a named save file, start the recording, or placed the leads incorrectly. In some cases, the GSR measure would lose its Bluetooth connection resulting in an incomplete recording. In one case a

participant re-applied the leads resulting in a different level of recording and their data needed to be excluded. Any data (n = 27) which had any of the above issues was excluded from the dataset. However, these technical issues did not impact the participants' experience going through the simulation, and therefore their remaining scores were retained, only removing their stress scores from analyses.

My final dataset (including the control group) consisted of 109 participants. For testing my hypotheses where performance was a dependent variable, data from 85 participants was available. For testing my hypotheses where self-control was a dependent variable, data from 84 participants was available. For testing my hypotheses where stress was a dependent variable, data from 68 participants was available.

Descriptive Statistics and Analyses

Cell means and standard deviations for each of the dependent variables are provided in Table 1.

Hypothesis Tests

To test my hypotheses, I performed a 2 x 2 (visibility x stigma threat) factorial analysis of variance to test for the main and interactive effects of the independent variables on my measures of performance and stress. Results of these analyses are displayed in Table 2. Pertaining to performance, a main effect of disability visibility was found, whereas no effect for stigma threat, and no interaction effect of visibility and stigma threat was detected. Pertaining to stress, no main effects of disability visibility or stigma threat were found and no interaction effect of visibility and stigma threat was detected.

For the analyses focused on self-control as a dependent variable, a 2x2 (visibility x stigma threat) repeated measures analysis of variance was conducted to test for the main and interactive effects of the independent variables on participant self-control over time. Results are reported in Table 3. As is shown, no main effects of disability visibility or stigma threat were found. A significant interaction effect between disability visibility and stigma threat was detected, $F(1, 80) = 6.981$, $p = .010$ (See Figure 1). To examine this interaction, I tested for the effect of the stigma manipulation separately for each disability condition. For participants in the visible disability condition, there was no significant main effect of stigma on self-control $F(1, 38) = 2.180$, $p = .148$. For participants in the invisible disability condition, however, there was a significant main effect of stigma on self-control ($F(1, 42) = 5.354$, $p = .026$), such that subjects facing high stigma showed a greater improvement in self-control over time ($M = -100$) compared to participants in the low stigma condition ($M = -33.2$). While consistent with hypothesis 3b, in that I expected an interaction between stigma threat and disability visibility on self-control, the results run counter to what I would have expected given Hypothesis 1 and 2.

To understand the nature of this interaction further, I investigated the independent self-control scores used in the repeated measures anova of self-control (self-control reaction time means can be seen in Table 4), allowing me to see participant self-control as independent scores, rather than as a change in self-control over time. As is shown, participants in the high stigma/invisible condition approached significance in having reduced self-control ($t(42) = -2.000$, $p = .057$) on the initial self-control task, there was no difference in self-control between the two groups on the

second self-control task ($t(42) = -.894$, $p = .377$). In essence, participants in the high stigma invisible condition showed less initial self-control, but *improved at a greater rate than their peers in the low stigma invisible condition* (see Figure 2). Thus, while the rate of improvement was counter to what would be expected, the actual levels of self-control were consistent with what would have been expected in Hypothesis 3B.

In summary I found support for the effects of disability visibility on performance (H1a) and an interaction effect of stigma and disability visibility on self-control (H3b, although it was not of the expected nature), whereas I found no support for the main effects of disability visibility on self-control (H1b), or stress (H1c), for stigma on performance, self-control, or stress (H2a-c), or an interaction effect of stigma and disability visibility on performance (H3a) and Stress (H3c).

DISCUSSION

Summary and Follow-up Analyses

In this experiment, I sought to show how factors above and beyond the actual disability itself will impact disabled workers on a variety of measures. Specifically, I manipulated disability visibility and disability stigma and analyzed participant outcomes in the areas of performance, stress, and self-control. Based on the theories of regulatory depletion, stigma threat, resource mobilization, and motivation I expected that disability visibility and stigma threat would jointly impair self-control and performance while increasing stress (beyond that which might be caused by the simulation itself). In other words, I sought to isolate the additional regulatory costs for participants who had a highly stigmatized and/or invisible disability.

In regards to self-control, I expected that participants would experience regulatory depletion as a result of going through my selection assessment. This would manifest as a decrement in self-control over time. In addition, I expected that participants in the invisible disability conditions, as well as participants in the high stigma conditions would show additional decrements in self-control above and beyond those caused by the simulation itself. However, only participants in the high stigma visible condition showed a significant change in self-control at the end of the assessment. To further complicate matters the change was an *improvement* in self-

control rather than a decrement. While on the surface this seems counter to theory, literature on resource conservation states that when people expect future demands they will ration their resources in preparation for those future demands ((Muraven et al., 2006; Thompson, 2006; Tyler & Burns, 2009)). Because my participants did not show a decrement in self-control as the result of engaging in depleting tasks, this suggests that they were implementing a series of regulatory conservation strategies *from the beginning of the assessment* in an attempt to prepare for future demands. An example can be seen with the high stigma visible group. While they showed significant improvement their initial self-control scores were significantly worse than any other experimental condition. However, on the second measure of self-control the high stigma visible group showed no significant differences from any other condition.

In the analysis of my stress data, I observed no main effects, nor interaction effects, of stigma or visibility on the stress of participants. Follow-up analyses looking more specifically at the stress scores during a particular task. In addition, I tested stress as a moderator of task performance rather than as a separate outcome variable. I found no significant effects of stigma threat and disability visibility on the stress of participants by corresponding activity. Further I did not find any incremental effects of stress on performance when added to the model as a moderator. However, given the studies current power, there was a less than 10% chance of finding a significant effect if one was present. As such, a lack of significant findings should not be considered conclusive evidence that the experimental manipulations did not have an impact on participant stress nor a moderating effect on participant performance.

When analyzing stress data, it is important to approach stress with an emphasis on how the stress scores are changing over time and what events immediately preceded the change in stress scores. This can result in a nearly infinite number of stress score permutations across all the participants. The current study did not consider this when determining the type of analysis that would be performed, nor in the power calculations to determine the number of participants necessary to reliably detect the desired effects.

Following my primary hypothesis tests, I analyzed the effects of my stigma threat and disability visibility manipulations on the following exploratory measures: perceived performance impact of the disability, expected co-worker reactions if made aware of the participants disabled status, and desire to officially disclose ones' disability to CES (means can be seen in Table 5). To test for group differences, I performed a series of ANOVA's (results in Table 6).

Pertaining to perceived impact of the disability on performance, a main effect of disability visibility was found, whereas no effect for stigma threat, and no interaction effect of visibility and stigma threat was detected. Participants in the visible disability condition felt that their disability had stronger negative effects on their overall performance.

Pertaining to participants' desire to disclose their disability to CES, I found no main effects of disability visibility and stigma threat on desire to disclose. A nearly significant interaction effect between disability visibility and stigma threat was detected, $F(1, 80) = 3.809$, $p = .055$. To examine this interaction, I tested for the effect of the stigma manipulation separately for each disability condition (see Figure 3). For participants in the visible disability condition, there was a significant main effect of

stigma on desire to disclose their disability $F(1, 38) = 5.057$, $p = .03$ such that subjects facing high stigma were undecided about disclosing their disability ($M = 2.95$), while those in the low stigma visible condition were much more willing to officially disclose their condition ($M = 3.60$). For participants in the invisible disability condition, there were no main effects of stigma on willingness to disclose their condition to the organization ($F(1, 38) = .350$, $p = .557$).

Pertaining to the expected coworker reactions I found no main effect for disability visibility, however there was a significant main effect of stigma and interaction effect between stigma threat and disability visibility on expected co-worker reactions. Cell means were probed to understand the nature of this interaction (see Figure 4). There was a significant effect of stigma in the visible disability condition ($F(1, 38) = 13.015$, $p = .001$) on expected co-worker reactions to participants disabled status. Participants in the low stigma visible condition expected a relatively neutral reaction from co-workers while participants in the high stigma visible condition expected a negative reaction from co-workers. However, those in the invisible conditions did not show any differences in expected co-worker reactions as a result of their stigmatized status.

Limitations and Future Research

Theoretical Limitations

Had my hypotheses been confirmed, the results would have provided a natural extension of the available literature. Despite my initial analyses finding only limited support for my hypotheses, a series of post hoc analysis did show group differences in related variables as a result of my manipulations.

Self-control requires that individuals override their automatic actions and engage in controlled behavior. To do so requires resources, and to control the allocation of resources, individuals will engage in self-regulatory processes (Vohs et al., 2008). However, the resources involved are limited, and when used, will result in a state of depletion. When depleted, it is expected that individuals experience a temporary shift of motivation and attention towards other tasks (Inzlicht & Schmeichel, 2012). This is consistent with the literature on mental fatigue, which shows that behavior will only continue if the additional energy expenditure is worth the expected reward (Boksem & Tops, 2008). As an individual becomes more depleted, they will use fewer resources in an attempt to conserve them (Muraven et al., 2006; Tyler & Burns, 2009). However individual differences can moderate this effect. Beliefs about self-control and will power moderate the impact of depletion on behaviors (Hamburg & Pronk, 2015; Job, Dweck, & Walton, 2010). Primarily, following a depleting task, individuals with an action orientation are more likely to continue allocating resources towards a task, while those with a state orientation will conserve resources (Gröpel, Baumeister, & Beckmann, 2014). We can understand this further by looking at individual responses to social rejections.

It has been proposed that reactions to social rejection will result in three different states of being: needing acceptance, vulnerability to future hurt, and indignation, with individuals focusing on one at any given time (Smart Richman & Leary, 2009). Each of these states will promote a series of behaviors dependent on the strength of the rejection, the situation, and individual differences.

