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Using Survival Analysis Techniques to Examine the Relationship Between Personality Facets and Employee Turnover

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Using Survival Analysis Techniques to Examine the Relationship Between Personality Facets and Employee Turnover

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Abstract

Employee turnover continues to have severe monetary, time, performance, and human capital implications for organizations. Due to these implications, multiple areas of research have examined the possible predictors of employee turnover, such as personality factors and the narrow facets that comprise those factors. This study examines the facet-level scores of the conscientiousness and openness to experience factors as predictors of employee turnover using data from the ETS® *WorkFORCE*™ Assessment for Job Fit (Naemi et al., 2014), an assessment based on the Five Factor Model (FMM) of personality. Survival analysis techniques were used in addition to logistic regression analysis when examining predictors. Results indicated that personality facets did not significantly predict employee turnover. However, survival analysis results indicated that the majority of turnover for the manufacturing company included in this study occurred within the first two months, suggesting a critical time frame for retaining employees. Study limitations, implications for employee retention, and directions for future research are discussed.

Keywords: turnover, personality, conscientiousness, openness to experience, survival analysis

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Introduction

Employee turnover has been a top priority for numerous organizations as well as researchers across the field of Industrial/Organizational Psychology due to the wide range of associated implications (e.g., replacement costs, resources) it has on organizations. Turnover refers to all employees who leave an organization, including those who resign or retire, or those who are made redundant (Edwards & Edwards, 2016). Organizations could find great value in being able to predict employee turnover and implement interventions designed to reduce turnover intention.

Predicting turnover is an important aspect for organizations primarily due to the costs associated with turnover. At the individual level, the cost of turnover can be 93-200 percent of the employee's salary depending on their skills, responsibility, and replaceability (Griffeth & Hom, 2001). At a larger level, turnover can have implications for teams or even entire organizations. Colleagues within the organization could negatively perceive turnover as a symptom of a deeper problem within the organization causing the impact to spread across multiple employees and divisions. On the other hand, organizations could benefit by analyzing turnover data. Determining the cause of turnover could help organizations avoid making assumptions about what is prompting the turnover and stop them from supporting those assumptions with any unnecessary changes or interventions.

Due to the implications faced by organizations, there has been a vast array of research examining possible predictors of turnover. Common antecedents of turnover related to the work environment include job context (Cho et al., 2012; Griffeth et al., 2000; Natkin et al., 2002; Park & Ko, 2020), justice (Griffeth et al., 2000; Rubenstein et al., 2018), performance (Mulla et al., 2013; Rubenstein et al., 2018; Zimmerman & Darnold, 2007), and promotion (Carson et al.,

1994; Griffeth et al., 2000). Additionally, factors involved in the withdrawal process such as job satisfaction (Cho et al., 2012; Cotton & Tuttle, 1986; Griffeth et al., 2000; Hom & Kinicki, 2001; Rubenstein et al., 2018; Somers, 1996; Trevor, 2001), organizational commitment (Griffeth et al., 2000; Rubenstein et al., 2018; Somers & Birnbaum, 1999), withdrawal cognition (Griffeth et al., 2000; Rubenstein et al., 2018; Somers & Birnbaum, 1999), job search (Griffeth et al., 2000; Rubenstein et al., 2018), and intention to quit (Griffeth et al., 2000; Steel & Ovalle, 1984), have been associated with turnover.

For instance, Zimmerman & Darnold (2007) conducted a meta-analysis to investigate the relationship between job performance and turnover intentions, as well as associated moderators, with data from 65 studies and an overall sample size of about 18,000. Results showed that supervisor ratings of performance, self-ratings, and objective measures had a negative relationship with turnover intention, and employee nationality and job type moderated the relationship. The researchers also found that when controlling for job satisfaction and turnover intentions, poor performers were more likely to actually leave the organization while good performers were somewhat more likely to have turnover intentions after controlling for job satisfaction.

Furthermore, demographic antecedents of turnover including age (Assefa et al., 2017; Cotton & Tuttle, 1986; Kim et al., 2021; Mulla et al., 2013; Park & Ko, 2020; Rubenstein et al., 2018; Somers, 1996), sex (Park & Ko, 2020), education (Natkin et al., 2002; Rubenstein et al., 2018), tenure, (Assefa et al., 2017; Cotton & Tuttle, 1986; Griffeth et al., 2000; Park & Ko, 2020; Somers, 1996), number of children (Griffeth et al., 2000; Rubenstein et al., 2018), and marriage status (Cho et al., 2012; Mulla et al., 2013) were also frequently mentioned in the literature. Researchers have also studied the moderating impact of factors such as nationality

(Cotton & Tuttle, 1986; Zimmerman & Darnold, 2007), age (Rubenstein et al., 2018), education (Kim et al., 2021; Rubenstein et al., 2018; Trevor, 2001), and stress (Kim et al., 2021; Rubenstein et al., 2018) on turnover.

For example, Mulla et al. (2013) identified predictors of turnover using a sample of 2,141 engineers over a 13-year period and found that engineers who were younger, unmarried, poor performers, from a premium college, and worked in a different region from their home were more likely to leave earlier. On the other hand, Lin et al. (2017) examined software developer turnover with five open source projects across different organizations and found that developers are more likely to remain in software projects when they start contributing to the project earlier, primarily modify instead of creating files, and primarily code instead of managing documentations.

