The assessment of attitudes toward overqualification

by

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Abstract

Overqualification represents an employment situation where an individual has excess knowledge, skills, abilities, experience, or other qualifications that are not required or applied in their current job. Previous research has identified positive and negative outcomes of overqualified workers. The present study developed and validated two scales assessing attitudes toward overqualification to gain a deeper understanding of overqualification. The first scale, employee's attitude toward overqualification, was developed based on person-job fit theory and assessed employee's attitude toward their overqualification. The second scale, perceived management attitudes toward overqualification, was developed based on human capital theory and assessed how the employee perceives management's attitude toward overqualified employees. Two samples were used to examine the factor structure and validate the scales. After exploratory and confirmatory factor analysis, the employee's attitude toward overqualification identified eight items loading onto two distinct factors of added organizational benefit and added personal benefit. The perceived management attitudes toward overqualification scale exploratory and confirmatory factor analysis identified eight items loading onto two distinct factors, recognition of assists and recognition of potential. Both scales were significantly and positively associated with person-job fit, perceived investment in employee development, and job satisfaction. Additionally, both scales were significantly and negatively associated with turnover intentions. Perceived management attitudes toward overqualification was significantly and negatively associated with perceived overqualification. The scales demonstrate incremental validity over and above perceived overqualification in predicting job satisfaction and turnover intentions. Together, the results suggest the need to assess attitudes toward overqualification to gain a more wholistic understanding of overqualification and organizational outcomes.

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Chapter 1 - Introduction

In the United States, it is estimated that one in four workers with a bachelor's degree is overqualified for their current position (Rose, 2017). This can be attributed to the fact that more individuals are obtaining a bachelor's degree and more organizations now use a bachelor's degree as a standard entry requirement for positions that formerly did not require one (e.g., telemarking, customer service representatives) (Taylor, Fry, & Oates, 2014). An increase in applicants and employees with a bachelor's degree has created a competitive workforce; however, when many individuals share the same baseline qualification, such as a bachelor's degree, the degree becomes just that, a baseline. This shift has led to a kind of job inflation where individuals with a bachelor's degree are accepting job offers for positions that they do not find challenging and are likely overqualified. Increasing entry requirements may create a situation where an individual may have excess knowledge, skills, and abilities (KSAs) that are not required in their current position but were acquired through their formal education in consideration that employers would require them to possess. Additionally, requirements for entry-level positions have increased due to the changing nature of work and the increase in formal education among the workforce. Moreover, the nature of work has shifted toward automation; many jobs have been replaced by computers or machines. This situation can also contribute to overqualification indirectly as there are fewer people required/needed to do the same job than before due to automation reducing the employee to workload ratio.

Overqualification represents an employment situation where an individual has excess knowledge, skills, abilities, experience, or other qualifications that are not required or applied in their current job (Erdogan, Bauer, Peiro, & Truxillo, 2011). Overqualification can affect employees at any stage in their career, although it is more common in recent graduates as they

have experienced greater access to public and/or private education and training resources (Taylor et al., 2014). Overqualification can also affect any age group, especially during an economic recession and/or downturn. Countries experiencing high unemployment rates creates a competitive employment situation where there are fewer jobs and many qualified applicants. Additionally, individuals may face overqualification when changing career fields, living as expatriates, or when returning to the workforce after a prolonged absence.

In their focal article, Erdogan et al. (2011) detail the issue of overqualification coming to the forefront in the post-recession economy. Many countries around the world felt the impact of the downturn in the economy, resulting in extremely high unemployment rates. The authors state that some 'truisms' of personnel selection are that overqualified job candidates are likely a poor fit for the organization, experience low job satisfaction, have low performance, and higher turnover.

Erdogan and colleagues build their focal article around the limited literature on overqualification in the industrial-organizational/organizational behavior fields. Yet, their article noted both advantages (e.g., receiving higher supervisor ratings of performance, Fine, 2007; Fine & Nevo, 2008; higher sales performance, Erdogan & Bauer, 2009) and disadvantages (e.g., higher turnover intentions, lower job satisfaction, lower organizational commitment, Harari, Manapragada, & Viswesvaran, 2017) to overqualification for both the employee and the organization. Understanding the employee's experience with their overqualification and why and/or when it may be beneficial and/or detrimental is an important next step to ultimately understanding how to better manage overqualified employees in the workplace.

If one in four workers with a bachelor's degree are overqualified for their current position, as Rose (2017) found, it may be a large limitation for organizations to dismiss

overqualified applicants due to potential negative outcomes. A deeper understanding of overqualified employees' attitudes is needed. The present study contends that overqualification does not exist in a vacuum and can be a double-edged sword. Previous research has identified both positive and negative outcomes of overqualification, however the context that evokes positive and negative experiences has yet to be determined. To this end, the present study attempts to develop and validate two scales 1) assessing employee's attitudes toward their overqualification and 2) assessing perceived management attitudes toward overqualified employees within the organization.

Chapter 2 - Review of Literature

Overqualification is defined as a situation where the individual has excess KSAs, education, experience, and/or other qualifications that are not required or applied in their current job (Erdogan et al., 2011). Overqualification differs from underemployment in that underemployment includes other aspects of undesirable employment situations such as working inadequate hours or working for inadequate pay. Objective measures of overqualification are typically used in the perspective of a potential employer in assessing applicants' qualifications and that of the job requirements (e.g., comparing employees' obtained qualification with job requirements). The psychological experience of the individual's involvement in overqualification needs to be discerned from objective measures of overqualification as objective measures fail to assess the subjective perception of one's overqualification. Many researchers suggest that subjective or perceived overqualification, which indicates the psychological responses to overqualification, is a more important aspect of overqualification (Hu, Erdogan, Bauer, Jiang, Liu, & Li, 2015; Luksyte, 2011; Luksyte, Spitzmueller, & Maynard, 2011; Maynard & Parfyonova, 2013). The subjective or perceived experience of overqualification might be more directly associated with one's attitudes toward work than objective overqualification. Thus, it is critical to measure and understand how the employee develops their subjective perceptions of overqualification and deals with their situation.

Previous research on perceived overqualification has focused primarily on relationships with various organizational outcomes. In general, perceived overqualification correlates with lower job satisfaction, lower organizational commitment, increased turnover intentions, (Harari et al., 2017; Maynard et al., 2006) and is positively related to stress (Johnson & Johnson, 1996). More specifically, Harari et al. (2017) conducted a meta-analysis and showed that perceived

overqualification has a positive correlation with job search behaviors and a negative correlation to psychological well-being. Their results also indicated perceived overqualification was positively associated with counterproductive work behaviors and lower self-ratings of organizational citizenship behaviors. Additionally, perceived overqualification was positively associated with increased levels of education, negative affectivity, higher narcissism, and objective overqualification. The authors noted that due to perceived overqualification having a negative association with psychological well-being, research is needed to develop interventions to help employees cope. Additionally, Johnson and Johnson (1997) found that negative implications of perceived overqualification were lessened for workers who had support from both their families and their organizations.

It is worth noting that most of the previous research on overqualification tends to consider the negative aspects of overqualification. Anecdotally, overqualified workers have been deemed a poor choice for personnel selection as they carry stigmas of negative organizational outcomes. Fine and Nevo (2008) studied customer service representatives in the United States and assessed their perceived cognitive overqualification, traditionally perceived overqualification, job attitude, and job performance. Although overqualification was positively associated with performance, overqualified workers reported lower job attitudes such that participants who were cognitively overqualified and traditionally overqualified had significantly lower job satisfaction. Further, the authors state their results support the notion that personnel managers should not hire overqualified job applicants as they are more likely to develop negative job attitudes (Fine & Nevo, 2008).

Disqualifying possibly overqualified applicants due to the potential for negative outcomes may not be the best solution considering the growing number of overqualified

workers/job applicants. Especially as one out of every four workers with a bachelor's degree is overqualified according to Rose (2017). The present study calls for an alternative perspective underscoring the role of management for creating an organizational environment that helps overqualified workers make the best use of their surplus skills, knowledge, and experience for their organizations and themselves. Erdogan and Bauer (2009) conducted a study on Turkish retail sales associates and found that empowerment moderated the negative effects of perceived overqualification on work attitudes and turnover such that empowerment alleviated the negative effects of perceived overqualification on job satisfaction and turnover. This finding emphasizes the importance of organizational support for overqualified workers and segues to the goal of the present study, developing two scales investigating both the individuals' attitudes toward their overqualification and their perceptions of management attitudes toward overqualified employees.

Overqualification research has shed light on some potential positive impacts of overqualified workers. Hu et al. (2015) examined boundary conditions for employee performance outcomes. Their results indicated when perceived overqualified participants worked with peers whose average overqualification level was high, as opposed to low, the participant perceived greater task significance, greater group-fit, and showed higher levels of in-role and extra-role performance. Russell, Ferris, Thompson, and Sikora (2016) proposed a framework for leveraging the underutilized resource of overqualified employees. They proposed that organizations provide opportunities for employees to participate in career development opportunities (i.e., job crafting, informal leadership, mentoring relationships), the politically skilled overqualified employees will capitalize upon the opportunities at hand and utilize their excess KSAs and experiences to make unique contributions, thus providing a valuable human resource to the organization. They further suggest that engaging in development opportunities

may benefit the employee (i.e., increased job satisfaction and reputation) and the organization (i.e., increased organizational commitment and promoting from within).

Research on overqualification has made significant contributions to the development and validation of perceived/subjective overqualification scales and to the examination of the potential impact overqualification may have on the various individual and organizational outcomes. The present study attempts to advance overqualification research by adopting a framework of organizational misfit in developing and validating two scales to better understand employees' attitudes toward their overqualification and their perceptions of management's attitudes toward overqualified employees within the organization.

Systematic Literature Review

A literature review using three search engines, PsychINFO, ProQuest, and Scopus, was conducted. Journal articles from January 2011 – February 2018 were searched to capture trends in research after Erdogan and colleagues' (2011) focal article. Two keywords 'overqualified' and 'overqualification' were entered into each search engine, respectively. After completing the process for all three search engines, a total of 87 unique articles were identified. Next, the 87 articles were reviewed by two undergraduate lab members who were trained on the inclusion criteria for the articles. Inclusion criteria for the articles included: articles must provide an operational definition of overqualification, articles must have a quantitative measure of overqualification, and articles must be available in English. Additionally, one metanalysis and all response articles to the Erdogan et al. (2011) article were also excluded. After reviewing the articles, 41 relevant articles remained that were published since Erdogan and colleagues' (2011) focal article.

A cluster dendrogram was created using Euclidean distance-based text mining in the opensource statistical package "TM" (Feinere & Hornik, 2018) in R using the abstracts from the 41 studies identified in the literature review (See Appendix D for text mining R commands). Figure 1 illustrates the cluster dendrogram. The dendrogram identifies research trends in the literature and provides two overarching meaningful clusters. First, since 2011, research has mainly focused on conceptualizing and measuring overqualification. Specifically, keywords such as mismatch, perception, subjective, education, requirements, skills, role, and underemployment were identified in supporting the first cluster. Second, research has focused on the outcomes of overqualification, specifically looking at outcomes of job satisfaction and performance. Not shown through the text mining approach, four out of the 41 (9.8%) studies focused on turnover intentions of overqualified employees. The present study will go beyond extant overqualification research by proposing that it is not overqualification itself but its combination with employee's attitudes toward overqualification and the perception of management's attitude toward overqualification that might lead to either positive or negative organizational outcomes.

After all relevant articles were identified, the next step was to identify overqualification scales and analyze them for the clear operationalization of perceived overqualification. In total, seven unique scales were identified in the literature review. Johnson and Johnson's (1996; 1997) ten-item measure of perceived overqualification and Maynard, Joseph, and Maynard's (2006) nine-item scale of perceived overqualification (SPOQ) were the most frequently used scales. Previous research has not concluded whether the overqualification construct is unidimensional or multidimensional. The two most common scales disagree in the number of latent factors of perceived overqualification. Johnson and Johnson's (1996; 1997) ten-item perceived overqualification scale indicates two factors, a perceived "mismatch" factor, and a perceived "no

grow" factor. The "mismatch" factor corresponds to a mismatch between the KSAs of the worker and those required for the job, while the "no grow" factor corresponds to change and growth within a job or career. Maynard et al.'s (2006) SPOQ identified a single factor, with items tapping into perceptions of surplus education, experience, and KSAs.