My stigma manipulation was designed to alter the strength of the expected social rejection but also the situational strength in ways that were unique to each condition. For example, the invisible condition would be expected to offer a strong incentive to activate state orientation tendencies as a way to maintain participants' current status as a non-stigmatized individual. The visible condition would be expected to offer a strong incentive to activate action orientation tendencies in an attempt to regain social acceptance. While visibility might alter the *type*s of behaviors displayed, stigma might have altered the amount of social rejection individuals expected to experience, changing the resources necessary to engage in protective behaviors associated with reducing the impact of a potential social rejection. As such, individuals in the low stigma conditions should show reduced resource mobilization towards behaviors related to social rejection, while those in the high stigma conditions should show additional resource mobilization towards behaviors associated with social rejection.

Methodological Limitations

There were a series of issues associated with my measures, data collection, and data scoring, that limited the number of participants that could be included for any given analysis, potentially contributing to the lack of significance observed in my results.

For performance tasks two and three, I used Qualtric's loop and merge function to limit participants to only one entry at a time. Having both this and the time restriction in place simultaneously resulted in task two advancing at only approximately the five-minute mark. While it worked in most situations, it did not

account for specific scenarios where participants either rush or give up, resulting in the removal of seven participants from the dataset.

Second there were issues in the collection of stress data. A number of participants had our stress technology disconnect as a result of leaving the room during the assessment. An additional proportion had data that was not recorded or collected incorrectly resulting in a small number of participants with usable stress data (i.e., n = 71), reducing the power of my analyses. In addition, the process I used to interpret participant stress responses was designed for the purpose of detecting individual change and was not sufficient for answering the questions required for my hypothesis. Any independent stress level not only matters in the context of the total level of stress, but also in the context of past levels of stress. The same level of stress for one participant might represent an increase in stress during an activity, or a decrease in stress during an activity. To meaningfully interpret how an individual's stress is related to their behavior, it requires additional within-person change analysis as well as many more specific time points to understand how specific individual actions are contributing to what is being observed.

Thirdly, despite my attempts to equalize the visible and invisible conditions, participants in the invisible condition did not find their disability as detrimental as those in the visible condition. One participant in the invisible condition even stated that "I am already used to this; I have a really slow computer at home". Indeed, there were several limitations and frustrations that were a direct result of the medical brace in the visible disability condition. Participants were required to utilize objects that we could not limit via our visibility manipulations such as folders, stapled documents, etc.

However, when you consider that participants in the invisible disability condition performed significantly worse than those in the visible disability condition, this result provides addition support for the hypothesized effects of disability visibility on performance. Despite participants in the invisible condition finding their disability to be less debilitating they performed significantly worse than those in the visible disability condition.

Fourth, I found that my manipulation check measures limited my ability to determine the effect of my manipulations. While both the stigma threat and disability visibility manipulation checks showed significant group differences in the hypothesized direction they offered participants to state expectations that ran completely counter to the expected results. For example, while the stigma threat manipulation check did show significant group differences with high stigma participants showing greater expected stigma than low stigma participants, the measure provided participants the opportunity to state that they expected to experience positive reactions from others, rather than negative as a result of their condition. Because this possibility was not considered in the initial hypothesis any high stigma participants who expected to have a positive reaction from others was treated as a failed stigma manipulation. Similar issues for the visibility condition resulted in the removal of a large number of participants from the analysis. In the future, a simple yes or no question at the end of the assessment should suffice as a manipulation check for disability visibility. For stigma, the questionnaire should take place immediately after the introduction of the stigma manipulation and before the assessment begins.

Finally, in future experiments, I will focus on meeting the requirements for a small effect size (N = 38 per condition), decrease the amount of data that had to be excluded from the analysis, streamline and standardize all aspects of the data gathering process, fully incorporate additional physiological measures, and take steps to validate the assessment as a measure of performance.

Implications for Theory and Practice

While the theoretical shortcomings and methodological limitations prevent me from generalizing these findings to the disabled population, I was able to gain some insight into the effects of disability visibility and stigma threat on a variety of measures in an experimental. Future studies will be necessary to fine-tune the experimental process as well as replicate the findings before we can reach any firm conclusions. However, given the fact that our participants were not disabled, the stigma was artificially generated, and participants knew it was only temporary, and I still found significant results offers promise to the possibility of using non-disabled participants to understand the experiences of the disabled population.

I argue that the primary relevance of this study is that it provides an innovative first step in methods for testing the effects of disability, stigma, regulation, and performance in an experimental setting—even among those who are not at the time of experiment disabled. My hope is that via various refinements, future researchers will be able to test more complicated research questions, control and incorporate temporal phenomena, and include physiological measures at a reasonable cost. This study showcases an internet-based electronic framework for carrying out research where it is possible to test the effects of disability, stigma, or other experimental manipulations on

performance, physiology, and self-control in an experimental setting that is similar to an assessment seen in the applied setting. The entire assessment was developed in a common and popular academic survey platform that can be easily shared with other labs, especially for the purpose of replication. In an applied setting I believe that the methods developed in this study provide an educational opportunity for diversity initiatives to increase empathy in a resource efficient manner; a means of “putting yourself in another’s shoes”. Across all conditions participants expressed greater understanding and a deep empathy for people suffering from our experimental condition. My hope is that my lab, and many others will use the techniques I developed and tested to remove some of the current limitations that limit the ability to engage in complex experimental research, allowing the field to test more complicated questions and eventually grow as a whole.

CONCLUSION

While my initial analyses showed limited support for components of my hypotheses, post hoc analysis highlighted the complex and temporal nature of the constructs being investigated, the processing involved in stigma, disability visibility, and the interaction of the two requires understanding of how aspects of a situation can result in different motivations, regulatory costs, and outcomes for disabled individuals. As researchers in this field, we need to increase the scope of what our experiments will encompass, incorporate additional measures into our methods, and address both the within- and between-person differences in the experiences of disabled individuals. Only then will we be able to have a comprehensive understanding of the difficulties faced by those with invisible disabilities. Eventually we will be able help not only disabled individuals but all stigmatized individuals by making meaningful and effective system-level.

LIST OF REFERENCES

LIST OF REFERENCES

Aronson, J., Lustina, M. J., & Keough, K. (1999). When white men can't do math: Necessary and sufficient factor in stereotype threat. *Journal of Experimental Social Psychology, 35*, 29-46.

Barnhoorn, J. S., Haasnoot, E., Bocanegra, B. R., & van Steenbergen, H. (2014). QRTEngine: An easy solution for running online reaction time experiments using Qualtrics. *Behavior Research Methods, 47*(4), 918-929. http://doi.org/10.3758/s13428-014-0530-7

Baumeister, R. F., Bratslavsky, E., Muraven, M., & Tice, D. M. (1998). Ego depletion: Is the active self a limited resource? *Journal of Personality and Social Psychology, 74*(5), 1252-1265. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/9599441

Baumeister, R. F., DeWall, C. N., Ciarocco, N. J., & Twenge, J. M. (2005). Social exclusion impairs self-regulation. *Journal of Personality and Social Psychology, 88*(4), 589-604. http://doi.org/10.1037/0022-3514.88.4.589

Baumeister, R. F., & Vohs, K. D. (2007). Self-regulation, ego depletion, and motivation. *Social and Personality Psychology Compass, 1*(1), 115-128. http://doi.org/10.1111/j.1751-9004.2007.00001.x

Beatty, J. E., & Kirby, S. L. (2006). Beyond the legal environment: How stigma influences invisible identity groups in the workplace. *Employee Responsibilities and Rights Journal, 18*(1), 29-44. http://doi.org/10.1007/s10672-005-9003-6

Boksem, M. A. S., & Tops, M. (2008). Mental fatigue: Costs and benefits. *Brain Research Reviews*, *59*(1), 125-139. http://doi.org/10.1016/j.brainresrev.2008.07.001

Bos, A. E. R., Pryor, J. B., Reeder, G. D., & Stutterheim, S. E. (2013). Stigma: advances in theory and research. *Basic and Applied Social Psychology*, *35*(1), 1-9. http://doi.org/10.1080/01973533.2012.746147

Brehm, J. W., & Self, E. A. (1989). The intensity of motivation. *Annual Review of Psychology, 40,* 109-131. http://doi.org/10.1146/annurev.psych.40.1.109

Bruyère, S. M. (2000). Disability employment policies and practices in private and federal sector organizations. *Program.*

Carver, C. S., & Scheier, M. F. (2011). Self-refulation of action and affect. In K. D. Vohs & R. F. Baumeister (Eds.), *Handbook of self-regulation:Research, theory, and applications* (pp. 3-21). New York, NY Guilford Press.

Cavanagh, J. F., Frank, M. J., & Allen, J. J. B. (2011). Social stress reactivity alters reward and punishment learning. *Social Cognitive and Affective Neuroscience*, *6*(3), 311-320. http://doi.org/10.1093/scan/nsq041

Chaudoir, S. R., & Quinn, D. M. (2010). Revealing concealable stigmatized identities: The impact of disclosure motivations and positive first-disclosure experiences on fear of disclosure and well-being. *Journal of Social Issues*, *66*(3), 570-584. http://doi.org/10.1111/j.1540-4560.2010.01663.x

Colella, A. (2001). Coworker distributive fairness judgments of the workplace accommodation of employees with disabilities. *Academy of Management Review, 26*(1), 100-116. Retrieved from http://amr.aom.org/content/26/1/100.short

Colella, A., DeNisi, A. S., & Varma, A. (1998). The impact of ratee's disability on performance judgments and choice as partner: The role of disability-job fit stereotypes and interdependence of rewards. *Journal of Applied Psychology, 83*(1), 102-111. http://doi.org/10.1037//0021-9010.83.1.102

Derks, B., Inzlicht, M., & Kang, S. K. (2008). The neuroscience of stigma and stereotype threat. *Group Processes & Intergroup Relations*, *11*(2), 163-181. http://doi.org/10.1177/1368430207088036

Dixon, K. A., Kruse, D., & Van Horn, C. E. (2003). Restricted access: A survey of employers about people with disabilities and lowering barriers to work. In *Work trends: American attitudes about work, employers and government* (Vol. 6). John J Heldrich Center for Workforce Development Rutgers, the State University of New Jersey

Fichten, C. S., & Amsel, R. (1986). Trait attributions about college students with a physical disability: Circumplex analyses and methodological issues. *Journal of Applied Psychology*, *16*(5), 410-427.