Furthermore, researchers have also examined personality traits as an antecedent of turnover. In general, previous research on predicting turnover or turnover intention from the Big Five personality traits has been mixed for extraversion and openness to experience, but fairly consistent for agreeableness, conscientiousness, and neuroticism/emotional stability. For instance, Jeswani and Dave (2012) and Salgado (2002) found that extraversion had a negative relationship with turnover intention, while Timmerman (2006) found that extraversion was positively correlated with turnover. Additionally, openness to experience has shown to have both a negative (Salgado, 2002; Timmerman, 2006) and positive (Zimmerman, 2008) relationship with turnover. In terms of agreeableness, most research is consistent with findings of a negative relationship with turnover (Jeswani & Dave, 2012; Salgado, 2002; Zimmerman, 2008). Conscientiousness has also consistently been shown to have a negative relationship with turnover (Drasgow et al., 2012; Singh et al., 2014; Salgado, 2002; Zimmerman, 2008), while neuroticism

has been shown to positively predict turnover (Drasgow et al., 2012; Salgado, 2002; Singh et al., 2014; Zimmerman, 2008).

While previous research has primarily focused on the Big Five factors, there has not been as much focus on how the specific facets that make up the personality factors relate to turnover. The current study will fill this gap by examining the specific facets of the big five personality factors of openness to experience and conscientiousness and their relationships to turnover. Research has investigated the relationship between the facets of conscientiousness and openness to experience and other workplace outcomes such as performance (Dudley et al., 2006; Woo et al. 2014), however research on the relationship between the facets and turnover is lacking.

To investigate the facet relationships with turnover, data from the ETS® *WorkFORCE*™ Assessment for Job Fit (Naemi et al., 2014) will be used. The personality assessment is derived from the five-factor model (FFM) of personality (Goldberg, 1990) and designed to assess the relationship between personality and educational or workplace outcomes. The assessment is used for both developmental and high-stakes assessment purposes. Thirteen personality facets are measured using a forced-choice response format and individuals can be scored across a variety of organizational, educational, and developmental contexts (Naemi et al., 2014).

A secondary purpose of this study is to use survival analysis techniques for analysis of turnover data. Survival analysis, also sometimes referred to as failure analysis, measures the time it takes for an event to occur. The term *survival analysis* originated in the medical field when examining relapse or death of patients after receiving different medical treatments (Tabachnick & Fidell, 2019). Survival analysis can be used to predict the time it will take for something to happen, such as an employee leaving an organization (Assefa et al., 2017; Birnbaum, 1999; Cho et al., 2012; Hom & Kinicki, 2001; Kim et al., 2021; Lin et al., 2017; Morita et al., 1989; 1993;

Mossholder et al., 2005; Mulla et al., 2013; Natkin et al., 2002; Park & Ko, 2020; Somers, 1996; Somers & Birnbaum, 1999; Trevor, 2001). Organizations could benefit by being able to predict when turnover is going to occur by using survival analysis techniques. Morita et al. (1989) first introduced the idea of using survival analysis techniques when assessing employee turnover and stressed the importance of incorporating time as a variable for the analysis of data obtained in longitudinal studies. The authors detailed techniques researchers can use when analyzing turnover or other behavioral processes. Morita et al. (1993) expanded on this by providing information on the applicability of the regression-analog to survival analysis when analyzing relationships in hopes of increasing the availability of these techniques to researchers working in various areas of management. Survival analysis is used for prediction purposes, therefore no claims of causation can be determined. However, findings from survival analyses can be used to support the need for additional research on providing evidence of causation.

Thus, the focus of this study is to investigate the personality factor and facet scores derived from ETS® *WorkFORCE*™ Assessment for Job Fit (Naemi et al., 2014) as predictors of employee turnover using correlations, logistic regression, and survival analysis methods. The factor scores are provided for one of the five broad factors of personality (e.g., conscientiousness) while the facet scores represent the narrower traits that comprise each of the factors. For instance, the conscientiousness factor is comprised of the following narrow traits/facets: diligence, dependability, organization, and self-discipline. The present study will contribute to the literature by determining the predictability of the personality scores included in the ETS® *WorkFORCE*™ Assessment for Job Fit. Previous research has found conscientiousness (Drasgow et al., 2012; Singh et al., 2014; Salgado, 2002; Zimmerman, 2008) and facets of openness to experience (Woo et al., 2014) to be predictive of turnover, however the

facet-levels scores (i.e., diligence, dependability, organization, self-discipline, creativity, inquisitiveness, intellectual orientation) may provide novel information that will allow organizations to predict turnover intentions based on the personality scores provided from this assessment. Additionally, the current study will use survival analysis as a method for predicting turnover.

The current study has theoretical implications as it addresses the significant gap in research when it comes to investigating the relationship between turnover and specific personality facets. The current study will also add to the literature by expanding on previous turnover studies applying survival analyses techniques by using the techniques with personality variables.

Numerous practical implications are also provided from this work. For instance, if organizations take personality facets into consideration instead of only the broad factors when assessing turnover they may be able to better predict if an employee will leave an organization as previous research has suggested that aggregating personality facets into the broader factors could result in a loss of trait-specific but criterion-valid variance, resulting in reduced predictive accuracy (Paunonen, 1998). The ability to better predict turnover from personality facets and behavioral competencies could assist organizations in integrating interventions focused on decreasing the monetary, time, productivity, and other associated costs of turnover. Due to these costs, reducing turnover, even by a small amount could save organizations money. Furthermore, with the use of survival analysis, organizations could better predict when an employee is going to leave the organization. This information could be very helpful for organizations to plan out when an intervention may be needed, or when an intervention would be most effective, to prevent employees from leaving.