The "mismatch" factor of Johnson and Johnson's (1996; 1997) perceived overqualification scale (example items include "My formal education overqualifies me for my present job" and "My work experience is more than necessary to do my present job'') and Maynard et al.'s (2006) scale of perceived overqualification (example items include "My job requires less education than I have" and "The work experience that I have is not necessary to be successful on this job") have a strong resemblance. However, it is noteworthy that from the standpoint of the present study, Johnson and Johnson's perceived overqualification scale captures more than the perception of one's overqualification. Particularly, its "no grow" factor (example items include "The day-to-day content of my job seldom changes" and "My job has a lot of potential for growth and change") involves judgment on one's working context whether it offers some opportunities in which one can utilize one's excess knowledge, skills, and abilities. Thus, it is more representative of potential reasons why one views their overqualification positively or negatively, than mere perception of overqualification. The present study's primary aim is to sort out and discern the perception of overqualification and contextual factors in which overqualification is interpreted either positively or negatively. Specifically, an employee's personal attitude toward their overqualification as well as their perception of management's attitude toward overqualified employees are assumed to be key contextual factors that may frame one's overqualification in different ways.

Theoretical Background

In their focal article, Erdogan and colleagues (2011) state the three most probable theoretical explanations of perceived overqualification are relative deprivation theory, equity theory, and person-job fit theory. Relative deprivation theory is used in overqualification research to understand how overqualified individuals may feel deprived in comparison to their peers. Erdogan et al. (2011) provide an example, suggesting that individuals who go to college will have higher employment expectations. If those individuals can only find a job that is typically held by someone with a high school education, even with good benefits and pay, the college-educated may feel deprived of the better employment opportunities they feel they deserve. Equity theory is used in overqualification research to describe the surplus inputs (e.g., education, training, experiences, commitment, skills) overqualified employees bring to an organization and the outcomes they receive (e.g., salary, employee benefits, praise, responsibility). Individuals determine equity perceptions by comparing their outcomes to their inputs in the form of a ratio. Their ratio is compared to their perceptions of similar other's ratio. The subjective comparison between the individual's ratio and the perceived similar other's ratio is what determines perceptions of equity. Erdogan et al. (2011) assert equity theory is utilized in understanding the response overqualified employees may choose to take to make the ratio equal (e.g., quit, negotiate for responsibility, job crafting, coping mechanisms). Person-job fit theory is used in overqualification research to understand the match between the person and their job.

The present study adopts person-job fit theory and human capital theory to comprehensively appreciate the context of overqualification. Person-job fit theory involves an array of comparison and/or analysis of discrepancy between two or more entities. Based on this paradigm of discerning match or mismatch between person and a given context, the present

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study calls for the need to not exclusively examine overqualification itself, but also examine the employee's and perceived management attitudes toward overqualification for a better understanding of overqualification within organizations. Human capital theory considers how we can make more efficient use of the surplus resources of overqualified employees to potentially benefit both the overqualified employees, by providing them opportunities to tap into their surplus KSAs, and the organization with the surplus KSAs of the overqualified employees. Like person-job fit theory, human capital theory also views that employee overqualification can be either positive or negative, depending on the match between overqualified employees and management's proper treatment of overqualified employees. These theories provide a rationale for the contrary contexts in which one's overqualification perception is framed, leading to positive or negative attitudes toward one's work, and subsequently leading to corresponding work outcomes.

Person-job fit.

Person-environment fit is broadly defined as the compatibility between a person and their work environment (Edwards, Caplan, & Harrison, 1998). Fit occurs when these characteristics are well matched, and misfit occurs when their characteristics are not well matched (Kristof-Brown, Zimmerman, & Johnson, 2005). Kristof-Brown and colleagues (2005) offer that person characteristics of fit may include biological or psychological needs, values, goals, abilities, or personality. Environmental characteristics of fit may include demands such as job requirements, role expectations, and group organizational norms or abilities, skills, and training.

Person-job fit is a subdomain of person-environment fit and is more narrowly defined. Person-job fit considers the person's characteristics and the tasks or skills required to perform the job. There are two basic conceptualizations of person-job fit that Edwards (1991) outlined. The

first form of person-job fit outlined is the demands-ability fit which considers the employees' KSAs and examines how they are in line with what the job requires. The second form of person-job fit considers the employees' needs, desires, goals, or preferences and how they are met in their job. Figures 2 and 3 illustrate the overqualification situation within the framework of person-job fit. Specifically, figure 2 demonstrates the level of qualification the organization expects and the level of qualification the employee possesses. Match is shown as the solid diagonal line. Mismatch above this line represents underqualification and mismatch below represents overqualification. Figure 3 represents the relationship between rewards and qualifications an employee possesses. Match again is shown as the diagonal line. The dotted line represents overqualification with the shaded area indicating the gap between the anticipated and received rewards given the mismatch. When this gap is greater, person-job fit is poorer and the likelihood of negative outcomes such as stress or turnover intention is greater. According to the present study, lack of person-job fit would be determined not solely by one's overqualification, but by the mismatch as a function of overqualification perception (person) and employee's attitudes toward their overqualification in their work context (job).

Human capital theory.

Human capital theory (Becker, 1994), an economic theory influenced by Adam Smith, is especially popular in human resource management as it considers expenditures on education, training, medical care, etc. as investments in capital. Capital is generally considered in terms of physical assets such as stocks, bank accounts, and property; however, human capital theory considers non-physical capital. Human capital is a collection of traits such as education, training, experience, intelligence, judgment, etc. that is possessed by individuals at a micro-level and collectively by individuals in a population at a macro-level. Individuals can increase their capital

by receiving training, education, or increasing their skills. Their new skills and education can then be used for production. The individual/workforce production level benefits the organization, while the employees are compensated with money and other benefits. Human capital analysis suggests that education increases earnings and productivity by providing knowledge, skills, and a method to analyze problems (Becker, 1994). Therefore, investing in human capital by developing employees should, in theory, benefit many aspects of the organization at a micro-level and the economy at a macro-level. Thus, investing and developing human capital provides a strong foundation for the economic development of an organization and nation for a long period of time (Becker, 1994). Investments in human capital are not tangible, they are inherent in the individual and cannot be owned by an organization. If an individual decides to leave an organization their human capital goes with them.

Based on human capital theory, there are potential benefits for hiring overqualified employees and for being an overqualified employee. Overqualified employees generally have higher capital. Peiró, Sora, and Caballer (2012) posit that overqualified employees are potentially highly-valuable employees and may in turn experience lower levels of job insecurity due to their surplus KSAs. Organizations may frame overqualification positively, such that the organization views overqualified employees as assets, especially for development and promotion in further developing the organization. Employees who perceive themselves as overqualified have a benefit as they bring their knowledge, skills, experience, and education to an organization. If the employee decides to leave an organization their knowledge, skills, experience, and education goes with them. Human capital captures how effectively an organization utilizes its workforce; this can be seen in the creativity and innovation of an organization. Kracke, Reichelt, and Vicari (2018) suggest that overqualification is a human capital mismatch between the employee's KSAs

and that required by the job. Management can note and capitalize on the possible innovation and creativity overqualified employees bring to the organization by trying to match the surplus KSAs the employee possesses to create an optimally productive employee (Kracke et al, 2018). Management can treat overqualified workers as valuable resources or have an attitude that overqualification is a surplus. According to the present study, employees' overqualification indicates more than sufficient human resources for organizations, which can be either positive or negative. Overlooked and under-recognized surplus qualifications of employees can be associated with negative organizational outcomes such as low job satisfaction and engagement. Meanwhile, a focused and rendered useful utilization of surplus qualifications of employees can be associated with positive organizational outcomes such as higher motivation and a sense of belonging.

In sum, person-job fit theory and human capital theory provide a clarification of the definition of overqualification. By doing so, these theories attempt to identify the pertinent contexts of overqualification.

Procedure and Hypotheses

The primary goal of the present study was to develop and validate two scales assessing 1) employee's attitude toward overqualification and 2) the perception of management attitudes toward overqualified employees. Item generation followed the recommended steps by DeVellis (2017) and Hinkin (1998) and was guided by person-job fit theory and human capital theory to ensure face and content validity. Consensus was strived for among the participating subject matter experts. After developing items for both scales, exploratory factor analyses (EFA) were conducted to refine the item sets and identify the underlying measurement structures of the scales

(Sample 1). Then, confirmatory factor analyses (CFAs) were conducted using an additional data set to confirm the appropriateness of the measurement models of both scales (Sample 2).

The first set of hypotheses examines the concurrent criterion-related validity of the scales. Based on person-job fit theory, if employees have the perception that their overqualification is useful and beneficial in their current work, the employee will sense that they are a good fit for their work. Put differently, if employees have a positive attitude toward their overqualification because their overqualification helps meet their needs and expectations within and outside their job, they are more likely to develop a greater sense of person-job fit. Meanwhile, perceptions of management attitudes toward overqualification may be supportive in recognizing overqualification and offer opportunities for employees to utilize their surplus KSAs and experiences. Alternatively, organizations may view overqualification as a surplus and not act to utilize it. Based on human capital theory, employees carry their capital and organizations can invest in growing their employees' capital, which in turn builds the organization's capital. Therefore, perceived management attitudes toward overqualification should have a positive association with employee development.

Hypothesis 1a. Employee's attitude toward overqualification will be significantly and positively associated with person-job fit.

Hypothesis 1b. Perceived management attitudes toward overqualification will be significantly and positively associated with perceived investment in employee development.

The next set of hypotheses examines the incremental validity for both scales. Previous research has consistently found that overqualification is negatively related to job satisfaction (Fine & Nevo, 2008; Harari et al., 2017; Maynard et al., 2006,). This relationship is examined

with the scale of perceived overqualification (SPOQ) in conjunction with employee's attitude toward overqualification and perceived management attitudes toward overqualification scales in assessing their association with job satisfaction. Together these scales should provide more insight into the relationship with job satisfaction than Maynard et al.'s (2006) scale of perceived overqualification itself as employee's and the perception of management's attitudes are important contexts in which overqualification is framed positively or negatively.

Hypothesis 2a. Perceived overqualification along with employee's attitude toward overqualification will predict job satisfaction better than the scale of perceived overqualification itself.

Hypothesis 2b. Perceived overqualification along with perceived management attitudes toward overqualification will predict job satisfaction better than the scale of perceived overqualification itself.

Hypothesis 2c. Perceived overqualification along with both measures of employee's attitude and perceived management attitudes toward overqualification will predict job satisfaction better than the scale of perceived overqualification itself.

Previous research has also found that employees who are perceived as overqualified have higher turnover intentions (Harari et al., 2017; Maynard et al., 2006). Person-job fit considers the fit of the person and the job, if there is poor fit, an employee may consider leaving the organization in search of a better fit. A deeper understanding of when overqualification is a good fit is needed. Additionally, human capital theory suggests that the organization should desire to retain overqualified employees as they may have valuable capital that the organization could utilize. It is worthwhile to examine the relationship between perceived overqualification, employee's attitude toward overqualification, and management attitudes toward

overqualification and their relationship with turnover intentions. To examine whether the attitudes toward overqualification scales provide more insight into the relationship with turnover intentions than Maynard et al.'s (2006) scale of perceived overqualification itself, hypothesis 3a, 3b, and 3c regarding the incremental validity were created.

Hypothesis 3a. Perceived overqualification along with employee's attitude toward overqualification will predict turnover intentions better than perceived overqualification itself.

Hypothesis 3b. Perceived overqualification along with perceived management attitudes toward overqualification will predict turnover intention better than perceived overqualification itself.

Hypothesis 3c. Perceived overqualification along with both measures of employee's attitude and perceived management attitudes toward overqualification will predict turnover intentions better than perceived overqualification itself.

Additionally, potential interactions between perceived overqualification and either/both of employee's and management's attitudes toward overqualification was examined to see if employee's and management's attitudes toward overqualification serve as valuable contexts for the relationship between overqualification, job satisfaction, and turnover intentions. Based on person-job fit theory, it can be posited that if one feels overqualified and has a positive attitude toward their overqualification, they might report greater job attitudes, such as job satisfaction. Furthermore, based on human capital theory, if one feels overqualified and perceives management to be supportive of their overqualification, they may also experience greater sense of recognition, which can be associated with greater satisfaction at work. If it turns out that positive attitudes toward overqualification (either by employees or management) further enhance

the overqualification to job satisfaction relationship, overqualification may be something that can be encouraged, rather than avoided. If there is no interaction, that would suggest employee's or management's attitudes toward overqualification are not necessarily dependent on employee's perceived overqualification, playing independent roles in promoting job satisfaction.