Frable, D. E., Platt, L., & Hoey, S. (1998). Concealable stigmas and positive self-perceptions: Feeling better around similar others. *Journal of Personality and Social Psychology*, *74*(4), 909-922. http://doi.org/10.1037/0022-3514.74.4.909

Frantz, C. M. (2004). A threat in the computer: The race implicit association test as a stereotype threat experience. *Personality and Social Psychology Bulletin, 30*(12), 1611-1624. http://doi.org/10.1177/0146167204266650

Gray, J. (1999). A bias toward short-term thinking in threat-related negative emotional states. *Personality and Social Psychology Bulletin, 25*(1), 65-75.

Gröpel, P., Baumeister, R. F., & Beckmann, J. (2014). Action versus state orientation and self-control performance after depletion. *Personality & Social Psychology Bulletin, 40,* 476-487. http://doi.org/10.1177/0146167213516636

Hamburg, M. E., & Pronk, T. M. (2015). Believe you can and you will: The belief in high self-control decreases interest in attractive alternatives. *Journal of Experimental Social Psychology, 56,* 30-35. http://doi.org/10.1016/j.jesp.2014.08.009

Inzlicht, M., & Schmeichel, B. J. (2012). What is ego depletion? Toward a mechanistic revision of the resource model of self-control. *Perspectives on Psychological Science, 7*(5), 450-463. http://doi.org/10.1177/1745691612454134

Jackson, S. E., & Joshi, A. (2001). Research on domestic and international diversity in organizations: A merger that works? *Handbook of Industrial, Work & Organizational Psychology Volume 2: Organizational Psychology, 2*, 206-231. Retrieved from http://psycnet.apa.org/psycinfo/2003-00438-011

Jans, L. H., Kaye, H. S., & Jones, E. C. (2012). Getting hired: Successfully employed people with disabilities offer advice on disclosure, interviewing, and job search. *Journal of Occupational Rehabilitation, 22*(2), 155-165. http://doi.org/10.1007/s10926-011-9336-y

Job, V., Dweck, C. S., & Walton, G. M. (2010). Ego depletion--is it all in your head? Implicit theories about willpower affect self-regulation. *Psychological Science, 21*(11), 1686-1693. http://doi.org/10.1177/0956797610384745

Jones, E., Farina, A., Hastorf, A., Markus, H., Miller, D., Scott, R., & Jones, E. (1984). *Social stigma: The psychology of marked relationships*. New York, NY: H. Freeman and Co.

Krendl, A. C., Krendl, A. C., Richeson, J. A., Richeson, J. a, Kelley, W. M., Kelley, W. M., . . . Heatherton, T. F. (2008). The negative consequences of threat. *Psychological Science*, *19*(2), 168-175.

Lane, J. D., & Wegner, D. M. (1995). The cognitive consequences of secrecy. *Journal of Personality and Social Psychology, 69*(2), 237-253. http://doi.org/http://dx.doi.org/10.1037/0022-3514.69.2.237

Leyens, J.-P., Desert, M., Croizet, J.-C., & Darcis, C. (2000). Stereotype threat: Are lower status and history of stigmatization preconditions of stereotype threat? *Personality and Social Psychology Bulletin*, *26*(10), 1189-1199. http://doi.org/10.1177/0146167200262002

MacLeod, C. M., Dodd, M. D., Sheard, E. D., Wilson, D. E., & Bibi, U. (2003). In opposition to inhibition. *Psychology of Learning and Motivation - Advances in Research and Theory*, *43*(416), 163-214. http://doi.org/10.1016/S0079-7421(03)01014-4

MacLeod, C., Rutherford, E., Campbell, L., Ebsworthy, G., & Holker, L. (2002). Selective attention and emotional vulnerability: Assessing the causal basis of their association through the experimental manipulation of attentional bias. *Journal of Abnormal Psychology*, *111*(1), 107-123. http://doi.org/10.1037//0021-843X.111.1.107

Mak, W. W. S., Poon, C. Y. M., Pun, L. Y. K., & Cheung, S. F. (2007). Meta-analysis of stigma and mental health. *Social Science & Medicine*, *65*(2), 245-261. http://doi.org/10.1016/j.socscimed.2007.03.015

Martijn, C., Tenbült, P., Merckelbach, H., Dreezens, E., & de Vries, N. K. (2002). Getting a grip on ourselves: Challenging expectancies about loss of energy after self-control. *Social Cognition*, *20*(6), 441-460. http://doi.org/10.1521/soco.20.6.441.22978

McLaughlin, M. E., Bell, M. P., & Stringer, D. Y. (2004). Stigma and acceptance of persons with disabilities: Understudied aspects of workforce diversity. *Group & Organization Management*, *29*(3), 302-333. http://doi.org/10.1177/1059601103257410

Mogg, K., Mathews, A., Bird, C., & Macgregor-Morris, R. (1990). Effects of stress and anxiety on the processing of threat stimuli. *Journal of Personality and Social Psychology*, *59*(6), 1230-1237. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/2283589

Mogg, K., Millar, N., & Bradley, B. P. (2000). Biases in eye movements to threatening facial expressions in generalized anxiety disorder and depressive disorder. *Journal of Abnormal Psychology, 109*(4), 695-704. http://doi.org/10.1037//0021-843X.

Muraven, M., & Baumeister, R. F. (2000). Self-regulation and depletion of limited resources: Does self-control resemble a muscle? *Psychological Bulletin, 126*(2), 247-259. http://doi.org/10.1037//0033-2909.126.2.247

Muraven, M., Shmueli, D., & Burkley, E. (2006). Conserving self-control strength. *Journal of Personality and Social Psychology, 91*(3), 524-537. http://doi.org/10.1037/0022-3514.91.3.524

Muraven, M., & Slessareva, E. (2003). Mechanisms of self-control failure: Motivation and limited resources. *Personality and Social Psychology Bulletin, 29*, 1062-1075. http://doi.org/10.1177/0146167203253209

Newheiser, A.-K., & Barreto, M. (2014). Hidden costs of hiding stigma: Ironic interpersonal consequences of concealing a stigmatized identity in social interactions. *Journal of Experimental Social Psychology, 52*, 58-70. http://doi.org/10.1016/j.jesp.2014.01.002

Norman, D. A., & Shallice, T. (1986). Attention to action: Willed and automatic control of behavior In R. J. Davidson, G. E. Schwartz & D. Shapiro (Eds.), *Consciousness and self-regulation: Advances in research, Vol. IV* (pp. 1–18). New York, NY: Plenum Press.

Paetzold, R. L., García, M. F., Colella, A., Ren, L. R., Triana, M. D. C., & Ziebro, M. (2008). Perceptions of people with disabilities: When is accommodation fair? *Basic and Applied Social Psychology*, *30*(1), 27-35. http://doi.org/10.1080/01973530701665280

Plessow, F., Fischer, R., Kirschbaum, C., & Goschke, T. (2011). Inflexibly focused under stress: Acute psychosocial stress increases shielding of action goals at the expense of reduced cognitive flexibility with increasing time lag to the stressor. *Journal of Cognitive Neuroscience*, *23*(11), 3218-3227. http://doi.org/10.1162/jocn_a_00024

Pruessner, J. C., & Baldwin, M. (2015). Biological aspects of self-esteem and stress. In G. H. E. Gendolla, M. Tops & S. L. Koole (Eds.), *Handbook of biobehavioral approaches to self-regulation* (pp. 385-396). New York, NY: Springer.

Putman, P., Antypa, N., Crysovergi, P., & van der Does, W. A. J. (2010). Exogenous cortisol acutely influences motivated decision making in healthy young men. *Psychopharmacology*, *208*(2), 257-263. http://doi.org/10.1007/s00213-009-1725-y

Quinn, D. M., & Chaudoir, S. R. (2009). Living with a concealable stigmatized identity: The impact of anticipated stigma, centrality, salience, and cultural stigma on psychological distress and health. *Journal of Personality and Social Psychology*, *97*(4), 634-651. http://doi.org/10.1037/a0015815

Quinn, D. M., & Earnshaw, V. A. (2011). Understanding concealable stigmatized identities: The role of identity in psychological, physical, and behavioral outcomes. *Social Issues and Policy Review, 5*(1), 160-190. http://doi.org/10.1111/j.1751-2409.2011.01029.x

Ravaud, J., Madiot, B., & Ville, I. (1992). Discrimination towards disabled people seeking employment. *Social Science & Medicine, 35*(8), 951-958. Retrieved from http://www.sciencedirect.com/science/article/pii/027795369290234H

Rawn, C. D., & Vohs, K. D. (2011). People use self-control to risk personal harm: An intra-interpersonal dilemma. *Personality and Social Psychology Review, 15*(3), 267-289. http://doi.org/10.1177/1088868310381084

Schur, L., Kruse, D., & Blanck, P. (2005). Corporate culture and the employment of persons with disabilities. *Behavioral Sciences & the Law, 23*(1), 3-20. http://doi.org/10.1002/bsl.624

Schur, L., Kruse, D., Blasi, J., & Blanck, P. (2009). Is disability disabling in all workplaces? Workplace disparities and corporate culture. *Industrial Relations: A Journal of Economy and Society, 48*(3), 381-410. http://doi.org/10.1111/j.1468-232X.2009.00565.x

Smart, L., & Wegner, D. (2000). The hidden costs of hidden stigma. In T. F. Heatherton, R. E. Kleck, M. R. Hebl & J. G. Hull (Eds.), *The social psychology of stigma* (pp. 220-242). New York, NY: Guildford Press. Retrieved from http://books.google.com/books?hl=en&lr=&id=--a5c_Q0COYC&oi=fnd&pg=PA220&dq=The+hidden+costs+of+hidden+stigma&ots=E2KCZyzKUG&sig=MhTPhlrPWDKjqW6PVgVPA_ezBZ4

Smart Richman, L., & Leary, M. R. (2009). Reactions to discrimination, stigmatization, ostracism, and other forms of interpersonal rejection: a multimotive model. *Psychological Review*, *116*(2), 365-383. http://doi.org/10.1037/a0015250

Starcke, K., & Brand, M. (2012). Decision making under stress: a selective review. *Neuroscience and Biobehavioral Reviews*, *36*(4), 1228-1248. http://doi.org/10.1016/j.neubiorev.2012.02.003

Starcke, K., Wolf, O. T., Markowitsch, H. J., & Brand, M. (2008). Anticipatory stress influences decision making under explicit risk conditions. *Behavioral Neuroscience*, *122*(6), 1352-1360. http://doi.org/10.1037/a0013281

Steele, C. M., Spencer, S. J., & Aronson, J. (2002). Contending with group image: The psychology of stereotype and social identity threat. In M. P. Zanna (Ed.), *Advances in experimental social psychology, Vol. 34* (pp. 379-440). San Diego, CA: Academic Press.