Literature Review

Turnover

According to Edwards and Edwards (2016), turnover refers to any employee that leaves an organization, including those who retire, resign, are let go, or leave the organization for any other reason. Moreover, there are two types of turnover: voluntary and involuntary. The former is used to describe turnover not initiated by the organization (e.g., retiring, death, quitting), while the latter describes turnover initiated by the organization (e.g., firing, layoffs, reducing/restructuring). While some voluntary turnover can be functional, such as a poorly performing employee who is not motivated deciding to leave an organization, in general having low voluntary turnover is a goal as it may insinuate that the organization is properly supporting the people-management environment (Edwards & Edwards, 2016).

Implications

Monetary costs of employee turnover can be very expensive for organizations. Griffeth and Hom (2001) identified three types of costs associated with employee turnover—separation, replacement, and training costs. Separation costs consist of the expenses required for aspects such as exit interviews, administrative costs, and client reassignment. Replacement costs are required for job advertisements, recruitment, and selection. Finally, training costs occur during orientation and job training for new employees. Johnson et al. (2000) suggested that replacement and training costs for an employee cost an organization about 50% of the employee's annual salary.

According to Fitz-Enz (1998), depending on the job type, turnover can cost anywhere between six months to three years' pay and benefits. Furthermore, Glebbeek and Bax (2004) set out to determine if extremely low and extremely high turnover rates were harmful to an

organization using data from 110 temporary employment agency offices with high variation in turnover. Results showed that high turnover was harmful in terms of economic performance. Furthermore, almost 30 years ago, Hogan (1992) determined that the indirect and direct costs of losing a single line employee were somewhere between $1,400 and $4,000 and nearly 20 years ago, Gustafson (2002) suggested that turnover for an hourly employee can cost between $3,000 and $10,000 due to additional costs such as lost productivity and sales, as well as management time.

In addition to monetary costs, there are time costs associated with employee turnover. For instance, it has been shown to take up to 12 months for a new employee to get to the level of the previous employee in terms of competence and productivity (Watkins, 2003). Ton and Huckman (2008) investigated the impact of employee turnover on performance. Performance was measured by profit margin, which is described as operating income divided by sales, and customer service, which is 50-item subjective measure completed once a month by a mystery shopper. Results showed that turnover is related to decreased performance and that the relationship is moderated by the nature of store-level management in terms of process conformance.

Orngori (2007) stated that organizational productivity also suffers when an employee leaves because of the learning curve needed for the new employee to understand their specific role as well as the organization overall. On the other hand, Stovel and Bontis (2002) discussed how organizations lose human and relational capital when an employee leaves and other companies could gain this capital if the employee is hired there.

To gather a better understanding of how organizations can avoid high turnover rates, McEvoy and Cascio (1985) conducted a meta-analysis examining strategies, specifically realistic

job previews (RJPs) and job enrichment, used by organizations to reduce employee turnover. RJPs are used to provide an applicant with a more realistic look into the job while job enrichment enhances the "decision making authority, task variety, and autonomy associated with a job" (McEvoy & Cascio, 1985, p. 344). The authors included a sample size of 6,492 employees across 20 experiments and found that sampling error alone attributed to the variation in outcomes of job enrichment studies while the variation in RJP studies could not be attributed to sampling error alone. When searching for moderator variables in the RJP studies, researchers found that task complexity impacted the RJP outcomes. In terms of reducing turnover, job enrichment interventions were shown to be about twice as effective as RJPs. Organizations could use this information in addition to personality testing to incorporate personalized inventions centered around job enrichment in hopes of decreasing employee turnover. Organizations could also benefit by understanding the different predictors of turnover.

Antecedents

Multiple researchers have conducted meta-analyses on predictors of employee turnover (Carson et al., 1994; Cotton & Tuttle, 1986; Griffeth et al., 2000; Rubenstein et al., 2018; Steele & Ovalle, 1984; Zimmerman & Darnold, 2007). For instance, Carson et al. (1994) conducted a meta-analysis to examine the relationship between three operationalizations of promotion (promotion satisfaction, perceptions of promotional opportunity, and actual promotion) and turnover. Results showed a significant negative relationship between actual promotion and turnover and no significant relationship between promotion satisfaction or perceptions of promotional opportunity and turnover. Additionally, Cotton and Tuttle (1986) reviewed over 120 sets of data and found that almost all of the 26 variables they studied were related to turnover. Some of the variables found to have stable and reliable relationships with turnover were age,

tenure, pay, overall job satisfaction, and employment perceptions. The authors also found that population, nationality, and industry moderated many of the relationships between the variables and turnover.

Furthermore, Griffeth et al. (2000) set out to expand on their previous review (Hom & Griffeth, 1995) by conducting a meta-analysis on the predictive strength of antecedents of employee turnover, including the impact of various moderator variables. Proximal precursors, such as job satisfaction, organizational commitment, job search, comparison of alternatives, withdrawal cognitions, and quit intentions, were some of the best predictors of turnover. Results also showed small to moderate effect sizes for predictors that are more distal in the turnover process such as work environment (job content, stress, work group cohesion, autonomy, leadership, distributive justice, promotional chances) and factors outside of the organization (alternative job opportunities). Most demographic characteristics, aside from company tenure and number of children, did not significantly predict turnover.

Similarly, Rubenstein et al. (2018) conducted a meta-analysis on the antecedents of turnover and the possibility of moderators. Proximal work perceptions and behaviors such as withdrawal cognitions, job search, organizational commitment, job satisfaction, rewards offered beyond pay, justice, embeddedness, and performance, and distal factors such as age, tenure, and children, were found to exhibit relatively low variability across contexts while also being the most predictive of turnover. Moderator effects were found for employee age, education, sex, job satisfaction, organizational commitment, tenure, and stress.