Hypothesis 4a. The relationship between perceived overqualification and job satisfaction will be stronger when employees have positive attitudes toward their overqualification.

Hypothesis 4b. The relationship between perceived overqualification and job satisfaction will be stronger when management has positive attitudes toward employees' overqualification.

As previous research has found that overqualified employees have higher turnover intentions, it is of interest to examine possible interaction effects (Harari et al., 2017; Maynard et al., 2006). Building on person-job fit theory, if one feels they have poor job fit due to their overqualification, they might decide to leave the organization to find a better fit. It is worthy to examine the interaction between perceived overqualified employees and their attitude toward their overqualification (e.g., high or low) and its relationship to turnover intentions. Additionally, drawing from human capital theory, if one perceives themselves to be overqualified, based on the level of perceived management support of overqualification (e.g., high or low), they may have different turnover intentions (e.g., quit or stay). If organizations are supportive of their overqualified employees, their overqualified employees may have lower turnover intentions.

Hypothesis 5a. The relationship between perceived overqualification and turnover intention will be stronger when employees have negative attitudes toward their overqualification.

Hypothesis 5b. The relationship between perceived overqualification and turnover intention will be stronger when management has negative attitudes toward employees' overqualification.

Chapter 3 - Methods

Participants

I evaluated employee's attitudes toward perceived overqualification and the perceptions of management attitudes toward overqualification for 447 (Sample 1) and 503 (Sample 2) full-time workers. Rose (2017) estimates that one in four workers in the United States with a bachelor's degree are overqualified for their current position. Therefore, specifying participants' baseline education level of a bachelor's degree was of interest in order to tap into this proposed population of overqualified individuals. To ensure participants perceived themselves as overqualified, all participants were given a definition of overqualification. Participants were then asked if they were overqualified for their current job or position based upon the definition provided. If participants selected 'yes' they were directed to the survey, if participants selected 'no' they were thanked for their time and not allowed to continue the survey. Additionally, participants that answered two of the attention check items incorrectly were removed from the sample. Nine participants from sample 1 (1.97%) and ten participants from sample 2 (1.95%) were removed for careless responding.

Sample 1 (n = 447) participants were recruited through Amazon's Mechanical Turk and were paid $1.75 for their participation. Participants were 54.4% male, 80.8% were Caucasian and the mean age was 37.34 years (SD = 9.35). Majority of participants had a bachelor's degree (65.8%) as their highest educational level. The top three industries reported were education (15.0%), healthcare (9.2%), and government (6.3%). Sample 2 participants (n = 503) were also

recruited using Amazon's Mechanical Turk and paid $2.50 for their participation. Participants

had a mean age of 37.94 years (SD = 9.72), 50.3% were male and 79.9% were Caucasian.

Majority of participants had a bachelor's degree (64.8%) as their highest educational level. The

mean tenure of participants was 7.53 years (SD = 7.30). The top three industries reported were

education (18.3%), retail (9.3%), and healthcare (8.2%).

Amazon's Mechanical Turk was utilized to access full-time workers with a minimum

education level of a bachelor's degree, who are fluent in English, and perceived themselves to be

overqualified for their current job. Using online samples can create potential limitations (e.g.,

bots, pencil whipping). Steps were taken to minimize the negative impact of these limitations.

First, only workers with an approval rating of 97% or higher could access the survey. This rating

is given by previous requesters (researchers collecting data) who can approve or reject their data

if they believe the participant was responding carelessly. Second, a question from the Test of

English as a Foreign Language (TOEFL) was included to screen out any participants that are not

fluent in English. This was required as I wanted to ensure the quality of the data was not

compromised by participants not understanding the language used. Third, a reCAPTCHA was

included at the beginning of the survey to eliminate any responses from artificial intelligence

systems ("bots"). Amazon's Mechanical Turk policy forbids workers from using bots; however,

some workers still choose to do so (McCreadie, Macdonald, & Ounis, 2010). To further ensure

the quality of the data, an item was included as a question imbedded into an image (e.g., "What

is 33 minus 3?"). This was added as a measure to ensure bots had not breeched the reCAPTCHA,

as bots cannot accurately respond to this type of question. Finally, three attention check items

were included to ensure participants were giving the survey their attention and not carelessly

responding to the items. One item from Meade and Craig (2012) and two items from DeSimone, Harms, and DeSimone's (2015) were randomly placed throughout the survey.

Initial Scale Development

Two scales were developed to assess employee's attitude toward their overqualification (Scale 1) and their perceptions of their organizational management attitudes toward overqualified employees (Scale 2). Both scales were created using the development techniques proposed by DeVellis (2017) and Hinkin (1998). Items for both scales were generated after a literature review and in consideration with theoretical foundations of overqualification. Person-job fit theory was used to develop items for employee's attitude toward overqualification. These items were written to reflect how the employee may feel about their current situation as an overqualified worker. Human capital theory was used to develop items for perceived managements attitude toward overqualification. These items were written to reflect how the employee perceives the organizational agent's/management's attitude toward employee overqualification in recognizing and/or supporting their overqualification.

Next, both scales were reviewed by subject matter experts (one psychology assistant professor, one doctoral psychology student, and four undergraduate psychology students) with knowledge of the overqualification literature to assess the clarity and content of each item and scale respectively. An interacting group approach was used to discuss and determine the theoretical and conceptual relevance of the individual items that were originally developed based on the existing overqualification related scales (Ven & Delbecq, 1974). Originally, I developed 35 items for the employee's attitude toward overqualification scale. After the interacting group discussion, checking for redundancies, representativeness, and double-barreled items, this scale had 22 remaining items. Perceived management attitudes toward overqualification had 24 items

originally. Following the integrating group discussion, this scale had 17 items remaining. Initial items for both scales can be found in Appendix C.

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Materials

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Person-job fit.

To assess person-job fit, Brkich, Jeffs, and Carless' (2002) nine-item person-job fit scale was used to examine the criterion-related validity of employee's perception. Responses were provided on a 1 (strongly disagree) to 7 (strongly agree) Likert-type scale. An example item was "I feel that my goals and needs are met in this job" and internal consistency was satisfactory (Cronbach's $\alpha = .94$).

Perceived investment in employee development.

Perceived investment in employee development was measured using Lee and Bruvold's (2003) nine-item measure of perceived investment in employee development (PIED). Responses were provided on a 1 (strongly disagree) to 7 (strongly agree) Likert-type scale. An example item was "My organization provides career counselling and planning assistance to employees" and internal consistency was satisfactory (Cronbach's $\alpha = .92$).

Perceived overqualification.

Maynard, Joseph, and Maynard's (2006) scale of perceived overqualification (SPOQ) nine-item measure was used to test the incremental validity of the employee's attitude toward overqualification scale. Item responses were obtained on a 1 *(strongly disagree)* to 7 *(strongly agree)* Likert-type scale. An example item was "I have job skills that are not required for this job" and internal consistency was satisfactory (Cronbach's $\alpha = .88$).

Job satisfaction.

Agho, Price, and Mueller's (1992) six-item measure of overall job satisfaction was used to assess job satisfaction. Item responses were obtained on a 1 *(strongly disagree)* to 7 *(strongly agree)* Likert-type scale. An example item was "I feel fairly well satisfied with my present job" and internal consistency was satisfactory (Cronbach's α = .94).

Turnover intention.

Adams and Beehr's (1998) three-item measure was used to assess turnover intentions. Item responses were obtained on a 1 *(strongly disagree)* to 7 *(strongly agree)* Likert-type scale. An example item was "I often think of quitting this job and finding another" and internal consistency was satisfactory (Cronbach's α = .95).

All items for the measures can be found in Appendix C. Also, descriptive statistics such as means and standard deviations as well as inter-correlations of the study variables are presented in Table 8.

Chapter 4 - Results

Employee's Attitude Toward Overqualification EFA:

The structure of the scale was examined using exploratory factor analysis (principal axis factoring, direct oblimin rotation) in SPSS (25.0) on Sample 1. Item-total statistics (Table 1) and inter-item correlations (Table 2) of the variables were examined. One item was removed for having a corrected item-total correlation below .40 (Hinkin, 1998) and six negatively worded items were removed. The negatively worded items were reverse coded before analyses began; however, the six negatively worded items created negative item correlations and were subsequently removed as suggested by Wang, Chen, and Jin (2015). After removing the reverse coded items, a scree plot was examined to identify factors with an eigen value above 1 (Hinkin, 1998). Initially, three factors had eigen values above 1. However, after removing one item for cross-loading onto two factors, the third factor's eigen value fell below 1. The EFA was reanalyzed and two additional items were removed for cross-loading onto two factors. The EFA was analyzed again and two items were removed for factor loadings below .60 (McCann, 1990; Sattler, Kaiser, & Hittner, 2000), one item was removed for clarity purposes, and one item was removed for redundancy. After reanalysis, the final set of eight items load onto two distinct factors. Figure 4 illustrates a naturally-occurring break or "elbow point" in the eigen values after the second factor. Of the final items, five items load onto the factor "Added Organizational Benefit". This factor contains items that correspond with the additional aspects the employees' overqualification adds to their organization and accounts for 53.45% of the total variance in scale scores. Additionally, three items load onto the factor "Added Personal Benefit". This factor contains items that correspond to the personal advantages of their overqualification and accounts for 23.62% of the total variance in scale scores. Factor loadings for each item are displayed in

Table 3. Cronbach's alpha was computed for each factor respectively and the scale. The added organizational benefit factor had an alpha of .93 and added personal benefit had an alpha of .89. The employee's attitude toward overqualification's alpha was .90. The correlation between the two subscale factors was .34. Together, the two factors account for 77.07% of the total variance in scale scores.

Employee's Attitude Toward Overqualification CFA

Confirmatory factor analysis (CFA) was conducted on the employee's attitude toward overqualification scale in R using the "lavaan" package (Rosseel, 2012). Hu and Bentler (1999) suggest using a criteria of comparative fit index (CFI) above .95, tucker-lewis index above .95 and the root mean square error of approximation (RMSEA) less than .10 to indicate adequate model fit. Sample 2 data was used to analyze the CFA. The fit indices indicate adequate model fit (Table 7). The RMSEA is above .08, which could be indicative of poor fit (MacCallum, Browne, & Sugawara, 1996). However, Kline (1998) and Hu and Bentler (1999) state a RMSEA less than .10 is indicative of acceptable fit. Additionally, RMSEA less than .10 has been viewed as acceptable fit in previous studies (Demir & Urberg, 2014; Hopwood & Donnellan, 2010; Klein, Cooper, Molloy, & Swanson, 2014; Resnick & Inguito, 2011).

The correlation between subscale factors was .41. A second-order CFA was adopted to confirm the employee's attitude toward overqualification scale loads onto the two underlying subscales, namely added organizational benefit and added personal benefit. The fit was acceptable, thus providing evidence that supports the use of an aggregate scale score (χ^2 = 103.21, df = 18, CFI = .97, TLI = .96, RMSEA = .10, SRMR = .05). To establish the difference between the employee's attitude toward overqualification scale and other correlated constructs, such as job satisfaction, additional CFA models were conducted. The item content in the

employee's attitude toward overqualification scale and job satisfaction are conceptually different. The items in the job satisfaction scale represent satisfaction and enjoyment in one's work. The items in the employee's attitude toward overqualification scale represent how the individual's overqualification benefits both their organization and themselves. A three-factor CFA model was conducted with both subfactors from the employee's attitude toward overqualification scale and the single factor from the job satisfaction scale. The fit was moderately acceptable (χ^2 = 381.04, df = 74, CFI = .95, TLI = .94, RMSEA = .09, SRMR = .06). Last, a CFA was conducted using one factor to account for all eight items in the employee's attitude toward overqualification scale and the six items in the job satisfaction scale. The fit was not acceptable, thus providing evidence the two scales of employee's attitude toward overqualification and job satisfaction are conceptually different. (χ^2 = 2801.09, df = 77, CFI = .57, TLI = .49, RMSEA = .27, SRMR = .19).