Stone, D. L. D., & Colella, A. (1996). A model of factors affecting the treatment of disabled individuals in organizations. *Academy of Management Review*, *21*(2), 352-401. http://doi.org/10.5465/AMR.1996.9605060216

Struening, E. L., Perlick, D. A., Link, B. G., Hellman, Fredric, B. A., Herman, . . . Sirey, J. A. (2001). The extent to which caregivers believe most people devalue consumers and their families. *Psychiatric Services*, *52*(12), 1633-1668.

Thompson, C. A. (2006). Conservation of resource theory. *Sloan Network Encyclopedia*, (2001).

Tice, D. M., Baumeister, R. F., Shmueli, D., & Muraven, M. (2007). Restoring the self: Positive affect helps improve self-regulation following ego depletion. *Journal of Experimental Social Psychology*, *43*(3), 379-384. http://doi.org/10.1016/j.jesp.2006.05.007

Tops, M., Schlinkert, C., Tjew-A-Sin, M., Samur, D., & Koole, S. L. (2015). Protective inhibition of self-regulation and motivation: Extending a classic Pavlovian principle to social and personality functioning. In G. H. E. Gendolla, M. Tops & S. L. Koole (Eds.), *Handbook of biobehavioral approaches to self-regulation* (pp. 69-84). New York, NY: Springer.

Tyler, J. M., & Burns, K. C. (2009). Triggering conservation of the self's regulatory resources. *Basic and Applied Social Psychology*, *31*(3), 255-266. http://doi.org/10.1080/01973530903058490

Vohs, K. D., Baumeister, R. F., Schmeichel, B. J., Twenge, J. M., Nelson, N. M., & Tice, D. M. (2008). Making choices impairs subsequent self-control: A limited-resource account of decision making, self-regulation, and active initiative. *Journal of Personality and Social Psychology*, *94*(5), 883-898. http://doi.org/10.1037/0022-3514.94.5.883

Webb, T. L., & Sheeran, P. (2003). Can implementation intentions help to overcome ego-depletion? *Journal of Experimental Social Psychology*, *39*(3), 279-286. http://doi.org/10.1016/S0022-1031(02)00527-9

Wenzlaff, R. M., & Wegner, D. M. (2000). Thought suppression. *Annual Review of Psychology*, *51*, 59-91. http://doi.org/10.1146/annurev.psych.51.1.59

Weymar, M., Schwabe, L., Löw, A., & Hamm, A. O. (2012). Stress sensitizes the brain: Increased processing of unpleasant pictures after exposure to acute stress. *Journal of Cognitive Neuroscience, 24*(7), 1511-1518. http://doi.org/10.1162/jocn_a_00174

APPENDICES

Appendix A

Table 1

Means and Standard Deviations

	Outcome					
	Task Performance		Self-Control		Stress	
Condition	*M*	*SD*	*M*	*SD*	*M*	*SD*
Low Stigma	.05	.42	-31.5	295.2	.25	.10
High Stigma	.03	.44	-39.7	279.7	.27	.08
Visible	.13	.44	9.8	263.7	.26	.08
Invisible	-.04	.39	-76.9	301.6	.26	.10

Table 2

Between Subjects ANOVA

	Outcome		
	Task Performance		
Condition	*df*	*F*	Sig.
Stigma	1	.093	.76
Visibility	1	3.859	.05
Stigma * Visibility	1	.002	.97
	Stress		
Stigma	1	.598	.44
Visibility	1	.002	.97
Stigma * Visibility	1	.037	.80

Table 3

Repeated Measures ANOVA of Self-Control

	Outcome		
	Self-Control		
Condition	*df*	*F*	Sig.
Stigma	1	.157	.69
Visibility	1	.235	.63
Stigma * Visibility	1	6.981	.01

Table 4

Stroop Score Reaction Times (MS)

	Stroop					
	Congruent RT		Incongruent RT		Difference	
Condition	*M*	*SD*	*M*	*SD*	*M*	*SD*
Low Visible						
Stroop One	1191.1	389.5	1410.2	345.2	219.1	249.1
Stroop Two	1118.8	307.4	1326.5	319.6	207.7	161.0
High Visible						
Stroop One	1261.3	323.5	1406.1	313.8	144.7	167.2
Low Invisible						
Stroop One	1324.6	232.0	1507.5	290.5	182.9	131.1
Stroop Two	1234.5	320.0	1366.7	322.5	131.3	214.9
High Invisible						
Stroop One	1374.2	250.3	1660.7	376.0	286.4	206.9
Stroop Two	1080.2	250.5	1266.6	320.4	186.4	192.8

Table 5

Means and Standard Deviations

	Outcome					
	Performance Impact		Co-Worker Reactions		Disclose Disability	
Condition	*M*	*SD*	*M*	*SD*	*M*	*SD*
Low Stigma	4.13	1.24	-.10	.928	0.28	1.01
High Stigma	3.93	.95	-.57	.770	0.05	.96
Visible	4.55	.68	-.37	.952	0.28	.96
Invisible	3.54	1.17	-.31	.811	0.05	1.01

Table 6

ANOVA's for Exploratory Disclosure Measures

Condition		Measure		
		df	*F*	Sig.
Performance Impact	Stigma	1	.70	.41
	Visibility	1	22.97	.00
	Stigma*Visibility	1	2.23	.14
Coworker Reactions	Stigma	1	7.015	.01
	Visibility	1	.130	.719
	Stigma*Visibility	1	6.498	.013
Disclose to CES	Stigma	1	1.17	.28
	Visibility	1	1.17	.28
	Stigma*Visibility	1	3.81	.06

Appendix B

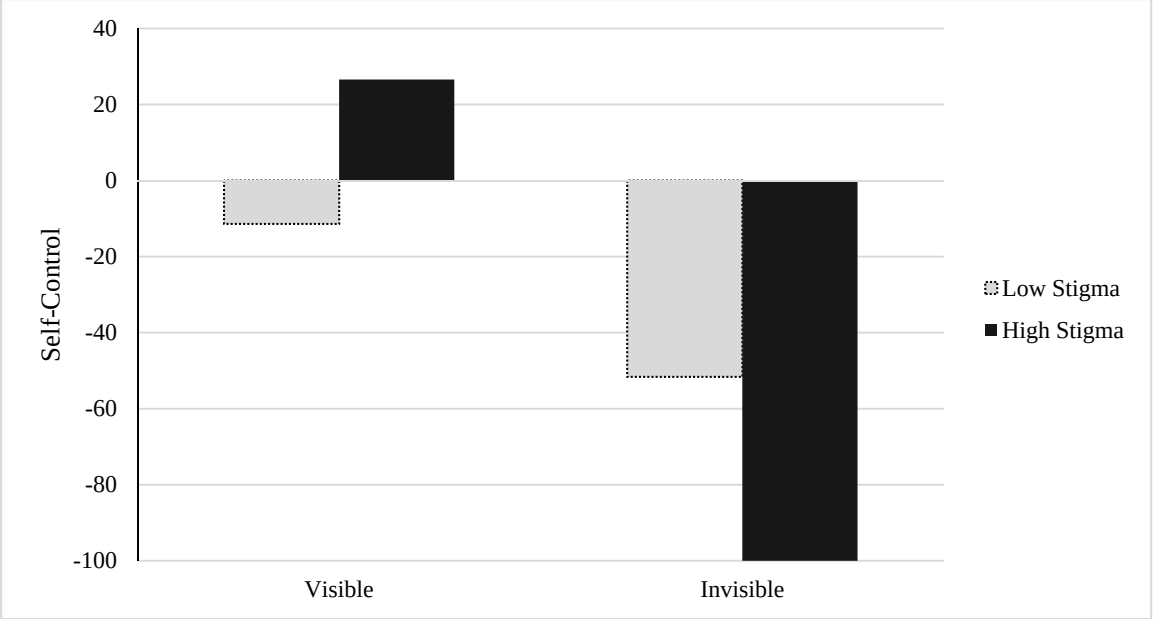


Figure 1. Effects of stigma threat and disability visibility on change in self-control over time as measured in reaction times (MS).