Finally, Steel and Ovalle (1984) conducted a meta-analysis to examine the relationship between behavioral intentions to quit and actual turnover. Results showed that intentions were stronger predictors of turnover than overall job satisfaction, satisfaction with the work itself, or

organizational commitment. When analyzing four potential moderators—time specification, military-civilian, blue-white collar, and time interval—results showed that length of time between collection of predictor data and procurement of attrition criteria significantly impacted the strength of the relationship between intent and turnover. The authors suggested that time interval variables may produce moderator affects.

The studies discussed above focused on relationships between turnover and demographic or job-related predictors demonstrating the numerous variables shown to be predictive of turnover. Another area of research which relates to the current study focuses on the impact of personality characteristics on turnover. The following section will introduce the topic of personality and detail previous research on the influence of personality on work outcomes.

Personality Characteristics: Definition, Characteristics & Facets

According to Scott and Reynolds (2010), personality is "a topic that is often discussed but seldom defined; the lack of agreed-on definitions is responsible for considerable unnecessary confusion" (p. 81). One of those definitions of personality comes from MacKinnon's (1994) observation that personality should be defined in two ways. The first way is *personality from the perspective of the actor* described as factors inside people (egos, temperaments, schemas, etc.) that explain their behavior. The second way is *personality from the perspective of the observer* described as impressions that people make on one another. Furthermore, personality psychology consists of three activities—conceptualizing human nature (how people are alike), identifying and developing measures of the most important ways that people differ from one another, and determining how the individual differences develop (Scott & Reynolds, 2010). Starting in the early 1990s, consensus started to form among researchers on the structure used for personality assessments. There are numerous methods for measuring personality, however the structure

agreed on was the FFM of personality (Goldberg, 1990), which includes five broad factors of personality: conscientiousness, agreeableness, extraversion, neuroticism, and openness to experience.

The relationship between personality characteristics and employee or workplace outcomes has been thoroughly examined in the literature. For example, many researchers have studied the predictability of the Big Five personality dimensions on job performance (Barrick & Mount, 1991; Ones et al. 2007; Roberts et al., 2007; Roberts et al., 2014; Salgado, 1997; Woo et al., 2014). Barrick and Mount (1991) compared the relationship between the Big Five dimensions to job proficiency, training proficiency, and personnel data. Results showed that conscientiousness was related to all job performance criteria across occupational groups while extraversion was a predictor in sales and managerial occupations. Also, openness to experience and extraversion predicted training proficiency across occupations.

Additionally, Roberts et al. (2007) reviewed previous literature and determined five reasons why personality would have a relationship with occupational achievement (Roberts, 2006). First, a person's personality may drive them towards work experiences with qualities that align towards their own personality, referred to as "attraction effects" or "active niche-picking". Second, a person may be selected into a situation and given special treatment based on their personality, referred to as "recruitment effects". The third reason mentioned to describe the relationship between personality and occupational achievement is the active role a person plays in shaping their work environment (Roberts, 2006) as fit with environment has been related to increased performance (Harms et al., 2006). Fourth, a person may decide to leave a job that does not align with their personality or may be removed from a position due to their trait-related behaviors, referred to as "attrition" or "deselection pressures" (Cairns & Cairns, 1994). Finally,

the relationship may be a result of direct effects that personality may have on aspects of performance such as task effectiveness (Ashby et al., 1999), interpersonal interactions (Hurtz & Donovan, 2000) and motivation (Erez & Judge, 2001; Judge & Iiles, 2002).

In a meta-analysis examining the relationship between the Big Five factors of personality and job criteria, Salgado (1997) reviewed studies conducted in the European Community that were excluded from previous meta-analyses. Results showed conscientiousness and emotional stability/neuroticism were valid predictors across different job criteria and occupational groups while extraversion was a predictor for two occupations and openness and agreeableness predicted training proficiency.

In addition to examining the impact of the Big Five factors, research has also been conducted to examine the relationship between work behaviors and different facets of the Big Five personality dimensions. Facets are the lower order personality traits that comprise the five broader personality factors. Researchers have also expressed support for using the framework of analyzing individual facets (Dudley et al., 2006; Woo et al., 2014). One area of focus has been on the dimension of conscientiousness (Dudley et al., 2006; Roberts et al., 2014). Dudley et al. (2006) conducted a meta-analysis to investigate conscientiousness, as well as the narrow traits of conscientiousness, as predictors of job performance. Results indicated that depending on the occupation and performance criteria, the narrow traits of conscientiousness incrementally predict performance better than overall conscientiousness. Specifically, dependability was found to be a stronger predictor of job performance than overall conscientiousness in the skilled and semiskilled occupational type. Dudley et al. (2006) also mentioned that dependability and/or achievement seem to strengthen the relationship between conscientiousness and the overall, task, and contextual performance across occupational type. Achievement and dependability were the

dominant predictors for task or contextual performance, aside from the skilled and semiskilled occupational type and for managers in which order is the primary predictor. The authors suggested future research into prediction of performance could benefit from examining the narrow traits of conscientiousness.

On the other hand, Woo et al. (2014) investigated the relationship between work behaviors and openness, two aspects of openness (intellect and culture), and six facets of openness (intellectual efficiency, ingenuity, curiosity, aesthetics, tolerance, and depth), to demonstrate the importance of facet-level investigations in predicting seven organizational outcomes (task performance, contextual performance, counterproductive work behavior, turnover, leadership effectiveness, training performance, and adaptive performance). Woo et al. (2014) found that intellect and ingenuity better predicted task performance than overall openness dimension. Ingenuity also had a stronger relationship with leadership effectiveness and adaptive performance while intellectual efficiency had a stronger relationship with turnover.