Perceived Management Attitudes Toward Overqualification EFA:

An EFA (principal axis factoring with direct oblimin rotation) was conducted in SPSS (25.0) on Sample 1 of the perceived management attitudes toward overqualification scale. Item-total statistics (Table 4) and inter-item correlations (Table 5) of the variables were examined. One reverse coded item was removed for a corrected item-total correlation below .40 (Hinkin, 1998). A scree plot was examined to identify factors with an eigen value above 1 (Hinkin, 1998). Initially, three factors had eigen values above 1. Three items were then removed for cross-loading onto multiple factors. A two-factor solution was then identified with eigen values above 1. Additionally, Figure 5 illustrates a naturally-occurring break or "elbow point" in eigen values after the second factor. One item was removed for cross-loading, three items were removed for redundancy, and one was removed for being a "double-barreled" item. After reanalysis, the final

set of eight items load onto two distinct factors. Five items load onto the factor "Recognition of Assets", accounting for 63.37% of the total variance in scale scores. This factor contains items that correspond to the organization recognizing the current assets of their overqualified employees. Three items load onto the factor "Recognition of Potential", accounting for 17.18% of the total variance in scale scores. This factor contains items that correspond with the future potential advantage of the organization's overqualified employees. Factor loadings for each item are displayed in Table 6. Cronbach's alpha was examined for each factor respectively and the scale. The factor recognition of assets had an alpha of .93 and the factor recognition of potential factor alpha was .94. The scale of perceived management attitudes toward overqualification alpha was .94. The correlation between the two subscale factors was .58. Together, the two factors account for 80.55% of the total variance in scale scores.

Perceived Management Attitudes Toward Overqualification CFA

A CFA was conducted on the perceived management attitudes toward overqualification scale using the "lavaan" package in R (Rosseel, 2012). Sample 2 data was used to analyze the CFA of the two-factor scale. The two factors were allowed to correlate within the model Hu and Bentler's (1999) fit criteria were again used to determine the goodness-of-fit. The goodness-of-fit statistics for the two-factor model can be found in Table 7. The scale has adequate fit as the RMSEA is below .10 (Klein, 1998) and the TLI and CFI are both above .95 (Hu & Bentler, 1999).

The correlation between subfactors was .69. A second-order CFA was adopted to confirm the perceived management attitudes toward overqualification scale loads onto the two underlying subscales, namely recognition of assets and recognition of potential. The fit was acceptable, thus providing support for the use of an aggregate scale score (χ^2 = 88.69, df = 18, CFI = .98, TLI =

.97, RMSEA = .09, SRMR = .03). To establish the difference between the perceived management attitudes toward overqualification scale and other correlated constructs, such as perceived investment in employee development, additional CFA models were conducted. The item content in the perceived management attitudes toward overqualification scale and perceived investment in employee development are conceptually different. The items in the perceived investment in employee development scale represent career development and career planning support from the organization. The items in the perceived management attitudes toward overqualification scale pertain to the view of overqualification as an asset and resource for organizations. A three-factor CFA model was conducted with both subfactors from the perceived management attitudes toward overqualification scale and the single factor from the perceived investment in employee development scale. The fit was moderately acceptable (χ^2 = 537.53, df = 116, CFI = .95, TLI = .94, RMSEA = .09, SRMR = .05). Last, a CFA was conducted using one factor to account for all eight items in the perceived management attitudes toward overqualification scale and the nine items of the perceived investment in employee development scale. The fit was not acceptable, thus providing evidence the two scales of perceived management attitudes toward overqualification and perceived investment in employee development are conceptually different (χ^2 = 2044.57, df = 119, CFI = .75, TLI = .71, RMSEA = .18, SRMR = .08).

Combined Scales CFA

A CFA was conducted on both the employee's attitude toward overqualification scale and the perceived management attitudes toward overqualification scale simultaneously. The "lavaan" package in R (Rosseel, 2012) was used to examine the CFA on Sample 2 data. The goodness-of-

fit statistics for the four-factor model can be found in Table 7. The fit indices remained acceptable.

Hypotheses Testing

To examine hypotheses 1a and 1b, correlations among the scales were examined in jamovi. Hypothesis 1a was supported, the employee's attitude toward overqualification scale was significantly correlated with person-job fit ($r = .44$, $p < .01$). Hypothesis 1b was also supported, such that perceived management attitudes toward overqualification was significantly associated with perceived investment in employee development ($r = .77$, $p < .01$). See Table 8 for correlation matrix.

Hypotheses 2a, 2b, and 2c were examined using linear regression in jamovi. Two models were examined to test hypothesis 2a. Model 1 consisted of examining perceived overqualification and its relationship to job satisfaction and was compared to Model 2, which examined the relationship between perceived overqualification and employee's attitude toward overqualification and their association with job satisfaction. Hypothesis 2a was supported, such that including the measure of employee's attitude toward overqualification increased the percent of variance explained in job satisfaction ($F(1,500) = 174.00$, $\Delta R^2 = 0.24$, $p < .01$) (Table 9).

Two models were compared to test hypothesis 2b. The first model (Model 1) consisted of perceived overqualification and its association with job satisfaction. The other model (Model 3) consisted of perceived overqualification and perceived management attitudes toward overqualification and their relationship with job satisfaction. Hypothesis 2b was supported, such that perceived management attitudes toward overqualification explains more of the variance in job satisfaction than the scale of perceived overqualification itself ($F(1,500) = 374.00$, $\Delta R^2 = 0.40$, $p < .01$) (Table 9).

Hypothesis 2c was tested comparing two models, Model 1 and Model 4. Model 1 examined perceived overqualification and its relationship with job satisfaction. Model 4 consisted of perceived overqualification, employee's attitude toward overqualification, and perceived management attitudes toward overqualification in examining their relationship with job satisfaction. Hypothesis 2c was supported, such that including all three scales of overqualification explain more of the variance in job satisfaction than perceived overqualification itself ($F(2,499) = 218.00$, $\Delta R^2 = .44$, $p < .01$) (Table 9).

Hypothesis 3a, 3b, and 3c were analyzed using linear regression in jamovi. Hypothesis 3a was examined comparing two models. Model 1 consisted of examining perceived overqualification and its relationship with turnover intentions. Model 2 consisted of perceived overqualification and the employee's attitude toward overqualification scale and their association with turnover intentions. This hypothesis was supported, such that including the employee's attitude toward overqualification along with perceived overqualification explain more of the variance in turnover intentions than perceived overqualification alone ($F(1,500) = 59.30$, $\Delta R^2 = .10$, $p < .01$) (Table 10).

Next, hypothesis 3b was examined comparing Model 1, perceived overqualification and its relationship to turnover intentions, to Model 3, perceived overqualification and perceived management attitudes toward overqualification and their association with turnover intentions. This hypothesis was supported, such that including the perceived management attitudes toward overqualification measure along with perceived overqualification explains more of the variance in turnover intentions than perceived overqualification alone ($F(1,500) = 177.00$, $\Delta R^2 = .26$, $p < .01$) (Table 10).

Hypothesis 3c examined two models assessing turnover intentions. The first model (Model 1) consisted of perceived overqualification and its association with turnover intentions. The other model (Model 4) consisted of perceived overqualification, employee's attitude toward overqualification, and perceived management attitudes toward overqualification and their relationship with turnover intentions. Hypothesis 2d was supported, such that including all three scales of overqualification explains more of the variance in turnover intentions than perceived overqualification itself ($F(2,499) = 90.80$, $\Delta R^2 = .25$, $p < .01$) (Table 10).

Hypotheses 4a and 4b examined interactions between perceived overqualification, employee's attitude toward overqualification, and perceived management attitudes toward overqualification and their relationships with job satisfaction. Hypothesis 4a examined the interaction between perceived overqualification and employee attitude toward overqualification and the relationship with job satisfaction. The interaction was not significant ($B = .01$, $SE = .05$, $t = .02$, $p = .99$) and the hypothesis was not supported (Table 9). Hypothesis 4b examined the interaction between perceived overqualification and perceived management attitudes toward overqualification in association with job satisfaction. This hypothesis was not supported as the interaction was not significant ($B = .06$, $SE = .04$, $t = 1.67$, $p = .10$) (Table 9).

Hypotheses 5a and 5b examined the interactions between perceived overqualification, employee's attitude toward overqualification, and perceived management attitudes toward overqualification and their relationship with turnover intentions. Hypothesis 5a was not supported as the interaction between perceived overqualification and employee's attitude toward overqualification was not significant in their association with turnover intentions ($B = -.09$, $SE = .07$, $t = -1.39$, $p = .16$) (Table 10). Hypothesis 5b was supported ($B = -.18$, $SE = .05$, $t = -3.32$, p

$< .01$, $R^2 = .32$), such that perceived overqualification and perceived management attitudes toward overqualification are significant factors in association with turnover intentions (Figure 6).

Chapter 5 - Discussion

Research has suggested that a sizeable proportion of workers with a bachelor's degree are overqualified for their job and the impact of overqualification can be adverse or positive depending on the context. For the better management of overqualification, the present study sought to develop and validate two scales assessing (1) the employee's attitude toward their overqualification and (2) their perceptions of their management's attitude toward overqualified workers.

The first scale, assessing the employee's attitude toward their overqualification, identified two factors (1) added organizational benefit and (2) added personal benefit. The employee attitude toward overqualification scale was not significantly related to the Maynard et al's (2006) scale of perceived overqualification, providing further evidence that the created scale is tapping into a different construct than solely the presence of perceived overqualification. Additionally, examining each factor separately, neither factor was significantly correlated with Maynard et al.'s (2006) scale of perceived overqualification. The employee's attitude toward overqualification scale was positively correlated with job satisfaction, person-job fit, perceived investment in employee development, and perceived management attitudes toward overqualification. Pervious research has found that perceived overqualification is associated with lower job satisfaction and lower person-job fit (Erdogan et al., 2011); however, in the present study, the employee's attitude toward overqualification correlated positively and significantly with these two measures. Further, employee's attitude toward overqualification was negatively and significantly correlated with turnover intentions after controlling for the relationship between overqualification and turnover intentions. Together these findings provide further evidence that looking exclusively at whether an employee is overqualified is not sufficient in understanding

organizational outcomes. In consideration of person-job fit theory, including measures that assesses the employee's attitude toward their overqualified working situation provides a better understanding of potential organizational outcomes, as we gain a better understanding of when overqualification is a good fit.

The second scale that was developed, based on human capital theory, assessed perceived management attitudes toward overqualification. The scale identified two factors, recognition of assets and recognition of potential. The scale was significantly negatively related to turnover intentions and Maynard et al.'s (2006) scale of perceived overqualification. Perceived management attitudes toward overqualification was significantly positively correlated with job satisfaction, person-job fit, perceived investment in employee development and employee's attitude toward overqualification. If perceived overqualification was exclusively examined, one would find significant and negative correlations with person-job fit, perceived investment in employee development, job satisfaction, and turnover intentions. Like the previous scale, perceived management attitudes toward overqualified workers provides greater insight into understanding organizational outcomes.

The primary goal of the study was to develop and validate two scales assessing employee's attitude toward overqualification and their perceptions of management's attitude toward overqualification. Acceptable fit of CFA models for employee's attitude toward overqualification scale and perceived management attitudes toward overqualification scale supported the construct validity of the scales. Also, non-significant to weak correlations with the scores from the two scales and the score from the scale of perceived overqualification (SPOQ) suggest the discriminant validity of the employee's attitude toward overqualification scale and perceived management attitudes toward overqualification scale. The concurrently assessed

criterion-related validity for both scales was also established. Regression analyses indicated that the employee's attitude toward overqualification scale has incremental validity over the well-established scale of perceived overqualification (Maynard et al., 2006). Regression analyses also indicated that perceived management attitudes toward overqualification scale has incremental validity over the well-established scale of perceived overqualification (Maynard et al., 2006).

Hypotheses 2a - 2c examine the newly developed scales, along with the scale of perceived overqualification, and their relationship with job satisfaction. The employee's attitude toward overqualification scale and perceived management attitudes toward overqualification scale have a positive relationship with job satisfaction, while the scale of perceived overqualification has a negative relationship with job satisfaction. This suggests that job satisfaction can be increased through one's attitude and/or perceptions of management's support of overqualified workers. This finding is similar to Erdogan and Bauer's (2009) study that identified when overqualified workers felt empowered by management, they reported higher job satisfaction. Person-job fit theory considers how well the one's KSAs match that required for their job. If one has a positive attitude about their overqualification and job fit, they may feel secure in their position and thus have higher job satisfaction. Together these findings suggest the need to examine the employee's attitude and perceptions of management attitudes toward overqualification, along with a measure of overqualification to better understand job satisfaction of overqualified workers.