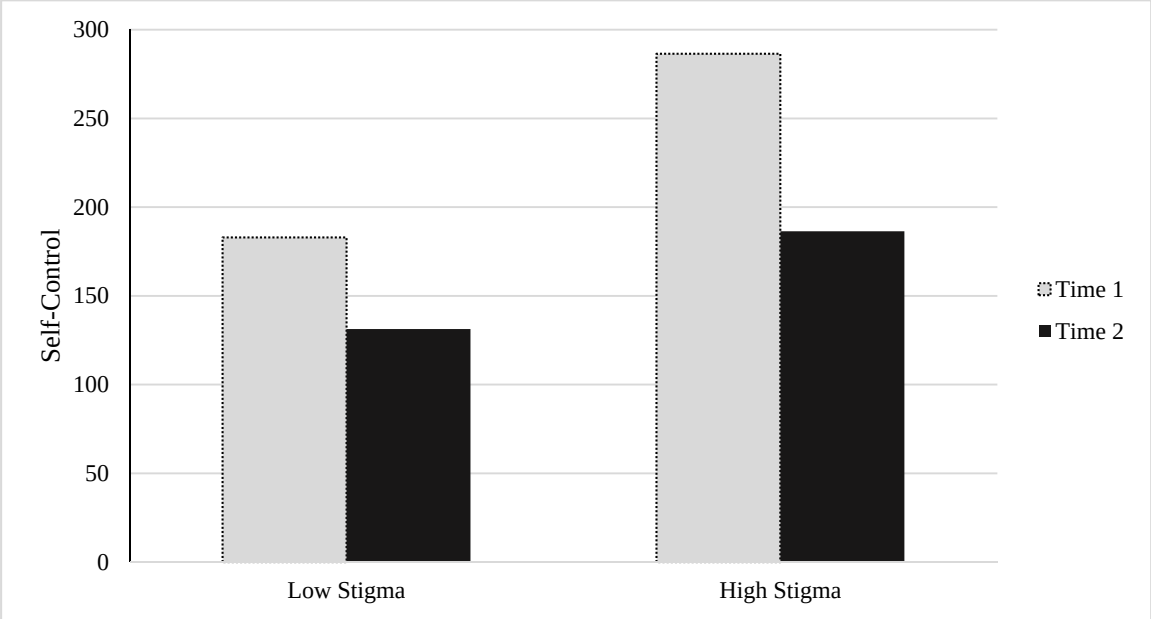


Figure 2. Effect of stigma threat on the self-control (as measured in MS) over time for participants in the invisible disability condition.

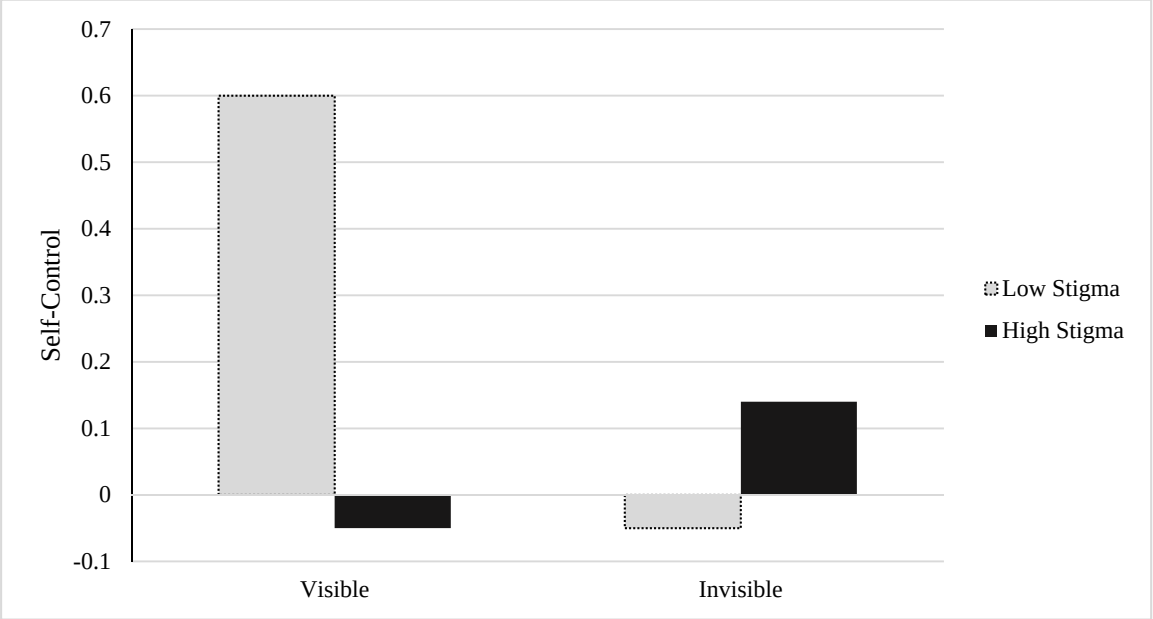


Figure 3. Effects of stigma threat and disability visibility on participant willingness to disclose their disability to CES.

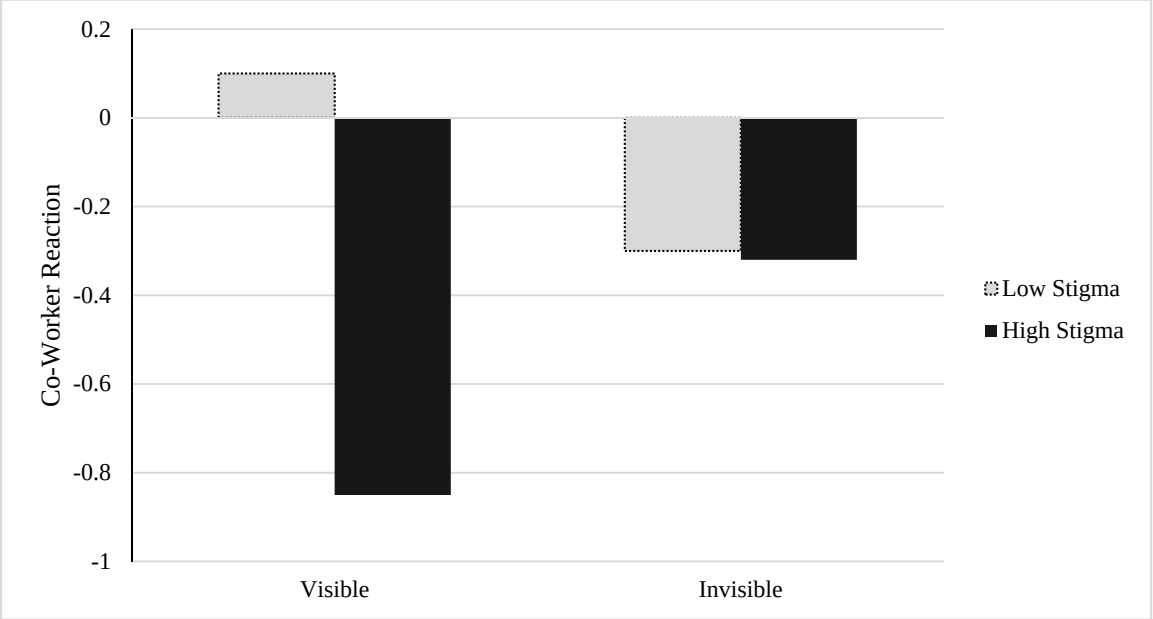


Figure 4. Expected co-worker reactions if aware of participants disabled status.

Appendix C

Reactive Arthritis Pamphlet

AMERICAN COLLEGE OF RHEUMATOLOGY
EDUCATION • TREATMENT • RESEARCH

Specialists in Arthritis Care & Research
2200 Lake Boulevard NE • Atlanta, GA 30319
Phone: (404) 633-3777 • Fax: (404) 633-1870
www.rheumatology.org • info@rheumatology.org

Reactive Arthritis

Reactive arthritis is a painful form of inflammatory arthritis that develops in reaction to an infection by bacteria. In the past, it went by the name "Reiter's syndrome." Now it belongs to the family of arthritis called "spondylarthritis."

Fast facts

- Reactive arthritis can affect the heels, toes, fingers, low back, and joints, especially of the knees or ankles.
- The infection that causes reactive arthritis usually presents (shows up) as diarrhea or as a sexually transmitted disease. But, it can have no symptoms (called *asymptomatic*).
- Though it often goes away on its own, reactive arthritis can be prolonged and severe enough to require seeing a specialist.

What is reactive arthritis?

Reactive arthritis is a painful form of inflammatory arthritis (joint disease due to inflammation). It occurs in reaction to an infection by certain bacteria. Most often, these bacteria are in the genitals (*Chlamydia trachomatis)* or the bowel (*Campylobacter, Salmonella, Shigella* and *Yersinia*). *Chlamydia* most often transmits by sex. It often has no symptoms, but can cause a pus-like or watery discharge from the genitals. The bowel bacteria can cause diarrhea.

Reactive arthritis can have any or all of these features:

- Pain and swelling of certain joints, often the knees and/or ankles
- Swelling and pain at the heels
- Extensive swelling of the toes or fingers
- Persistent low back pain, which tends to be worse at night or in the morning

Some patients with this type of arthritis also have eye redness and irritation. Still other signs and symptoms include burning with urination and a rash on the palms or the soles of the feet.

AMERICAN COLLEGE OF RHEUMATOLOGY
EDUCATION • TREATMENT • RESEARCH

Specialists in Arthritis Care & Research
2200 Lake Boulevard NE • Atlanta, GA 30319
Phone: (404) 633-3777 • Fax: (404) 633-1870
www.rheumatology.org • info@rheumatology.org

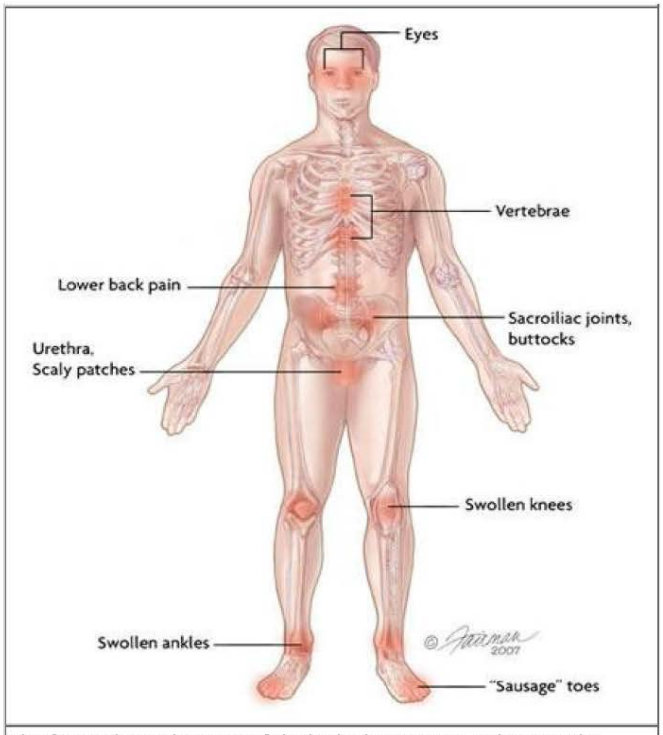
What causes reactive arthritis?