Furthermore, previous research has not always been consistent on which lower order personality facets are included within each factor. For instance, the lower order facets taxonomy of the Tailored Adaptive Personality Assessment System (TAPAS) described by Drasgow et al. (2012) lists 3-6 facets that comprise conscientiousness, extraversion, openness to experience, agreeableness, and neuroticism while Luminet et al. (1999) used the revised version of the NEO Personality Inventory (NEO-PI-R; McCrae & Costa 1985, 1991; McCrae & John, 1992) which lists six facets within each factor. On the other hand, Chauvin et al. (2007) used the International Personality Item Pool (IPIP) developed by Goldberg (1999) that indicates nine facets across each of the factors. However, the same facets are included in different factors depending on the instrument. For instance, warmth is a facet of extraversion for the NEO-PI-R but is included in

the agreeableness factor for the IPIP. Additionally, competence is included in the conscientiousness facet for the NEO-PI-R but is a facet of openness for the IPIP. A full list of the facets included in each factor for the NEO-PI-R, IPIP, and TAPAS is included in Table 1. Facets that are similar across two or more assessments are bolded.

As shown in Table 1, each factor is comprised of different facets depending on the assessment used, demonstrating the need for further research on individual facets outside of the factors they comprise. Given that there are numerous facets included in each personality factor, it is important to investigate how these individual facets are related to turnover or turnover intention, therefore further research is needed using personality assessments that examine and score individuals at the facet-level. One assessment that accomplishes this is the *WorkFORCE*™ Assessment for Job Fit (Naemi et al., 2014).

ETS® *WorkFORCE*™ Assessment

The ETS® *WorkFORCE*™ Assessment for Job Fit (Naemi et al., 2014) is a personality assessment derived from the FFM of personality that uses the lower order facets taxonomy described by Drasgow et al. (2012). Each of the personality factors included in the assessment, the lower order facets they are comprised, and a brief description of the facet are included in Table 2 (Naemi et al., 2014).

Naemi et al. (2014) determined six behavioral competencies—initiative and perseverance, responsibility, teamwork and citizenship, customer service orientation, problem solving and ingenuity and flexibility and resilience—that are comprised of the lower order facets. The initiative and perseverance behavioral competency is described as "reflecting behaviors formally recognized as part of job duties and which contribute to assigned work; completing task efficiently and accurately; acting as a self-starter; drives to get work accomplished" (Naemi et

al., 2014, p. 22) and is comprised of diligence, assertiveness, and dependability. Since the initiative and perseverance behavioral competency consists of two facets of conscientiousness and one facet of extraversion, this competency is expected to show a negative relationship with turnover based on previous research (Drasgow et al., 2012; Singh et al., 2014; Jeswani & Dave, 2012; Salgado, 2002; Zimmerman, 2008).

The responsibility competency is described as "conducting oneself with responsibility, accountability, and excellence; adhering to organizational policies; being sensitive to and following safety and other regulatory rules and procedures; demonstrating appropriate workplace behavior and conduct" (Naemi et al., 2014, p. 22) and is comprised of dependability, self-discipline, and organization. Again, because the responsibility competency is comprised of three facets of conscientiousness, this competency is expected to show a negative relationship with turnover based on previous research (Drasgow et al., 2012; Singh et al., 2014; Salgado, 2002; Zimmerman, 2008).

The teamwork and citizenship behavioral competency is described as "working with diverse groups of peers and colleagues; contributing to groups; having a healthy respect of different opinions, customs and preferences; participating in group decision-making" (Naemi et al., 2014, p. 22) and is comprised of collaboration and generosity. Since the teamwork and citizenship behavioral competency includes two facets from the agreeableness dimensions, it is expected that this competency will have a negative relationship with turnover based on previous research (Jeswani & Dave, 2012; Salgado, 2002; Zimmerman, 2008).

The customer service orientation behavioral competency is described as "conducting oneself in a courteous, patient, and cooperative manner with external or internal clients or customers; acting to meet client needs and maintain the role as spokesperson when dealing with

others; following through with clients to get job done well; managing difficult people and assignments; putting the customer first" (Naemi et al., 2014, p. 22) and is comprised of friendliness, collaboration, and generosity. The customer service orientation behavioral competency is comprised of one facet of extraversion and two facets of agreeableness, therefore this competency is expected to have a negative relationship with turnover based on previous research (Jeswani & Dave, 2012; Salgado, 2002; Zimmerman, 2008).

The problem solving and ingenuity behavioral competency is described as "using knowledge, facts, and data to solve problems effectively; thinking critically and creatively; using good judgement when making decisions; being a self-directed learner" (Naemi et al., 2014, p. 22) and is comprised of creativity, intellectual orientation, and inquisitiveness. The problem solving and ingenuity behavioral competency is comprised of three facets of openness to experience in which the previous literature on the relationship with turnover has been mixed (Salgado, 2002; Timmerman, 2006; Zimmerman, 2008). However, Woo et al. (2014) determined that some individual facets of openness (including intellectual efficiency and inquisitiveness) were better predictors of work behaviors than general openness, specifically that intellectual efficiency had a stronger (negative) relationship with turnover than general openness, therefore it is expected that the problem solving and ingenuity behavioral competency will have a negative relationship with turnover.