Hypotheses 3a – 3c investigate the three overqualification scales and their relationship with turnover intentions. The employee's attitude toward overqualification scale and perceived management attitudes toward overqualification scale have a negative relationship with turnover intention, while the scale of perceived overqualification has a positive relationship with turnover

intention. Perceived management attitudes toward overqualification has the largest effect on one's turnover intentions. This seems logical based on human capital theory, if management is aware of overqualified workers and seeks to find ways to incorporate their surplus KSAs into crafting a job or task that better suits the overqualified worker, the overqualified worker may be less likely to leave the organization.

Regarding the interaction hypotheses (4a, 4b, 5a, 5b) only hypothesis 5b was supported, such that those who perceive themselves to be overqualified and perceive management to be supportive of overqualified workers have lower turnover intentions. This is an interesting finding theoretically, as previous research has found that overqualified workers have high turnover intentions (Erdogan & Bauer, 2009; Maynard et al., 2006). However, this finding suggests that perceived management support of overqualified workers has a significant effect in lowering turnover intentions of overqualified worker.

Developing two scales that measure employee's attitudes toward overqualification and perceptions of management's attitude toward overqualification contributes theoretically to our understanding of overqualified workers. The newly developed scales have shown that there are context when overqualification can have positive organizational outcomes, such as workers with positive attitudes toward their overqualification had higher job satisfaction and lower turnover intentions. Additionally, workers that perceived their management to be supportive of overqualified workers had higher job satisfaction and lower turnover intentions. Examining only the presence of overqualification is not enough in adequately understanding the effects of overqualified employees. Exclusively examining perceived overqualification can give a biased view of overqualified workers, but this is not necessarily the case. Without examining attitudes

as well as perceived overqualification, we are not seeing a more complete picture of overqualification.

Practical implications of developing and validating two scales assessing employee's attitude toward overqualification and perceived management attitudes toward overqualification provide insight into how organizations can better manage overqualified employees. Specifically, the finding that employees with positive attitudes toward their overqualification and employees that perceived management attitudes toward overqualification to be positive, report higher job satisfaction and lower turnover intentions is of interest. The perception of management attitudes toward overqualified employees is most important in facilitating job satisfaction and turnover intentions; however, the employee's attitude toward their overqualification is also a significant variable to consider. Practically, organizations can promote a more positive culture toward overqualified employees by implementing policies, procedures, or interventions to better engage overqualified employees and utilize their surplus KSAs. This in turn could benefit the employee (person-job fit) and the organization (utilizing human capital). Additionally, organizations can identify overqualified employees and seek to promote them, if applicable and when ready or necessary, to better retain their employees and promote from within the organization.

To verify the external validity of the newly developed scales of employee's and management's attitudes toward overqualification, a mixed-method approach can be considered such that qualitative input regarding the scales can be obtained from workers from various industries. This information can help confirm the conceptual distinctiveness across employees' overqualification perception and the attitudes toward it by employees and management. Any gap in employees' overqualification and attitudes of employees and management can be further

examined in both qualitative and quantitative ways to better understand and manage/support overqualified employees in the workplace.

Future research can adopt a multilevel framework to investigate the relationship of employee's attitudes toward overqualification and perceived management attitudes toward overqualification. Hu et al. (2015) studied the effect of overqualified workers in groups of either overqualified peers or qualified peers. Expanding upon this design, future research can assess attitudes at various individual- and group-level variables to gain a deeper understanding of the effect attitudes have on the individual and group level organizational outcomes. This could be a promising line of research in gaining a more wholistic understanding of overqualification in the modern workplace.

Limitations

This study is not without limitations. Both samples consisted of MTurk workers. Monitoring participants online is difficult, and it can be a natural concern as to whether participants are conscientious and honest. However, previous research has found that data collected through MTurk is psychometrically equivalent or superior to other data collection methods such as undergraduate samples (Buhrmester, Kwang, & Gosling, 2011) Additionally, using an online sample allowed me to collect data from over 900 individuals that perceived themselves to be overqualified. Another limitation of the study was the RMSEA for both the employee's attitude toward overqualification scale and perceived management attitudes toward overqualification scale. Both scales had RMSEA values of .09, which some may regard unacceptable or too liberal. However, Kline (1998) and Hu and Bentler (1999) state a RMSEA less than .10 is indicative of acceptable fit. Furthermore, the other fit indices for both scales (CFI, TLI, SRMR) were within acceptable range. An additional limitation of the present study is the

cross-sectional design and the inability to determine causality. For example, while the study found that positive attitudes towards overqualification was associated with job satisfaction, the causal order of the variables cannot be determined. Future studies should use a longitudinal design to assess the causal order of the variables. Finally, a common methodological concern is that of common method bias, as data was collected using the same method. However, the study design can still provide important and meaningful insights into overqualification by the development and validation of the two scales. Additionally, future research utilizing the developed scales could use a longitudinal design or various methodologies to help resolve the concern of common method bias.

Conclusion

To better understand perceived overqualification and for its strategic management, two scales were developed to examine the employee's attitude toward their overqualification and to understand perceptions of their management's attitude toward overqualified workers. The construct validity, concurrent criterion-related validity, and incremental validity for both scales were established. The results suggest that assessing the presence of overqualification exclusively is not enough in fully understanding the impact of overqualification. Future research on overqualification should include measures of employee's attitude toward overqualification and their perceptions of management's attitude toward overqualification to better understand overqualified workers and their psychological and behavioral outcomes.

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Appendix A - Figures

Cluster Dendrogram
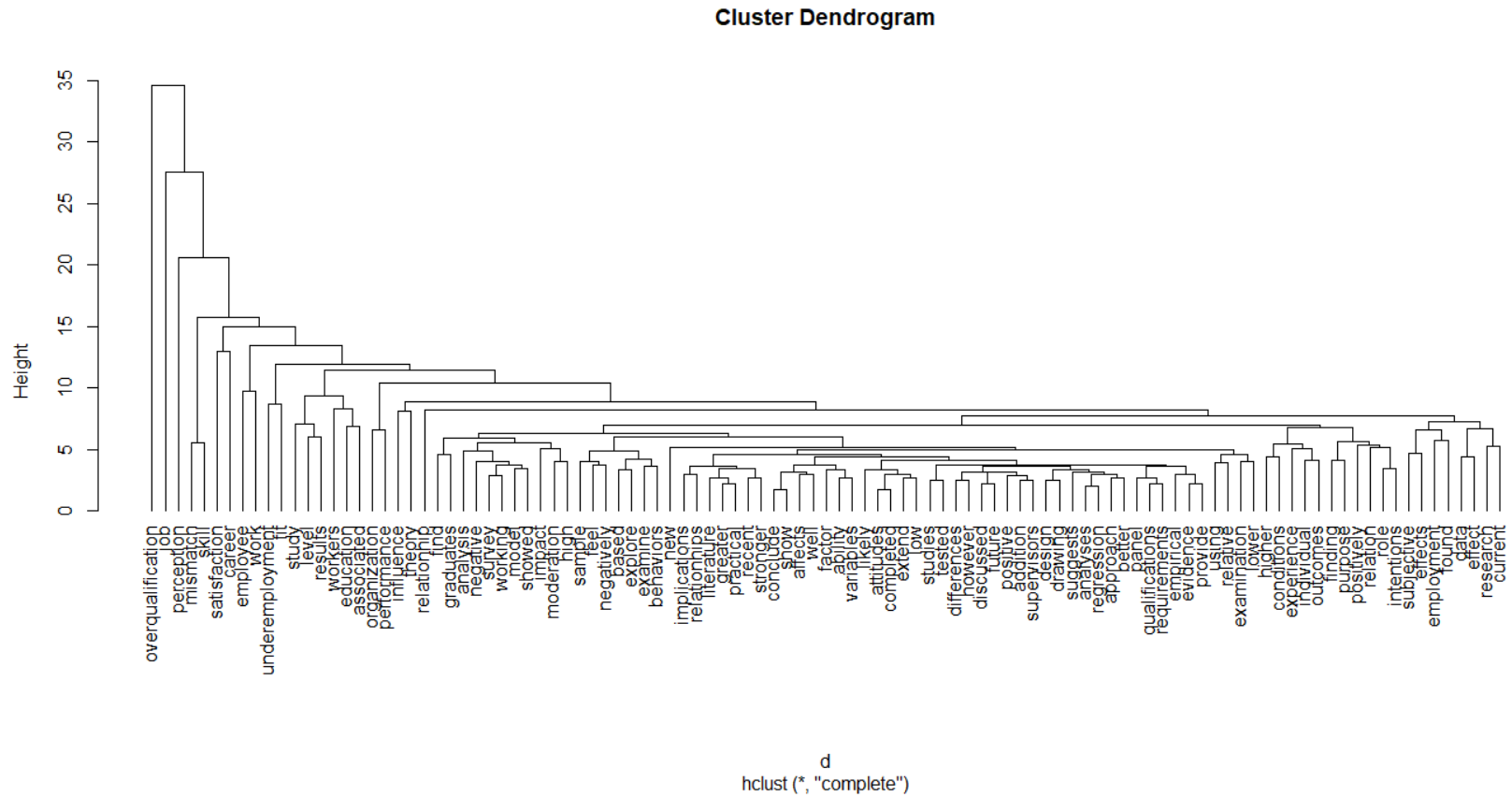
**Figure 1. Cluster dendrogram of 41 article abstracts.**
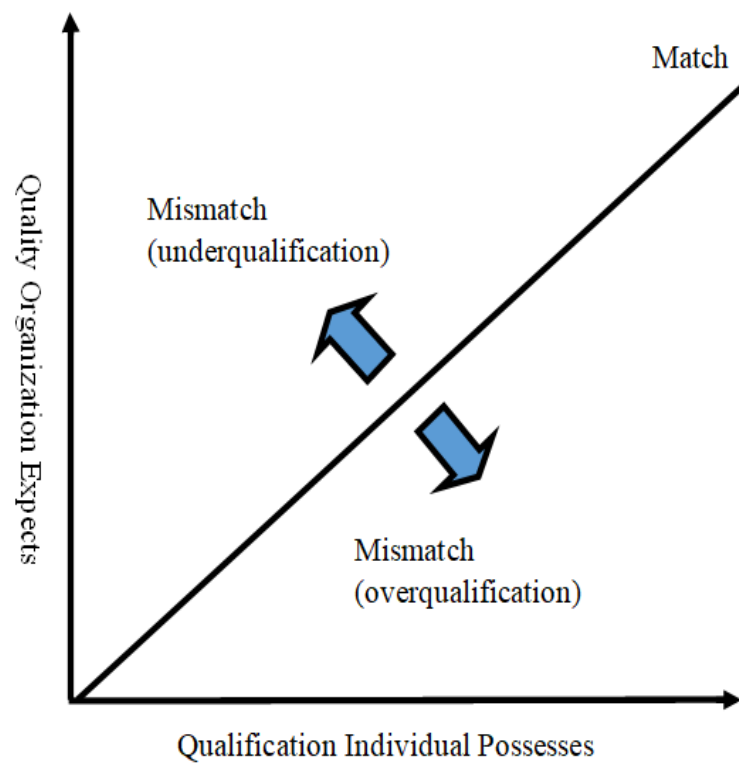
Figure 2. Person-job fit theory and mismatch.
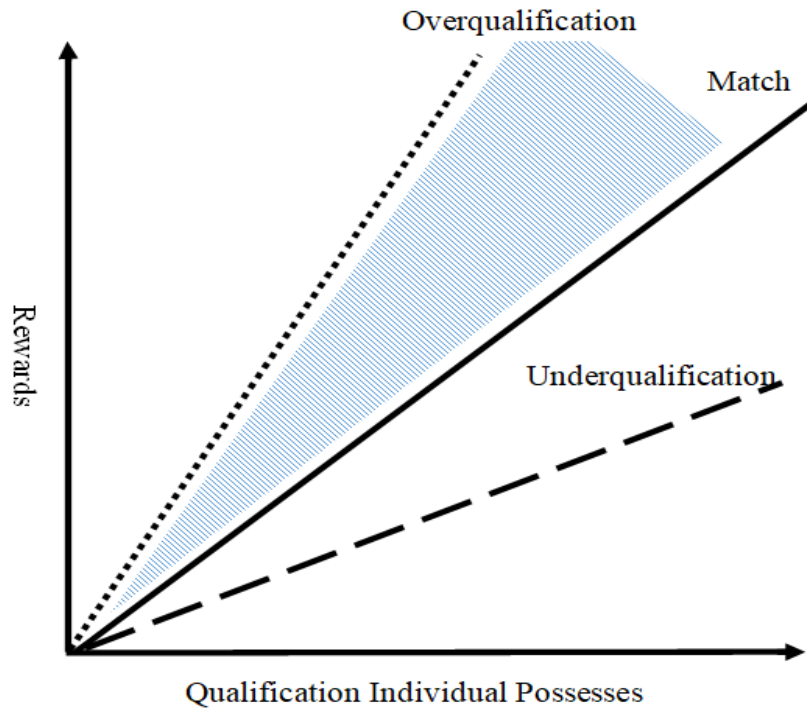
Figure 3. Mismatch between rewards and qualification. The shaded area indicates the gap between the anticipated and received rewards given the mismatch. The greater the gap, the greater the stress and lower person-job fit.
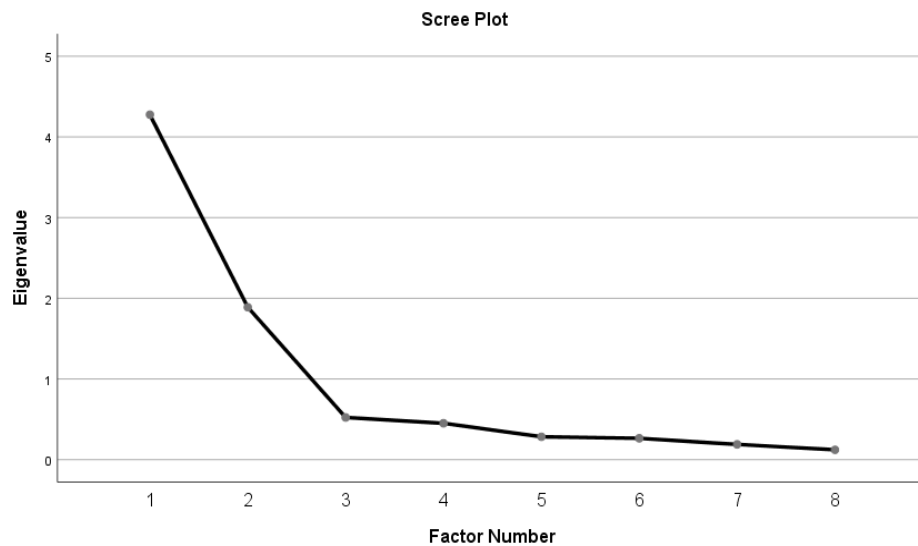