The bacteria induce (cause) arthritis by distorting your body's defense against infections, as well as your genetic environment.

How exactly each of these factors plays a role in the disease likely varies from patient to patient. This is a focus of research.

Who gets reactive arthritis?

The bacteria that cause reactive arthritis are very common. In theory, anyone who becomes infected with these germs might develop reactive arthritis. Yet very few people with bacterial diarrhea actually go on to have serious reactive arthritis. What remains unclear is the role of *Chlamydia* infection that has no symptoms. It is possible that some cases of arthritis of unknown cause are due to *Chlamydia*.



This figure shows the areas of the body that reactive arthritis might affect.

Reactive arthritis tends to occur most often in men between ages 20 and 50.

Some patients with reactive arthritis carry a gene called HLA-B27. Patients who test positive for HLA-B27 often have a more sudden and severe onset of symptoms. They also are more likely to have chronic (long-lasting) symptoms. Yet, patients who are HLA-B27 negative (do not have the gene) can still get reactive arthritis after exposure to an organism that causes it.

AMERICAN COLLEGE OF RHEUMATOLOGY
EDUCATION • TREATMENT • RESEARCH

Specialists in Arthritis Care & Research

2200 Lake Boulevard NE • Atlanta, GA 30319
Phone: (404) 633-3777 • Fax: (404) 633-1870
www.rheumatology.org • info@rheumatology.org

Although immunodeficient, patients who have the AIDS virus HIV can also develop reactive arthritis.

How is reactive arthritis diagnosed?

Diagnosis is largely based on symptoms of the inducing infections and appearance of typical musculoskeletal (joint and muscle) involvement. If indicated, doctors might order a test for *Chlamydia* infection or test for the HLA-B27 gene.

The test for *Chlamydia* uses a urine sample or a swab of the genitals.

How is reactive arthritis treated?

The type of treatment depends on the stage of reactive arthritis.

Treatment for early stage. The acute (early) inflammation can be treated with nonsteroidal anti-inflammatory drugs (often referred to as NSAIDs). These drugs, which suppress swelling and pain, include naproxen (Aleve), diclofenac (Voltaren), indomethacin (Indocin) or celecoxib (Celebrex). The exact effective dose varies from patient to patient.

The risk of side effects of these drugs, such as gastrointestinal (often called GI) bleeding, also varies. Your doctor will consider your risk of GI bleeding in suggesting an NSAID.

Treatment for late stage. Chronic reactive arthritis may require treatment with a disease-modifying antirheumatic drug (sometimes called a DMARD) such as sulfasalazine or methotrexate. Sulfasalazine may be more useful when the reactive arthritis is triggered by a GI infection. In some cases, very inflamed joints may benefit from corticosteroid injections (cortisone shots).

New research suggests that a prolonged course of two or more antibiotics might be effective in patients with chronic *Chlamydia*-induced reactive arthritis. However, more studies are needed.

Talk to your physician about what to expect from treatment with NSAIDs and DMARDs.

Points to remember

- If you develop arthritis within one month of diarrhea or a genital infection—especially with a discharge—see a health care provider. You may have reactive arthritis.
- Most cases of reactive arthritis appear as a short episode. Occasionally, it becomes chronic.
- Effective treatment is available for reactive arthritis.

The Rheumatologist's Role in Treating Reactive Arthritis

The role of the rheumatologist—an expert in arthritis—is to make the diagnosis. Other doctors may feel less comfortable diagnosing reactive arthritis. This is because diagnosis is based on clinical features and not on tests.

AMERICAN COLLEGE OF RHEUMATOLOGY
EDUCATION • TREATMENT • RESEARCH

Specialists in Arthritis Care & Research

2200 Lake Boulevard NE • Atlanta, GA 30319
Phone: (404) 633-3777 • Fax: (404) 633-1870
www.rheumatology.org • info@rheumatology.org

To find a rheumatologist

For a list of rheumatologists in your area, click here.

Learn more about rheumatologists and rheumatology health professionals.

For more information

The American College of Rheumatology has compiled this list to give you a starting point for your own additional research. The ACR does not endorse or maintain these Web sites, and is not responsible for any information or claims provided on them. It is always best to talk with your rheumatologist for more information and before making any decisions about your care.

The Arthritis Foundation
www.arthritis.org

The Arthritis Society
www.arthritis.ca

The Spondylitis Association of America
www.spondylitis.org

The National Institute of Arthritis and Musculoskeletal and Skin Diseases
www.niams.nih.gov/Health_Info/Reactive_Arthritis/default.asp

Updated February 2013
Written by Vivian Bykerk, MD, edited and reviewed by David Yu, MD, John Carter, MD and the American College of Rheumatology Communications and Marketing Committee.

This patient fact sheet is provided for general education only. Individuals should consult a qualified health care provider for professional medical advice, diagnosis and treatment of a medical or health condition.

Appendix D

Arthritis Simulation Gloves

For the purpose of simulating the reduced dexterity that is commonly co-occurring with other symptoms of arthritis I am going to be fitting participants with the Cambridge Simulation Gloves sold by Inclusive Designs Tools(http://www.inclusivedesigntoolkit.com/) seen below.

These gloves are designed by University of Cambridge's Engineering Design Center to simulate the reduced functional ability of the hands in a person without reduced hand dexterity. The plastic strips are placed so that they line up with the individuals nails and are then strapped at the first nail of each finger and thumb. They limit the strength and dexterity of the hands by making it much more difficult to bend the fingers at each joint. For the purposes of our study these gloves will make it more difficult to type and use a mouse, accurately simulating the difficulties that people with arthritis have in using standard computer equipment for day to day work tasks.

The gloves are designed to limit mobility ***without pain***. According to the manufacturer these gloves "do not simulate any pain, tremor, loss of tactile sensitivity, or other changes to the shape of the hand". Furthermore, they do not simulate any problems with the wrists, allowing for full mobility of that area. In testing I found that, consistent with the company's statements, the gloves do not cause pain. Even in situations where they were worn for an extended duration (much longer than any individuals in our experiment will be wearing them) I found they did not cause pain in any areas.

Each participant will be fitted by a trained research assistant to maintain consistency of placement. The gloves come in two sizes (large and small) and individuals will be fitted accordingly.

Appendix E

Low Stigma Reactive Arthritis Phamplet

AMERICAN COLLEGE OF RHEUMATOLOGY
EDUCATION • TREATMENT • RESEARCH

Specialists in Arthritis Care & Research
2200 Lake Boulevard NE • Atlanta, GA 30319
Phone: (404) 633-3777 • Fax: (404) 633-1870
www.rheumatology.org • info@rheumatology.org

Reactive Arthritis

What is reactive arthritis?

Reactive arthritis is a joint disease that causes immobility in the hands due to inflammation.

What causes reactive arthritis?

Reactive arthritis comes about due to bacteria in the stomach—often which result from having food poisoning and/or salmonella. The bacteria that cause reactive arthritis are very common. In theory, anyone with these bacteria in their stomach could have reactive arthritis, however a majority of individuals who contract this condition carry a specific gene, and thus reactive arthritis is considered genetic.

Reactive arthritis has the following features:

- Pain and swelling of the joints, specifically in the hands and fingers
- Limited hand and finger mobility.
- Short term and predictable periods of having symptoms

Am I always going to have the symptoms?

While an individual with reactive arthritis will have this condition for the rest of their life, symptoms are acute and predictable. Whereas the pain and swelling can be mitigated with over-the-counter medications, there is no way to prevent the limited joint mobility associated with this condition.

Appendix F

High Stigma Reactive Arthritis Phamplet

AMERICAN COLLEGE OF RHEUMATOLOGY
EDUCATION • TREATMENT • RESEARCH

Specialists in Arthritis Care & Research
2200 Lake Boulevard NE • Atlanta, GA 30319
Phone: (404) 633-3777 • Fax: (404) 633-1870
www.rheumatology.org • info@rheumatology.org

Reactive Arthritis

What is reactive arthritis?

Reactive arthritis is a joint disease that causes immobility in the hands due to inflammation.

What causes reactive arthritis?

Reactive arthritis occurs in reaction to a sexually transmitted disease (STD) that has spread to the joints in the hands. The STD, Chlamydia, causes arthritis by distorting your body's defense against infection. Chlamydia is a sexually transmitted disease (STD) that is transmitted via unprotected sex. Individuals with reactive arthritis are encouraged to immediately seek testing for this and other sexually transmitted diseases, as they are often contagious.

Reactive arthritis can have the following features:

- Pain and swelling of the joints, specifically in the hands and fingers
- Limited hand and finger mobility.
- Long term and unpredictable periods of having symptoms

Am I always going to have the symptoms?

An individual with reactive arthritis will have this condition for the rest of their life, and symptoms can be both chronic and unpredictable. While the pain and swelling can be mitigated with over the counter medications, there is no way to prevent the limited joint mobility associated with this condition.

Appendix G

Control Condition

Equal Employment Opportunity

Who is the Equal Employment Opportunity Commission?

The U.S. Equal Employment Opportunity Commission (EEOC) is responsible for enforcing federal laws that make it illegal to discriminate against a job applicant or an employee based on certain criteria.