Finally, the flexibility and resilience behavioral competency is described as "adjusting well to changing or ambiguous work environments, handling stress, accepting criticism and feedback from others, being positive even when facing setbacks" (Naemi et al., 2014, p. 22) and is comprised of stability and optimism. The flexibility and resilience behavioral competency is comprised of two facets of emotional stability, therefore this competency is expected to have a

negative relationship with turnover based on previous research (Drasgow et al., 2012; Salgado, 2002; Singh et al., 2014; Zimmerman, 2008).

The current study used the ETS® *WorkFORCE*™ Assessment to examine the association between personality factor and facet-level scores and employee turnover. This research expanded on the current findings from the literature on the relationship between turnover and personality factors and facets listed in the below section.

Personality and Turnover

Previous research has investigated the relationship between the Big Five personality factors and turnover, however, findings have not always been consistent on the direction of the relationship for extraversion and openness to experience. The direction of the relationship between turnover and conscientiousness (negative), agreeableness (negative), and neuroticism (positive) have been consistent. For instance, Jeswani and Dave (2012) examined the effects of the Big Five factors of personality on turnover intention with 261 faculty members of technical educational institutes in India. Researchers collected data using a 13-item instrument developed from the Ten-Item Personality Inventory (TIPI) and the Turnover Intention Scale. Using regression analysis, researchers found that both extraversion and agreeableness had a significant negative relationship with turnover intention. The authors suggested that in order to increase faculty member retention, management should focus on enhancing human resource practices and strategies that enhance positive personality traits.

On the other hand, Salgado (2002) conducted a meta-analysis on the predictive ability of the Big Five personality factors on multiple counterproductive behaviors (absenteeism, accidents, deviant behaviors, and turnover). The American and European validity studies included in the meta-analysis had to report on validity coefficients concerning personality and

counterproductivity for applicant, employee, or trainee samples, but not student samples, in order to be included in the meta-analysis. The researcher's final database included five independent samples with turnover as the criterion. Results indicated that conscientiousness, extraversion, openness to experience, and agreeableness had a negative relationship with turnover, while neuroticism was found to have a positive relationship with turnover.

Zimmerman (2008) also conducted a meta-analysis to investigate the impact of personality traits of turnover intentions and behaviors. Prior meta-analyses were included, and new meta-analyses were conducted comparing the Big Five factors to turnover, leading to 19, 18, 16, 15, and 17 samples included for neuroticism, extraversion, openness, agreeableness, and conscientiousness, respectively. Results indicated neuroticism best predicted (positively) employee's intentions to quit, while conscientiousness and agreeableness were the best predictors (negative) of actual turnover decisions. Openness to experience also showed a slightly weaker, but still significant, positive relationship with turnover. Additionally, researchers found that personality traits were stronger predictors of turnover outcomes than job complexity/job characteristics.

Moreover, Singh et al. (2014) examined the relationship of trait emotional intelligence and personality with turnover intention using a sample of 100 front level executives in Indian organizations. Researchers included three standardized psychometric instruments (TEIQue-SF, Big Five Inventory-10, and Intention to leave) and analyzed the results using correlational and hierarchal regression analysis. Findings showed a significant negative relationship between conscientiousness and turnover intention and a significant positive relationship between neuroticism and turnover intention. The authors concluded that an executive's intention to leave an organization is associated with personality.

While many studies have focused on the Big Five factors in relation to turnover and other workplace outcomes, research could be expanded by examining the specific facets within each of the Big Five personality traits for relationships to turnover or turnover intention. In one example, Timmerman (2006) set out to examine the relationship between turnover and broad and narrow personality traits using a sample of 203 call center employees. The 240-item NEO-PI-R (Costa & McCrae, 1992), including six narrow facets within each broad factor, was used to assess personality. Turnover information was collected eight months after the questionnaires were completed from company records. Significant correlations between turnover and the broad traits of extraversion (positive correlation) and openness (negative correlation) were found. In terms of the narrow traits, Timmerman (2006) determined that anxiety (facet of neuroticism) and dutifulness (facet of conscientiousness) had a significant negative relationship with turnover, while imagination (facet of openness) and artistic interests (facet of openness) had a significant positive relationship with turnover.

Similarly, Drasgow et al. (2012) investigated the predictability of broad and narrow personality traits on turnover within the Army using the TAPAS designed to prevent faking for use in high stakes assessments, such as enlistment testing. TAPAS included 21 facets of the Big Five personality factors with items in which respondents are provided two statements, equal in social desirability, and asked to select which of the items are more like them. Results showed turnover was predicted (negatively) by the broad conscientiousness and emotional stability factors. Researchers also found optimism (facet of emotional stability), curiosity (facet of openness), and virtue (facet of conscientiousness) had stronger negative relationships with turnover than their broad factors. These results suggest personality facets can successfully be

used to predict turnover and occasionally can be stronger predictors of turnover than the broad factors they encompass.

The current study expanded on this research by examining how the individual personality facets from the ETS® *WorkFORCE*™ Assessment relate to turnover. In order to accomplish this, a secondary purpose of the current study is to use survival analysis techniques to examine these relationships. The definition of survival analysis and the importance of using this analysis in the context of turnover is discussed in the section below.

Survival Analysis

Survival analysis, also sometimes referred to as failure analysis, measures the time it takes for an event to occur (Sheskin, 2011)—in this study, the event is the time it takes for an employee to leave an organization. There are three types of research questions that can be addressed using survival analysis (Tabachnick & Fidell, 2019). The first type describes the number of cases surviving at a variety of times while the second type expands on this by analyzing group differences in survival times. Finally, the third type of survival analysis is used to determine the relationship between survival times and a set of predictors. The third type of analysis will be used for this study to examine the predictability of the facets of personality on turnover.