Figure 4. Employee's Attitude Toward Overqualification Scree Plot
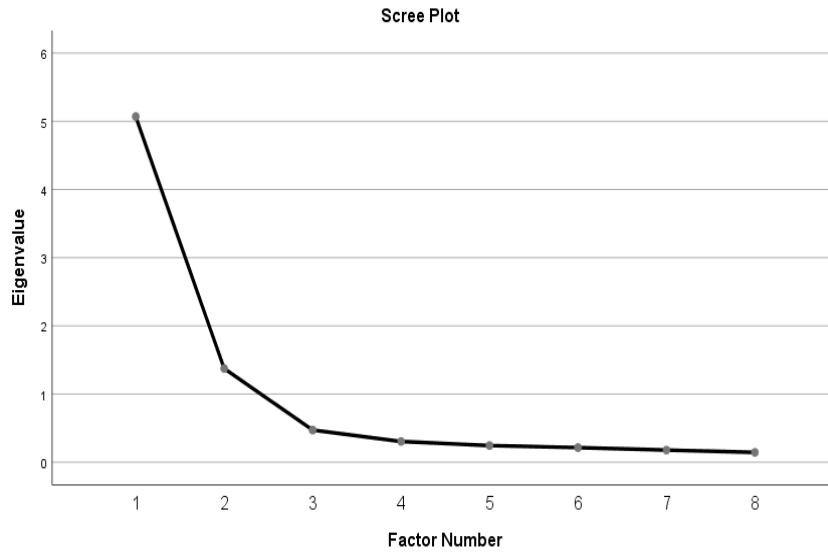
**Figure 5. Perceived Management Attitudes Toward
Overqualification Scree Plot.**
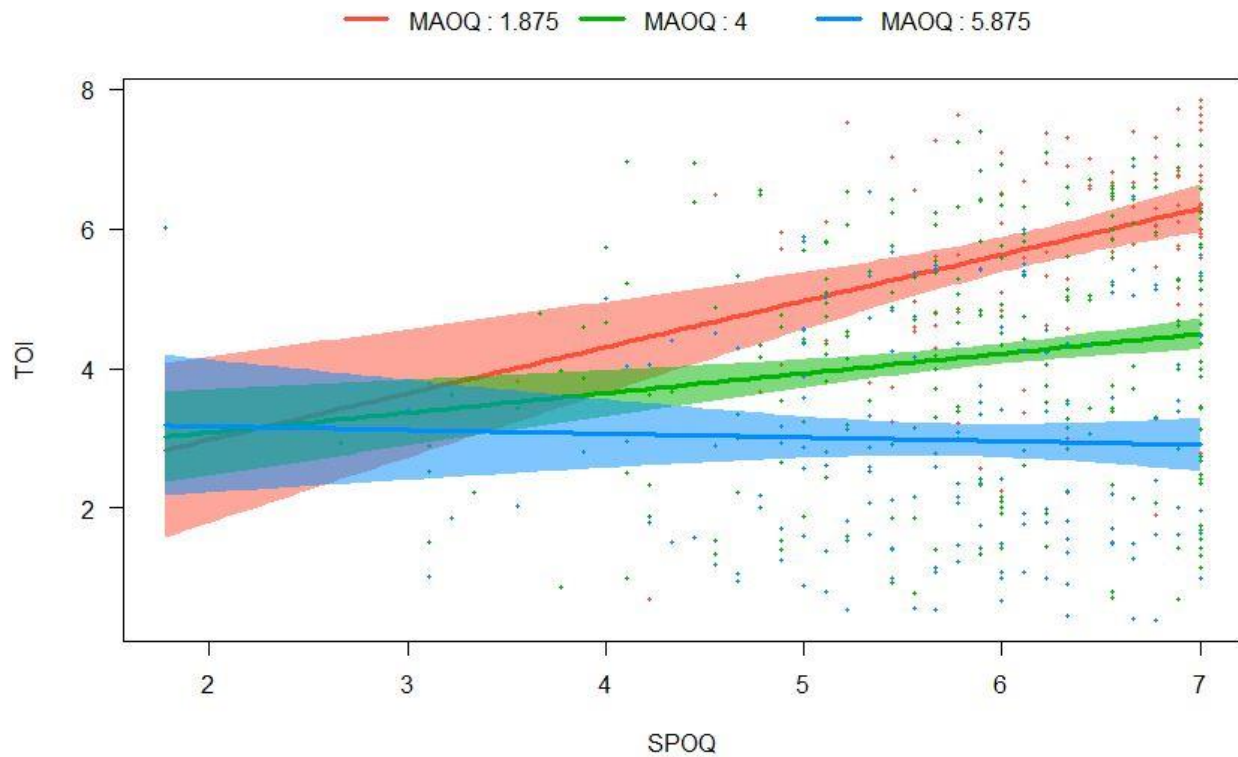
Figure 6. Interaction between the scale of perceived overqualification (SPOQ) and perceived management attitudes toward overqualification (MAOQ) and their association with turnover intentions (TOI). The perceived management attitudes scale was measured on a 1 (strongly disagree) to 7 (strongly agree) Likert-type scale. Red line: 10th percentile (negative [bottom 10 %] management attitudes toward overqualification), Green line: 50th percentile (average management attitudes toward overqualification), Blue line: 90th percentile (positive [top 10%] management attitudes toward overqualification).

Appendix B - Tables

Table 1. Item-Total Statistics Employee's Attitude Toward Overqualification Scale

Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item Total Correlation	Squared Multiple Correlation	Cronbach's α if Item Deleted
EAOQ1R	96.78	315.38	.38	.43	.88
EAOQ2	95.09	305.58	.56	.68	.87
EAOQ3	95.16	322.13	.26	.58	.88
EAOQ4R	97.82	336.08	.07	.30	.88
EAOQ5	95.46	305.48	.54	.68	.87
EAOQ6	95.22	300.18	.61	.71	.87
EAOQ7	94.26	313.41	.57	.61	.87
EAOQ8	95.80	299.68	.66	.54	.87
EAOQ9R	97.08	328.49	.17	.50	.88
EAOQ10R	96.70	313.44	.40	.56	.88
EAOQ11	94.90	304.11	.61	.50	.87
EAOQ12R	94.77	322.88	.26	.22	.88
EAOQ13	94.30	307.41	.66	.85	.87
EAOQ14	94.30	306.83	.63	.86	.87
EAOQ15	94.30	305.73	.65	.84	.87
EAOQ16	94.37	307.39	.61	.75	.87
EAOQ17	94.47	306.57	.60	.68	.87
EAOQ18	95.26	298.11	.66	.50	.87
EAOQ19	95.60	302.63	.59	.58	.87
EAOQ20	95.15	299.35	.64	.73	.87
EAOQ21R	95.40	358.68	.35	.18	.90
EAOQ22	94.57	310.13	.58	.61	.87

Note. EAOQ = employee's attitude toward overqualification; R = reverse coded item; items in bold were retained in the final scale.

Table 2. Employee's Attitude Toward Overqualification Scale Item Correlation

	1R	2	3	4R	5	6	7	8	9R	10R	11	12R	13	14	15	16	17	18	19	20	21R	22
1R	-																					
2	.20**	-																				
3	-.01	.68**	-																			
4R	.42**	.00	-.01	-																		
5	.17**	.67**	.57**	.13**	-																	
6	.14**	.45**	.30**	.03	.53**	-																
7	.10**	.43**	.30**	-.17**	.30**	.43**	-															
8	.37**	.51**	.33**	.19**	.54**	.50**	.36**	-														
9R	.43**	-.14**	-.27**	.29**	-.02	.05	-.09	.18**	-													
10	.50**	.05	-.16**	.29**	.15**	.17**	.11**	.36**	.64**	-												
11	.18**	.29**	.08*	-.04	.24**	.37**	.41**	.40**	.18**	.28**	-											
12R	.22**	.00	-.14**	.03	.03	.07	.16**	.14**	.23**	.33**	.23**	-										
13	.18**	.26**	.03	-.11*	.16**	.32**	.48**	.32**	.09*	.24**	.63**	.29**	-									
14	.14**	.25**	.02	-.13**	.14**	.28**	.47**	.29**	.08	.23**	.63**	.23**	.90**	-								
15	.15**	.31**	.05	-.15**	.19**	.34**	.46**	.31**	.10*	.21**	.61**	.24**	.87**	.87**	-							
16	.16**	.24**	.04	-.15**	.18**	.31**	.46**	.30**	.08*	.24**	.57**	.24**	.79**	.80**	.83**	-						
17	.17**	.22**	.04	-.10*	.14**	.34**	.41**	.30**	.06	.20**	.55**	.23**	.76**	.79**	.74**	.75**	-					
18	.32**	.40**	.18**	.12**	.47**	.50**	.38**	.58**	.17**	.32**	.41**	.21**	.42**	.41**	.41**	.36**	.37**	-				
19	.23**	.54**	.43**	.13**	.69**	.47**	.35**	.53**	.03	.19**	.25**	.00	.27**	.25**	.28**	.26**	.25**	.50**	-			
20	.15**	.39**	.25**	-.05	.44**	.80**	.52**	.46**	.04	.20**	.43**	.16**	.39**	.37**	.40**	.37**	.40**	.51**	.51**	-		
21R	-.11**	-.14**	-.11*	.02	-.17**	-.21**	-.30**	-.16**	-.12**	-.19**	-.23**	-.07	-.31**	-.30**	-.30**	-.32**	-.26**	-.21**	-.17**	-.28**	-	
22	.14**	.43**	.25**	-.12**	.30**	.46**	.73**	.36**	-.03	.13**	.42**	.14**	.43**	.44**	.46**	.44**	.41**	.42**	.39**	.57**	-.28**	-

Note. $^{*}p < .05$, $^{**}p < .01$

Table 3. Employee's Attitude Toward Overqualification Scale Item Loadings

Item	EFA		CFA	
	F1	F2	F1	F2
F1: Added organizational benefit				
My overqualification…				
1. makes me feel I provide additional resources to my organization.	.63	.11	.76	-
2. benefits my organization in the additional knowledge I have.	.95	-.06	.94	-
3. benefits my organization in the additional skills I have.	.92	.01	.90	-
4. benefits my organization in the additional experience I bring.	.89	-.02	.87	-
5. benefits my organization in the additional education I have.	.84	-.04	.84	-
F2: Added personal benefit				
My overqualification…				
6. makes my job easier and allows me more free time.	.07	.71	-	.83
7. allows me to focus on other aspects of my life.	-.12	.98	-	.92
8. contributes to a balance between my work and life.	.06	.72	-	.83

Note. F1 = factor 1; F2 = factor 2. Final items retained in Employee's Attitude Toward Overqualification Scale. Responses measured along a 1 (strongly disagree) to 7 (strongly agree) response scale.