What is Equal Employment Opportunity (EEO)?

Equal Employment Opportunity is the right of applicants to, and employees of, most employers to protection under Federal law from discrimination. The laws apply to all types of work situations, including hiring, firing, promotions, harassment, training, wages, and benefits.

What is legally protected?

EEOC Laws protect applicants and employees from discrimination in hiring, promotion, discharge, pay, fringe benefits, job training, classification, referral, and other aspects of employment. Further these Federal laws prohibit covered entities from retaliating against a person who files a charge of discrimination, participates in a discrimination proceeding, or otherwise opposes an unlawful employment practice.

EEO protects against discrimination based on the following characteristics:

- Race, Color, Religion, National Origin
- DISABILITY, AGE(40+)
- SEX(including pregnancy)
- Genetic Information

Who are required to follow EEO Laws?

Private Employers, State and Local Governments, Educational Institutions, Employment Agencies and Labor Organizations with at least 15 employees are covered by EEOC laws

CONTROL CONDITION QUIZ:

What does EEOC stand for?

- Enforcing Employment Outcomes Community
- Equivalence in Employment Opportunities Council
- Equal Employment Opportunity Commission

Which of the following is NOT protected by the EEOC

- Race
- Age
- Sexual Orientation

Pregnancy is considered a protected status

- True
- False
- Situational

At what age does an individual become protected from age discrimination?

- 40
- 44
- 53

The EEOC protects employees from discrimination in which of the following areas

- Pay
- Hiring
- Job Training
- All of the Above

Appendix H

Assessment Tasks

Example Employee File

Crescent Education Systems

Employee Name: Sid Agarwal
Date of Hire: 8/3/2011

PERSONAL INFORMATION

Address: 110 West Ct
City: Grove City State: OH
Zip: 43123

PREVIOUS EMPLOYMENT INFORMATION

Employer 1	Roles/Title	Start Date	End Date
MedIQ	Programmer	5/11/2009	8/1/2011
Tasks:	Created automated data creation/validation systems Designed and implemented analytic tools Developed backend/operational workflow systems Conducted product/research interviews Created project estimates and Coordinated with Interface Design Architects for meeting accessibility standards at code level		
Employer 2	Roles/Title	Start Date	End Date
HCL Technologies	IT intern	7/5/2006	6/6/2008
Tasks:	Created Web application front end as per design comps and information architecture Created conceptual diagrams and visual mock-ups Managed user interface specifications Conducted usability testing to resolve interface problems		

EDUCATION

School 1	Degree/Major	Start Date	End Date
Purdue University	Masters in Computer Science	6/23/2008	6/7/2010
School 2	Degree/Major	Start Date	End Date
Delhi University	Bachelor of Engineering – Computer Science	9/16/2002	5/30/2006
School 3	Degree/Major	Start Date	End Date

Certifications (if any):

- Java certified professional
- NIIT – C
- C++ certification

Meeting Minutes Task

Company Bylaws Amendment Meeting – Crescent Education Systems

---

Location: 1250 Caraway Ave, San Rafael California – Crescent Satellite Branch
Date: 12/20/14
Time: 11:30pm(Pacific Time Zone UTC-08:00)

Those Present

Joseph Azevedo
David Brill
Jennifer Orton
Summer Drewry
Kathryn Lang-Smith
Dr. Stephanie Hailey
Ryan Garcia
Brandon Harper
Dr. Elizabeth Brice
Viola Alexandra
Aaron Hoffman
Shawn Young

Reading of Agenda Items

1. Reading of Agenda Items – 12:35 PM
2. Motion: To approve the agenda for December 20th 2014 – 12: 45 PM

   Vote: Passed
   Resolved: Agenda for December 20th approved without modification

Council Sponsored Bills

3. CB 14 – Council Approved David Brill's Petition (12-Y 0-N)
4. CB 67 - Council Approved Dr. Stephanie Hailey's Petition (12-Y 0-N)
5. CB 71 - Council Approved Brandon Harper's Petition (12-Y 0-N)
6. CB 110 - Council Approved Jennifer Ortons's Petition (9-Y 2-N 1-A)
7. CB 145 - Council Approved Shawn Young's Petition (10-Y 2-N)
8. CB 150 - Council Rejected Viola Alexandra's Petition (8-Y 3-N)
9. CB 239 - Council Approved Dr. Elizabeth Brice's Petition (7-Y 4-N 1-A)
10. CB 282 - Council Rejected Joseph Azevedo's Petition (3-Y 9-N)
11. CB 376 - Council Approved Summer Drewry's Petition (12-Y 0-N)
12. CB 377 - Council Rejected Aaron Hoffman's Petition (5-Y 7-N)
13. CB 421 - Council Approved Ryan Garcia's Petition (12-Y 0-N)

14. CB 443 - Council Rejected Kathryn Lang-Smith's Petition (4-Y 8-N)
15. CB 480 - Council Approved Summer Drewry's Petition (11-Y 1-N)
16. CB 551 - Council Approved Shawn Young's Petition (11-Y 0-N 1-A)
17. CB 561 - Council Rejected Jennifer Orton's Petition (1-Y 4-N A-7)
18. CB 565 - Council Approved Joseph Azevedo's Petition (12-Y 0-N)
19. CB 649 - Council Approved Aaron Hoffman's Petition (12-Y 0-N)
20. CB 650 - Passed by for day (7-Y 2-N 3-A)
21. CB 651 - Council Approved Dr. Stephanie Hailey's Petition (12-Y 0-N)
22. CB 657 - Council Approved Brandon Harper's Petition (12-Y 0-N)

Employee Sponsored Bills

23. HOUSE BILLS WITH GOVERNOR'S RECOMMENDATIONS
24. EB 10 - Council Approved Paige Miller's Petition (7-Y 5-N)
25. EB 104 - Council Approved Sarah Trotter's Petition (6-Y 2-N 4-A)
26. EB 132 - Council Approved Caroline Murphy's Petition (12-Y 0-N)
27. EB 285 - Council Approved Anthony Campbell's Petition (8-Y 0-N 4-A)
28. EB 492 - Council Approved Blake Hammond's Petition (10-Y 2-N)
29. EB 791 - Council Approved Lauren Moretti's Petition (8-Y 4-N)
30. EB 882 - Council Approved Jake Anderson's Petition (11-Y 1-N)
31. EB1053 - Council Rejected Amy Keating's Petition (4-Y 5-N 3-A)
32. EB1072 – Passed by for the day (6-Y 2-N 3-A)
33. EB1110 - Council Approved Jason Reid's Petition (12-Y 0-N)

Motion to end Meeting

1. Motion: To End the 2nd Company Bylaws Amendment meeting – 2: 45 PM
2. Vote: Passed

Resolved: Meeting for December 20th adjourned (9-Y 3-N)

Company Bylaws Amendment Meeting – Crescent Education Systems

Location:	450 S. Liberty Ave, Ann Arbor Michigan – Research Division
Date:	12/20/14
Time:	2:30pm(Eastern Time Zone UTC-05:00)

Those Present

Joseph Azevedo
David Brill
Jennifer Orton
Summer Drewry
Kathryn Lang-Smith
Dr. Stephanie Hailey
Ryan Garcia
Brandon Harper
Dr. Elizabeth Brice
Viola Alexandra
Aaron Hoffman
Shawn Young

Reading of Agenda Items

34. Reading of Agenda Items – 2:35 PM
35. Motion: To approve the agenda for December 20th 2014 – 2: 45 PM

    Vote: Passed
    Resolved: Agenda for December 20th approved without modification

Council Sponsored Bills

1. CB 14 – Council Approved David Brill's Petition (02:47)
2. CB 71 - Council Approved Brandon Harper's Petition (02:50)
3. CB 421 - Council Approved Ryan Garcia's Petition (02:53)
4. CB 150 - Council Rejected Viola Alexandra's Petition (02:56)
5. CB 551 - Council Approved Shawn Young's Petition (02:58)
6. CB 443 - Council Rejected Kathryn Lang-Smith's Petition (03:00)
7. EB1053 - Council Rejected Amy Keating's Petition (03:05)
8. EB 285 - Council Approved Anthony Campbell's Petition (03:07)
9. CB 67 - Council Approved Dr. Stephanie Hailey's Petition (03:12)
10. CB 376 - Council Approved Summer Drewry's Petition (03:18)
11. EB 132 - Council Approved Caroline Murphy's Petition (03:20)
12. CB 480 - Council Approved Summer Drewry's Petition (03:27)
13. CB 239 - Council Approved Dr. Elizabeth Brice's Petition (03:28)

14. CB 145 - Council Approved Shawn Young's Petition (03:29)
15. CB 561 - Council Rejected Jennifer Orton's Petition (03:41)
16. EB 492 - Council Approved Blake Hammond's Petition (04:00)
17. CB 377 - Council Rejected Aaron Hoffman's Petition (04:03)
18. EB1072 – Passed by for the day (04:08)
19. CB 282 - Council Rejected Joseph Azevedo's Petition (04:15)
20. CB 110 - Council Approved Jennifer Ortons's Petition (04:16)
21. CB 650 - Passed by for day (04:18)
22. EB 104 - Council Approved Sarah Trotter's Petition (04:19)
23. EB 882 - Council Approved Jake Anderson's Petition (04:30)
24. EB 791 - Council Approved Lauren Moretti's Petition (04:40)
25. CB 649 - Council Approved Aaron Hoffman's Petition (04:55)
26. CB 565 - Council Approved Joseph Azevedo's Petition (05:00)
27. CB 651 - Council Approved Dr. Stephanie Hailey's Petition (05:11)
28. CB 657 - Council Approved Brandon Harper's Petition (05:20)
29. EB1110 - Council Approved Jason Reid's Petition (05:22)
30. EB 10 - Council Approved Paige Miller's Petition (05:42)