The dependent variable in survival analysis—when the employee leaves the organization—is not always known because many employees in the participant pool could still be working for the organization at the time of the analysis (Tabachnick & Fidell, 2019). This aspect of survival analysis is important to consider for the current study as post hoc analysis will be conducted to test study hypotheses on data already collected by the Educational Testing Service (ETS) for the *WorkFORCE*™ Assessment for Job Fit assessment. Thus, many

participants were still employed in the organization at the time of data collection for this study, meaning the time of turnover does not exist for many of the participants.

Research has examined the predictability of certain variables in relation to turnover using survival analysis (Assefa et al., 2017; Birnbaum, 1999; Cho et al., 2012; Hom & Kinicki, 2001; Kim et al., 2021; Lin et al., 2017; Mossholder et al., 2005; Mulla et al., 2013; Natkin et al., 2002; Park & Ko, 2020; Somers, 1996; Somers & Birnbaum, 1999; Trevor, 2001). For example, Somers (1996) tested a conceptual model of turnover using survival analysis techniques with retention data from a sample of 244 staff nurses. Results indicated that age, organizational tenure, and job satisfaction were negatively related to the likelihood of leaving the organization over time while non-work variables and job search behavior were not related to turnover. Somers agreed with the conclusion Morita et al. (1993) had proposed that using survival analysis techniques are preferable to other methods and should be used whenever possible when examining turnover. A few years later, Somers and Birnbaum (1999) recognized the need for further research in this area, therefore they compared survival analysis methods to other traditional methods used in turnover research and found significant differences between the two types of methods. Specifically, the authors found job withdrawal intentions as the single predictor of turnover when using traditional methods, however when using survival analysis methods, the authors found that continuance commitment and ethnicity predicted turnover behavior. However, the researchers did not draw firm conclusions regarding the differences observed. Since this study occurred at the beginning stages of using survival analysis to examine turnover, the authors stressed the importance of replicating this research in future studies.

Furthermore, Trevor (2001) used survival analysis with time-dependent covariates and repeated turnover events when examining longitudinal data from 5,506 individuals. The authors

found that education, cognitive ability, and occupation-specific training moderated the relationship between job satisfaction and unemployment rate on voluntary turnover. Also, Hom and Kinicki (2001) inspected the progression of job satisfaction into turnover (Hom & Griffeth, 1991) in retail store personnel while integrating job avoidance, inter-role conflict, and employment conditions. The authors found that unemployment rates were directly associated turnover while inter-role conflict and job avoidance was indirectly associated with turnover, as stated in the Hom-Griffeth model.

Additional studies assessing turnover of Korean nurses have also used survival analysis (Cho et al., 2012; Park & Ko, 2020; Kim et al., 2021). Cho et al. (2012) studied factors (individual and family, nursing education, hospital, and job dissatisfaction) related to turnover with 351 new graduate nurses in South Korea in their first job over a 3-year time period. Nurses were more likely to leave their first job if they were married, worked in small, nonmetropolitan and nonunionized hospitals, reported overall job dissatisfaction, or reported dissatisfaction with interpersonal relationships, work content, and physical work environment. Similarly, Park and Ko (2020) explored factors influencing turnover for 95,158 Korean acute care nurses over three years. The factors analyzed were nurse's age, sex, career duration and hospital setting, type, ownership, and nurse staffing level—all of which significantly were associated with turnover. Furthermore, Kim et al. (2021) aimed to identify individual, health-related, social work environment and work organizational factors influencing turnover for Korean female nurses. Results showed that a higher probability of experiencing turnover as they aged was present for nurses who had less education, were unmarried, were pregnant, and had higher stress levels. On the other hand, there was a decreased probability of experiencing turnover as they aged for nurses who perceived moderate health rather than good/very good health, had depressive

symptoms, had a higher salary, were charge nurses/unit managers/supervisors or advanced practice nurses, were advanced practice nurses rather than registered nurses, worked shifts, worked in special care units or outpatient wards/administration as opposed to general wards, and worked in larger hospitals.

Also within the medical field, Assefa et al. (2017) identified factors associated with turnover of 1,258 faculty physicians across seven government-owned medical schools in Ethiopia over six years. The authors found no differences between males and females, however differences in age and academic rank impacted turnover in that younger and less experienced physicians were less likely to leave. Similarly, Mossholder et al. (2005) examined the predictability of structural, attitudinal, and behavioral variables on employee turnover using data collected with 176 health care employees over a five-year time frame. The authors found that network centrality and interpersonal citizenship behavior predicted turnover.

As indicated in the previous research, survival analysis has successfully been used to predict turnover using multiple predictor variables. Numerous researchers have supported the use of survival analysis techniques when examining turnover to provide more information about the length of time to departure, or tenure, rather than simply examining a dichotomous model of "employed" or "no longer employed". This research used survival analysis to examine the association of personality variables with turnover.

The Present Study

Employee turnover indicates any employee that leaves an organization for any reason whether that be voluntarily (e.g., retire, resign) or involuntarily (e.g., fired, let go) (Edwards & Edwards, 2016). High turnover rates can have significant implications for an organization due to the high monetary costs (Fitz-Enz, 1998; Griffeth & Hom, 2001; Gustafson, 2002; Hogan, 1992; Johnson et al., 2000), time costs (Watkins, 2003), negative impact on organizational performance (Glebbeek & Bax, 2004; Huckman, 2008) and productivity (Orngori, 2007), and loss of human and relational capital (Stovel & Bontis, 2002). Due to these negative implications, the literature regarding antecedents of turnover is robust in describing the factors that may be predictive of employee turnover. Previous research has investigated the influence of demographic characteristics, factors in the work environment, and factors involved in the withdrawal process on turnover.