Table 4. Item-Total Statistics Perceived Management Attitudes Toward Overqualification Scale

Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
MAOQ1	66.11	393.42	.61	.61	.95
MAOQ2	65.77	385.95	.70	.74	.94
MAOQ3	65.10	384.40	.77	.68	.94
MAOQ4	65.45	385.87	.70	.64	.94
MAOQ5	65.75	384.02	.73	.75	.94
MAOQ6	65.70	380.72	.77	.70	.94
MAOQ7	64.43	389.02	.75	.73	.94
MAOQ8R	64.70	419.21	.24	.21	.95
MAOQ9	65.11	385.54	.77	.74	.94
MAOQ10	64.36	394.15	.75	.75	.94
MAOQ11	64.44	387.81	.79	.83	.94
MAOQ12	64.60	387.72	.78	.74	.94
MAOQ13	64.45	368.88	.78	.78	.94
MAOQ14	65.09	384.96	.76	.78	.94
MAOQ15	65.15	381.95	.77	.76	.94
MAOQ16	64.91	392.88	.60	.53	.95
MAOQ17	66.32	390.68	.65	.51	.95

Note. MAOQ = perceived management attitudes toward overqualification; R = reverse coded item; items in bold were retained in the final scale.

Table 5. Perceived Management Attitudes Toward Overqualification Item Correlations

	1	2	3	4	5	6	7	8R	9	10	11	12	13	14	15	16	17
1	-																
2	.73**	-															
3	.55**	.67**	-														
4	.55**	.61**	.58**	-													
5	.71**	.81**	.69**	.67**	-												
6	.61**	.61**	.63**	.62**	.65**	-											
7	.38**	.45**	.61**	.48**	.48**	.52**	-										
8R	.01	.07	.28**	.10*	.07	.11*	.32**	-									
9	.45**	.51**	.59**	.50**	.53**	.71**	.58**	.16**	-								
10	.35**	.43**	.62**	.45**	.47**	.53**	.74**	.30**	.60**	-							
11	.38**	.48**	.63**	.50**	.50**	.53**	.81**	.31**	.62**	.84**	-						
12	.41**	.48**	.62**	.51**	.49**	.55**	.74**	.28**	.61**	.76**	.81**	-					
13	.36**	.47**	.64**	.51**	.48**	.51**	.80**	.34**	.62**	.77**	.83**	.78**	-				
14	.39**	.47**	.53**	.49**	.46**	.65**	.54**	.25**	.80**	.61**	.61**	.62**	.64**	-			
15	.40**	.45**	.54**	.50**	.49**	.67**	.58**	.26**	.79**	.58**	.62**	.64**	.63**	.83**	-		
16	.40**	.42**	.36**	.66**	.46**	.48**	.47**	.08	.46**	.44**	.47**	.52**	.51**	.48**	.49**	-	
17	.51**	.54**	.54**	.48**	.45**	.65**	.41**	.07	.54**	.46**	.45**	.47**	.44**	.57**	.55**	.39**	-

Note. * $p < .05$, ** $p < .01$.

Table 6. Perceived Management Attitudes Toward Overqualification Scale Items Loadings

Item	EFA		CFA	
	F1	F2	F1	F2
F1: Recognition of assets				
My organization…				
1. has positive attitudes towards overqualified employees.	.90	-.05	.82	-
2. views overqualified employees as assets for organizational development.	.96	-.04	.91	-
3. views overqualified employees as assets for organizational creativity and innovation.	.87	.02	.91	-
4. views overqualified employees as a valuable resource.	.91	-.03	.94	-
5. provides overqualified employees with greater independence.	.60	.17	.70	-
F2: Recognition of potential				
My organization…				
6. provides overqualified workers with additional resources to tap into their other skills.	-.05	.83	-	.88
7. provides overqualified workers with growth opportunities.	.02	.90	-	.93
8. provides overqualified employees with development opportunities for future promotions.	.07	.85	-	.93

Note. F1 = factor 1; F2 = factor 2. Final items retained in Perceived Management Attitudes Toward Overqualification Scale. Responses measured along a 1 (strongly disagree) to 7 (strongly agree) response scale.

Table 7. Confirmatory Factor Analysis Results and Psychometric Properties

Model	*df*	χ^2	CFI	TLI	RMSEA	SRMR
EAOQ	19	103	.97	.96	.09	.05
MAOQ	19	88.70	.98	.97	.09	.03
EAOQ & MAOQ	98	351.61	.97	.96	.07	.06

Note. df = degrees of freedom; CFI = comparative fit index; TLI = tucker-lewis index; RMSEA = root mean squared error of approximation; SRMR = standardized root mean square residual.

Table 8. Aggregate Scale Correlation Matrix

	Mean (SD)	1	2	3	4	5	6	7
1. EAOQ	5.11 (1.22)	(.90)						
2. MAOQ	3.99 (1.47)	.51**	(.94)					
3. Person-job fit	3.79 (1.42)	.44**	.64**	(.94)				
4. PIED	4.13 (1.42)	.44**	.77**	.56**	(.92)			
5. SPOQ	5.86 (0.94)	-.04	-.22**	-.35**	-.14**	(.88)		
6. Job Satisfaction	4.06 (1.57)	.50**	.67**	.85**	.60**	-.25**	(.94)	
7. Turnover intention	4.23 (1.95)	-.32**	-.54**	-.72**	-.48**	.24**	-.69**	(.95)

Note. EAOQ = employee's attitude toward overqualification; MAOQ = perceived management attitudes toward overqualification; PIED = perceived investment in employee development; SPOQ = scale of perceived overqualification. Cronbach's alpha is represented on the diagonal line. * p < .05, ** p < .01.

Table 9. Job Satisfaction Model Beta Coefficients

	Intercept	SPOQ	EAOQ	MAOQ	EAOQ ×SPOQ	MAOQ ×SPOQ	R^2
Hypothesis 2 testing							
Model 1	6.48	-.41 (.07)**	-	-	-	-	.06
Model 2	3.09	-.38 (.06)**	.63 (.05)**	-	-	-	.30
Model 3	2.34	-.18 (.06)**	-	.69 (.04)**	-	-	.46
Model 4	1.56	-21 (.05)**	.29 (.05)**	.57 (.04)**	-	-	.50
Hypothesis 4 testing							
Model 5	3.12	-.39 (.25)	.62 (.30)*	-	.01 (.05)	-	.30
Model 6	3.93	-.44 (.17)**	-	.31 (.23)	-	.06 (.04)	.47

Note. SPOQ = scale of perceived overqualification; EAOQ = employee attitude toward overqualification; MAOQ = perceived management attitudes toward overqualification; standard errors are in parentheses; * p < .05, ** p < .01.

Table 10. Turnover Intentions Model Beta Coefficients

	Intercept	SPOQ	EAOQ	MAOQ	EAOQ ×SPOQ	MAOQ ×SPOQ	R^2
Hypothesis 3 testing							
Model 1	1.30	.50 (.09)**	-	-	-	-	.06
Model 2	4.02	.48 (.09)**	-.50 (.07)**	-	-	-	.16
Model 3	5.35	.27 (.08)**	-	-.68 (.05)**	-	-	.30
Model 4	5.70	.28 (.08)**	-.13 (.07)	-.62 (.06)**	-	-	.31
Hypothesis 5 testing							
Model 5	1.18	.94 (.34)**	.06 (.41)	-	-.09 (.07)	-	.16
Model 6	.89	1.00 (.23)**	-	.41 (.33)	-	-.18 (.05)**	.32

Note. SPOQ = scale of perceived overqualification; EAOQ = employee attitude toward overqualification; MAOQ = perceived management attitudes toward overqualification; standard errors are in parentheses; * $p < .05$, ** $p < .01$.

Appendix C - Scales

Person-Job Fit Scale (Brkich, Jeffs, & Carless, 2002)

Responses options provided on a Likert scale: 1 (strongly disagree) to 7 (strongly agree)

1. My current job is not really me (R)
2. This job is not really what I would like to be doing (R)
3. All things considered, this job suits me
4. I feel like this is not the right type of work for me (R)
5. I feel that my goals and needs are met in this job
6. I find my current job motivating
7. My abilities, skills, and talents are the right type for this job
8. I'm sure there must be another job for which I am better suited (R)
9. I am able to use my talents, skills and competencies in my current job

Perceived Investment in Employee Development (PIED) (Lee & Bruvold, 2003)

Responses options provided on a Likert scale: 1 (strongly disagree) to 7 (strongly agree)
1. My organization trains employees on skills that prepare them for future jobs and career development.
2. My organization provides career counselling and planning assistance to employees.
3. My organization allows employees to have the time to learn new skills that prepare them for future jobs.
4. My organization provides support when employees decide to obtain ongoing training.
5. My organization is receptive to employees' requests for lateral transfers (transfer to another department).
6. My organization ensures that employees can expect confidentiality when consulting staff.
7. My organization provides employees with information on the availability of job openings inside the organization.
8. My organization is fully supportive of a career-management program for the employees.
9. My organization provides a systematic program that regularly assesses employees' skills and interests.

The scale of perceived overqualification (SPOQ) (Maynard, Joseph, and Maynard, 2006)

Responses options provided on a Likert scale: 1 (strongly disagree) to 7 (strongly agree)
1. My job requires less education than I have
2. The work experience that I have is not necessary to be successful on this job
3. I have job skills that are not required for this job
4. Someone with less education than myself could perform well on my job
5. My previous training is not being fully utilized on this job
6. I have a lot of knowledge that I do not need in order to do my job
7. My education level is above the education level required by my job
8. Someone with less work experience than myself could do my job just as well
9. I have more abilities than I need in order to do my job

Overall Job Satisfaction (Agho et al., 1992)

Responses are obtained using a five-point Likert-type scale where 1 = strongly disagree and 5 = strongly agree.

1. I am often bored with my job (R)
2. I feel fairly well satisfied with my present job
3. I am satisfied with my job for the time being
4. Most days I am enthusiastic about my work
5. I like my job better than the average worker does
6. I find real enjoyment in my work

Items denoted with (R) are reverse scored.