Motion to end Meeting

3. Motion: To End the 2nd Company Bylaws Amendment meeting (5: 45)
4. Vote: Passed

   Resolved: Meeting for December 20th adjourned (5:47)

Appendix I

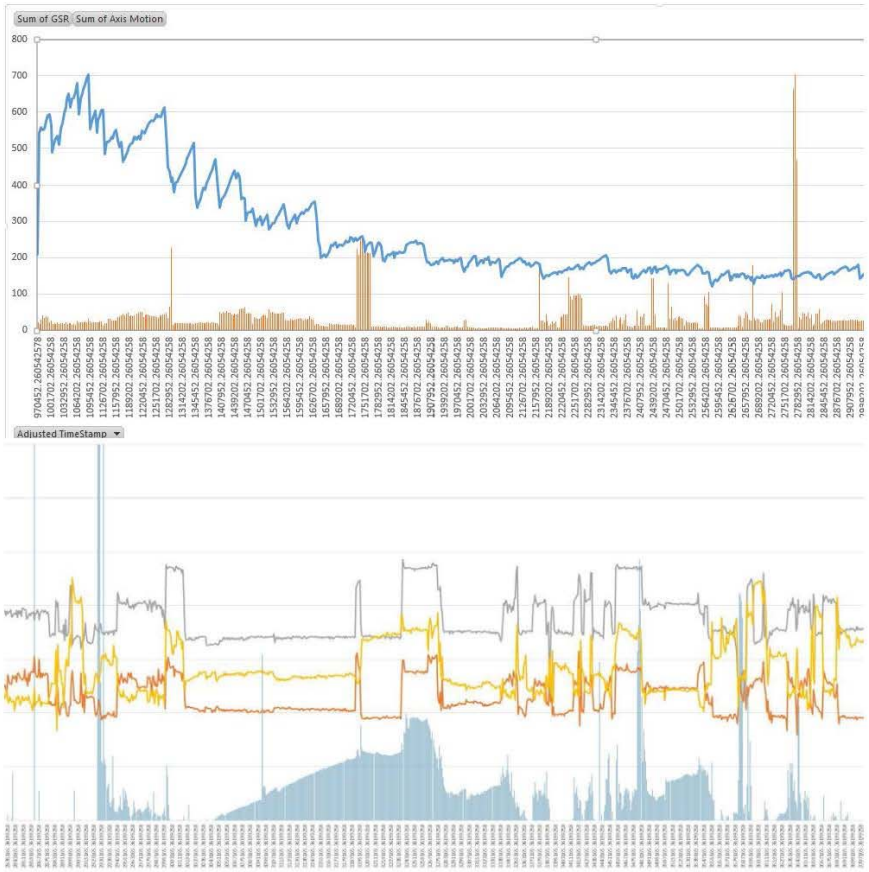
Stress Measure

In order to capture participant arousal levels (stress), I will be using a Galvanic Skin Response (GSR) sensor, provided by Shimmer (www.shimmersensing.com). The sensor is a small, wireless device that attaches to the participants wrist. It has two sensor "leads" that extend out and attach to the fingers as depicted below:

The sensor works by gauging the skins resistance to a very small current which is undetectable by humans. When the sympathetic nervous system is activated, as during periods of stress or general arousal, the resistance is reduced as a function of trace amounts of perspiration produced by eccrine sweat glands. By tracking these changes in the skins level of conductance/resistance, we are able to draw conclusions about the relative level of arousal of the participant.

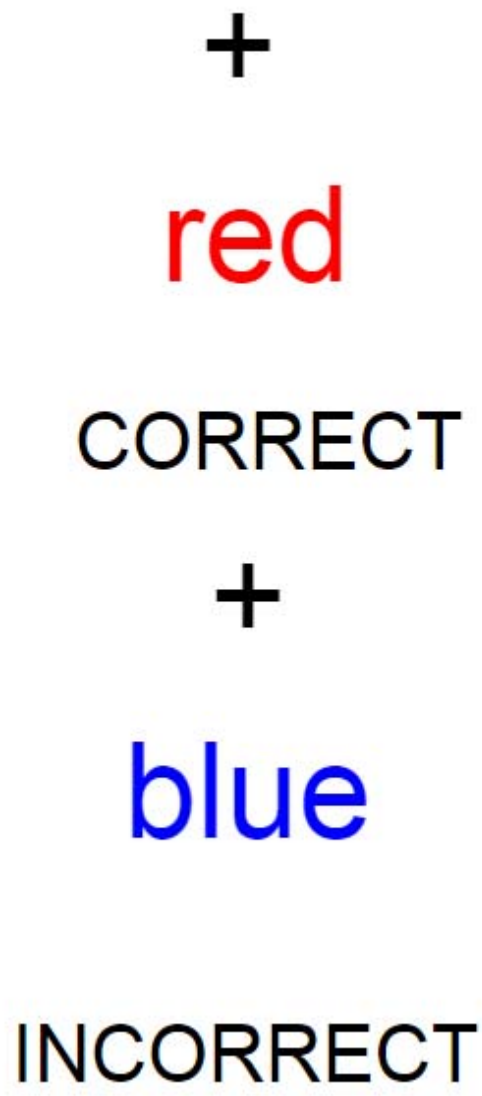
Data from the sensor (resistance as measured in Ohms) are captured several times per second and stored on the specific computer that the device is connected to via a Bluetooth wireless connection

Appendix J
Stress Output



Appendix K

Stroop Task



Appendix L

Disability Impact Assessment

Assuming the only source of information about your condition is the pamphlet presented earlier: how do you think those around you would respond in the following areas IF they knew/found out about your reactive arthritis?

Assuming the only source of information about your condition is the pamphlet presented earlier: how do you think those around you would respond in the following areas IF they knew/found out about your reactive arthritis?

	Very Negatively	Negatiively	Neither	Positivily	Very Positivily
Acceptance as a Co-Worker	○	○	○	○	○
Empathy towards people with your condition	○	○	○	○	○
Hireability	○	○	○	○	○
Perceptions of your morality	○	○	○	○	○
Judgements of you	○	○	○	○	○

	Very Negatively	Negatively	Neutral	Positively	Very Positively
How do you think Crescent would respond to your disability?	○	○	○	○	○
How do you think Crescent employees would respond to your disability	○	○	○	○	○

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Having this disability impacted my ability to perform on these job tasks	○	○	○	○	○
I feel comfortable talking about this disability with my hiring organization	○	○	○	○	○
I wish to disclose my disability to Crescent Education Systems	○	○	○	○	○
I would feel comfortable talking to Crescent about accomodations	○	○	○	○	○
I believe that CES will notice my disability, even without disclosure	○	○	○	○	○

Appendix M

Assessment Feedback Form

For the Future Consulting
1220 W. Washington Street
Indianapolis, Indiana, 46208
Phone: 317-931-0547
www.FTFConsult.com

Assessment feedback

Internship Selection Assessment

Candidate: Lisa Smart
Reviewer: John Walker

Assessment: CES Internship Selection
Weighting 75%

The qualities being assessed by this assignment are:

GQ1: Technical Competency – Use a computer to complete work tasks (40%)
GQ2: Efficiency – Ability to complete work tasks quickly (20%)
GQ3: Accuracy – Able to complete work tasks accurately (20%)
GQ4: Composure – Maintain a state of calm under stress (20%)

Key criteria for this assignment	Rating	Comments and advice for speaker for each criterion
Technical Competency(GQ1): Application by ▪ Display of basic typing skills ▪ Operation and control of basic computer processes		
Efficiency (GQ2): Calculated by ▪ Percentage of Assigned tasks completed		
Accuracy (GQ3): ▪ Percentage of work tasks completed accurately		
Composure (GQ4): ▪ Response to the work simulation		

• **Assessor Comments**	**Assessment grade**

Not achieved	Low level of ability, below the minimum standard for professional competence for the profession.	Some proficiency, not to the standard of professional practice and not in keeping with the minimum competency standards for the profession.	Level of competence reflects normal professional practice, equal to or above the level of the minimum competency standards for the profession.	Exceptional level of skills and competence, arguably better than normal contemporary practice

Appendix N

Disability Quiz

What is the primary reason someone will contract reactive arthritis?

- Genetic Factors
- Bacterial Infection
- Parasitic Infection

What bacteria is most closely associated with reactive arthritis?

- Chlamydia
- Tuberculosis
- Salmonella

What leads to contracting the bacteria associated with Reactive Arthritis?

- Food Poisoning
- Unprotected Sex
- Infection after an injury

Is the bacteria associated with reactive arthritis contagious?

- Highly Contagious
- Contagious
- Not Contagious

What is the primary symptom of reactive arthritis? (Note: not the bacteria that causes reactive arthritis)

- Low Enegy/Drowsiness
- Swelling/Inflamation of the Joints
- abdominal/chest pain

Appendix O

Demographics and Employment History

Demographics Form

1. Age:_____

2. Gender
   - ☐ Male
   - ☐ Female
   - ☐ Other

3. Ethnicity (please check all that apply):
   - ☐ White
   - ☐ Hispanic or Latino
   - ☐ African American
   - ☐ Native American
   - ☐ Asian/ Pacific Islander
   - ☐ Other

4. Class standing:
   - ☐ Freshman
   - ☐ Sophomore
   - ☐ Junior
   - ☐ Senior
   - ☐ Other

5. Are you a native English speaker?
   a. Yes
   b. No

<u>Employment Information</u>

6. Employment Status:
   - ☐ I am currently employed
   - ☐ I am not currently employed, but have been within the last year
   - ☐ I have not been employed within the last year

7. Please tell us about your most recent employment. If you are currently employed, tell us about that job. If you have not been employed within the last year, please skip to number 7.
    a. Type of employment
        - ☐ Full time
        - ☐ Part time

    b. Hours worked per week:_____

    c. Job Title:_____

    d. Time at job (in months):_____

8. What is your total work experience?

    Years:_____

    Months:_____