Turnover Intentions (Adams & Beehr, 1998)

Responses options provided on a Likert scale: 1 (strongly disagree) to 7 (strongly agree)
1. I am planning to leave my job for another in the near future
2. I often think of quitting this job and finding another
3. I would like to quit this job and find another in the near future

Employee's Attitude Toward Overqualification (EAOQ):

Responses options provided on a Likert scale: 1 (strongly disagree) to 7 (strongly agree)
1. My overqualification makes me feel behind in my career goals (R)
2. My overqualification makes my job easier and allows me more free time.
3. My overqualification allows me to apply less energy to my job.
4. My overqualification makes me feel like I could make a better salary in another position. (R)
5. My overqualification allows me to focus on other aspects of my life.
6. My overqualification provides me with a sense of job security.
7. My overqualification makes me feel confident in my performance at work.
8. My overqualification allows me to enjoy my job
9. My overqualification makes me feel like I am not challenged at my job (R)
10. My overqualification make me feel bored in my job (R)
11. My overqualification makes me feel I provide additional resources to my organization.
12. I lower my performance due to my overqualification. (R)
13. My overqualification benefits my organization in the additional knowledge, skills, experience, and education I have.
14. My overqualification benefits my organization in the additional knowledge I have.
15. My overqualification benefits my organization in the additional skills I have.
16. My overqualification benefits my organization in the additional experience I bring.
17. My overqualification benefits my organization in the additional education I have.
18. My overqualification benefits me
19. My overqualification contributes to a balance between my work and life.
20. My overqualification makes me feel safe and secure in my position.
21. My overqualification is irrelevant to my current job duties. (R)

22. My overqualification makes me feel confident in my performance at work.

Perceived Management Attitudes Toward Overqualification (MAOQ):

Responses options provided on a Likert scale: 1 (strongly disagree) to 7 (strongly agree)

1. My organization provides overqualified workers with additional resources to tap into their other skills
2. My organization provides overqualified workers with growth opportunities.
3. My organization is supportive overqualified employees
4. My organization recognizes overqualified employees and provides them with additional responsibilities.
5. My organization provides overqualified employees with development opportunities for future promotions.
6. My organization allows overqualified employees to customize their job to best suit their abilities.
7. My organization views overqualified employees as an asset to the organization.
8. My organization views overqualified employees as having an unnecessary excess of knowledge, skills, or abilities. (R)
9. My organization provides overqualified employees with independence.
10. My organization has positive attitudes towards overqualified employees.
11. My organization views overqualified employees as assets for organizational development.
12. My organization views overqualified employees as assets for organizational creativity and innovation.
13. My organization views overqualified employees as a valuable resource.
14. My organization provides overqualified employees with autonomy.
15. My organization provides overqualified employees with greater independence.
16. My organization provides overqualified employees with additional projects/tasks.
17. My organization offers overqualified workers with more resources (e.g., salary, time off, flexibility) than originally expected.

Appendix D - R Script

Cluster dendrogram r commands:

To start, install a set of packages to mine text (You only need to do this step once)

Needed=c("NLP", "RColorBrewer", "tm", "fpc", "cluster", "wordcloud", "mclust", "vegan", "ape", "ggplot2")

install.packages(Needed, dep=TRUE)

Load the installed packages

library(NLP)

library(RColorBrewer)

library(tm)

library(fpc)

library(cluster)

library(wordcloud)

library(mclust)

library(vegan)

library(ape)

library(ggplot2)

Load data

data=Corpus(DirSource("C:\\Users\\lee\\Desktop\\+ KSU\\+ 05. 2018 Fall\\Lab meeting\\OQ\\OQ Text Mining"))

Pre-process the qualitative data
# Remove punctuation & other special characters that your computer cannot actually read
data=tm_map(data, removePunctuation)

# Remove numbers
data=tm_map(data, removeNumbers)

# Coverting to lowercase
data=tm_map(data, tolower)

# Remove particular words that are of no analytic value
data=tm_map(data, removeWords, c("the", "can", "this", "these", "that", "which", "one", "two", "also", "may", "among", "three", "paper", "whether"))

# Removing common words that usually have no analytic value (e.g., a, and, also, the, etc.)
data=tm_map(data, removeWords, stopwords("english"))

******* Interrater Agreement Double Checking *******
# Combine words that should stay together
for (j in seq(data))
{
data[[j]]=gsub("abilities", "ability", data[[j]])
data[[j]]=gsub("approaches", "approach", data[[j]])
data[[j]]=gsub("employees", "employee", data[[j]])
data[[j]]=gsub("examines", "examination", data[[j]])
data[[j]]=gsub("examined", "examination", data[[j]])
data[[j]]=gsub("examining", "examination", data[[j]])
data[[j]]=gsub("experiences", "experience", data[[j]])
data[[j]]=gsub("experienced", "experience", data[[j]])

```
data[[j]]=gsub("experiencing", "experience", data[[j]])
data[[j]]=gsub("explores", "explore", data[[j]])
data[[j]]=gsub("explored", "explore", data[[j]])
data[[j]]=gsub("extended", "extend", data[[j]])
data[[j]]=gsub("extending", "extend", data[[j]])
data[[j]]=gsub("factors", "factor", data[[j]])
data[[j]]=gsub("findings", "finding", data[[j]])
data[[j]]=gsub("individuals", "individual", data[[j]])
data[[j]]=gsub("jobs", "job", data[[j]])
data[[j]]=gsub("levels", "level", data[[j]])
data[[j]]=gsub("mismatches", "mismatch", data[[j]])
data[[j]]=gsub("moderated", "moderation", data[[j]])
data[[j]]=gsub("moderating", "moderation", data[[j]])
data[[j]]=gsub("organisation", "organization", data[[j]])
data[[j]]=gsub("organization", "organization", data[[j]])
data[[j]]=gsub("organisations", "organization", data[[j]])
data[[j]]=gsub("organizations", "organization", data[[j]])
data[[j]]=gsub("organisational", "organization", data[[j]])
data[[j]]=gsub("organizational", "organization", data[[j]])
data[[j]]=gsub("overeducated", "overeducation", data[[j]])
data[[j]]=gsub("over qualification", "overqualification", data[[j]])
data[[j]]=gsub("over-qualification", "overqualification", data[[j]])
data[[j]]=gsub("over qualified", "overqualification", data[[j]])
data[[j]]=gsub("over-qualified", "overqualification", data[[j]])
data[[j]]=gsub("overqualification–job", "overqualification", data[[j]])
data[[j]]=gsub("overqualification's", "overqualification", data[[j]])
data[[j]]=gsub("overqualified", "overqualification", data[[j]])
data[[j]]=gsub("performs", "performance", data[[j]])
data[[j]]=gsub("performed", "performance", data[[j]])
data[[j]]=gsub("perceptions", "perception", data[[j]])
data[[j]]=gsub("perceives", "perception", data[[j]])
```

```
data[[j]]=gsub("poq", "overqualification", data[[j]])
data[[j]]=gsub("problems", "problem", data[[j]])
data[[j]]=gsub("provides", "provide", data[[j]])
data[[j]]=gsub("providing", "provide", data[[j]])
data[[j]]=gsub("questionnaires", "questionnaire", data[[j]])
data[[j]]=gsub("recently", "recent", data[[j]])
data[[j]]=gsub("recommendations", "recommendation", data[[j]])
data[[j]]=gsub("reduces", "reduce", data[[j]])
data[[j]]=gsub("related", "relation", data[[j]])
data[[j]]=gsub("relating", "relation", data[[j]])
data[[j]]=gsub("relations", "relation", data[[j]])
data[[j]]=gsub("relationship", "relation", data[[j]])
data[[j]]=gsub("relationships", "relation", data[[j]])
data[[j]]=gsub("perceived", "perception", data[[j]])
data[[j]]=gsub("skills", "skill", data[[j]])
data[[j]]=gsub("structures", "structure", data[[j]])
data[[j]]=gsub("theoretical", "theory", data[[j]])
data[[j]]=gsub("transitions", "transition", data[[j]])
data[[j]]=gsub("unemployed", "unemployment", data[[j]])
}

# Stripping unnecesary whitespace
data=tm_map(data, stripWhitespace)

# [[[[[CAUTION!!]]]]] Stem the documents so that a word will be recognizable to the computer,
despite whether or not it may have a variety of possible endings in the original text. BUT, this is
not used because the stem function is not complete yet.
data=tm_map(data, stemDocument)
```

```
## Create a document term matrix
dtm=DocumentTermMatrix(data)

# Remove infrequently used words, making a matrix that is 85% empty space, maximum (in this
following example)
dtms=removeSparseTerms(dtm, .85)

# Checking word frequencies
freq.dtm=colSums(as.matrix(dtm))
freq.dtms=colSums(as.matrix(dtms))



## Plotting word frequencies
wf=data.frame(word=names(freq.dtm), freq=freq.dtm)
library(ggplot2)
p=ggplot(subset(wf, freq>2), aes(x=reorder(word, -freq), y=freq))+
geom_bar(stat = "identity")+
theme(axis.text.x=element_text(angle=45, hjust=1))



## Correlation: If words always appear together, then correlation = 1.0.
findAssocs(dtm, "overqualification", corlimit=.95)



## Hierarchical Clustering
library(cluster)
d=dist(t(dtm), method="euclidian")
fit=hclust(d=d, method="complete") # for a different look try substituting: method="ward.D"
```

fit

plot(fit, hang=-1)

Hierarchical Clustering: Fixed number of clusters

plot.new()

plot(fit, hang=-1)

groups=cutree(fit, k=6)   # "k=" defines the number of clusters you are assuming

rect.hclust(fit, k=6, border="red")

K-means clustering

library(fpc)

d=dist(t(dtm), method="euclidian")

kfit=kmeans(d, 5)   # The number next to "d" in this line defines the number of clusters you are assuming

clusplot(as.matrix(d), kfit$cluster, color=T, shade=T, labels=2, lines=0)

Estimate the optimal model and number of clusters according to the partitioning around medoids to estimate the number of clusters using the pamk function in the fpc package.

```
pamk.best=pamk(d)
cat("number of clusters estimated by optimum average silhouette width:", pamk.best$nc, "\n")
plot(pam(d, pamk.best$nc))
```

Determine the optimal model and number of clusters according to the Calinski-Harabasz index (calinhara)

```
require(vegan)
fit=cascadeKM(scale(d, center=TRUE, scale=TRUE), 1, 10, iter=1000)
plot(fit, sortg=TRUE, grpmts.plot=TRUE)
calinski.best=as.numeric(which.max(fit$results[2,]))
cat("Calinski criterion optimal number of clusters:", calinski.best, "\n")
```

Determine the optimal model and number of clusters according to the Bayesian Information Criterion for expectation-maximization, initialized by hierarchical clustering for parameterized Gaussian mixture models

```
d_clust=Mclust(as.matrix(d), G=1:20)
m.best=dim(d_clust$z)[2]
cat("model-based optimal number of clusters:", m.best, "\n")
plot(d_clust)
```

Create an elbow plot

```
wss=1:29
for(i in 1:29) wss[i]=sum(kmeans(d,centers=i,nstart=25)$withinss)
plot(2:29, wss[2:29], type="b", xlab="Number of Clusters",ylab="Within groups sum of
squares")
```

Create cluster dendrogram

Basic cluster dendrogram

```
d=dist(t(data_dtm), method="euclidian")
fit=hclust(d=d, method="ward")
fit
plot(fit, hang=-1)
```

```
plot.new()
plot(fit, hang=-1)
groups=cutree(fit, k=5)
rect.hclust(fit, k=5, border="red")
```

Advanced cluster dendrogram

```
d=dist(t(data_dtm), method="euclidian")
fit=hclust(d=d, method="ward")
hcd=as.dendrogram(fit)
```

```
labelColors=c("#CDB380", "#036564", "#EB6841", "#EDC951")
```

or

labelColors=brewer.pal(8,"Set2")


```
par(cex=0.7)
clusMember=cutree(fit, 4)
colLab=function(n) {
  if (is.leaf(n)) {
    a=attributes(n)
    labCol=labelColors[clusMember[which(names(clusMember)==a$label)]]
    attr(n, "nodePar")=c(a$nodePar, lab.col=labCol)
  }
  n
}
clusDendro = dendrapply(hcd, colLab)
plot(clusDendro, main="PH 101 Evaluation Keywords Cluster Dendrogram", type="triangle",
cex.main=1.4, cex.axis=1.4, horiz=T)
```


```
source("http://addictedtor.free.fr/packages/A2R/lastVersion/R/code.R")
A2Rplot(fit, k = 4, boxes = FALSE, col.up = "gray50", col.down=labelColors, cex.main=1.4,
cex.axis=1.4, horiz=T)
```


```
## unrooted diagram
plot(as.phylo(fit), type="unrooted")
```

```
## fan diagram
mypal=brewer.pal(8,"Set2")
clus4=cutree(fit, 4)
plot(as.phylo(fit), type="fan", tip.color=mypal[clus4], label.offset = 1, cex=1)



## radial diagram
mypal=brewer.pal(8,"Set2")
clus4=cutree(fit, 4)
plot(as.phylo(fit), type = "radial", tip.color=my
```