Another area of research has focused on the influence of personality factors on turnover. The most commonly used model of personality, the FFM of personality (Goldberg, 1990), includes the following five broad factors of personality: *conscientiousness, agreeableness, extraversion, neuroticism, and openness to experience*. Each of the five factors are comprised of different lower order facets of personality, however, the research is not always consistent regarding which specific facets that comprise each of the five factors and may vary depending on the type of personality assessment used. One such assessment is the ETS® *WorkFORCE*™ Assessment for Job Fit (Naemi et al., 2014) which uses the lower order facets taxonomy described by Drasgow et al. (2012). From this taxonomy, Naemi et al. (2014) determined six behavioral competencies that are comprised of these lower order facets.

Using the previously described framework, the conscientiousness factor was comprised of the following four facets: dependability, diligence, organization, and self-discipline. Additionally, the openness to experience factor was comprised of three facets: creativity, inquisitiveness, and intellectual orientation. The facets comprising the factors of conscientiousness and openness to experience will be the focus of this study because of the specific relationships of these constructs with employee turnover as indicated in the literature (Drasgow et al., 2012; Singh et al., 2014; Salgado, 2002; Zimmerman, 2008).

In terms of conscientiousness, Dudley et al. (2006) conducted a meta-analysis to investigate the relationships between broad personality factors and their narrow facets as predictors of job performance. Results indicated that facets of conscientiousness incrementally predicted performance better than the broad factor of conscientiousness. For instance, the dependability facet was found to be a stronger predictor of job performance than overall conscientiousness while dependability and achievement strengthened the relationship between conscientiousness and performance. Furthermore, achievement and dependability were the dominant predictors for task or contextual performance across majority of occupation types. Due to the negative relationship between job performance and turnover (Mulla et al., 2013; Rubenstein et al., 2018; Zimmerman & Darnold, 2007), it is expected that the facets of conscientiousness will also have a negative relationship with turnover.

Furthermore, multiple studies have found conscientiousness to have a significant negative relationship with turnover: $\rho = -.17$ (conscientiousness and turnover; Drasgow et al., 2012), $\rho = -.22$ (conscientiousness and turnover; Zimmerman, 2008), $\rho = .23$ (conscientiousness and lack of turnover; Salgado, 2002). Results from previous research suggest that the facets comprising the broad factor may also be significantly correlated. Moreover, in terms of individual facets,

Drasgow et al. (2012) showed a negative relationship between the following facets of conscientiousness and employee turnover: achievement, order, responsibility, non-delinquency, and virtue. Moreover, the virtue facet showed a stronger correlation with turnover than the broad factor of conscientiousness.

While no direct relationship between the personality facet of dependability and turnover was found in the literature review, previous research suggests a negative relationship between perceived organizational dependability and turnover (Spencer & Steers, 1980) or turnover intention (Libres & Mabasa, 2014). These findings are relevant because if an employee values organizational dependability it might suggest they value their own dependability as an employee, further suggesting the personality facet of dependability as a predictor of employee turnover. Due to previous findings in related areas and the characteristics associated with dependability, it is assumed that those high in the trait would be less likely to leave a company due to their sense of duty towards the organization.

On the other hand, the facet of diligence—working toward goals and other positive outcomes—has been shown to have a significant indirect effect on turnover intention and a significant positive relationship with engagement, affective commitment, and self-efficacy (Albrecht & Marty, 2020). These findings, along with the characteristics of diligence encompassing a desire to work towards goals (i.e., organizational goals), further suggest a negative relationship between the facet and employee turnover.

The organization facet of conscientiousness is related to planning and organizing tasks and activities and is similar to the order facet of conscientiousness (not included in the taxonomy for the *WorkFORCE*™ Assessment). This relationship is relevant as order has been shown to strongly predict performance for newly hired employees (Stewart, 1999). While no previous

research suggests a direct link between organization and turnover, it can be expected that an employee with high organization would also be a high performer and valued by their company, therefore making them less likely to leave.

Regarding the facet of self-discipline, Ma et al. (2017) investigated the relationship between turnover intentions and personality characteristics in an infectious diseases hospital staff and found that the medical staff had significantly higher scores in self-discipline than the Chinese norm while 48% of the staff had very low or low turnover intention. Furthermore, the aspects of self-discipline such as controlling impulsiveness, focusing on tasks without distraction, and considering consequences before taking action, are expected to be valued by organizations, suggesting that those high in self-discipline may have lower turnover.

Taken together with the previous research on the broad factor of conscientiousness, as well as the narrow facets that comprise the factor, it is proposed that the facets of conscientiousness will have a negative relationship with turnover.

Hypothesis 1: *Conscientiousness facets of diligence, dependability, organization, and self-discipline will be negatively related to turnover.*

Previous research has shown both a negative (Salgado, 2002; Timmerman, 2006) and positive (Zimmerman, 2008) relationship between openness to experience and turnover. However, additional studies have examined the relationship between turnover and the lower order facets that comprise openness to experience (Drasgow et al., 2012; Woo et al., 2014; Woo et al., 2016).

The facet of creativity and other similar facets (e.g., ingenuity) are associated with imagination and original thinking. Previous research suggests a significant positive relationship between creativity and job satisfaction (Robinson & Beesley, 2010; Tongchaiprasit &

Ariyabuddhiphongs, 2016). On the other hand, Woo et al. (2014) found the facet of ingenuity to be a better positive predictor of task performance and adaptive performance than the broad openness to experience factor. Given the previously shown negative relationship between job satisfaction and turnover (Cho et al., 2012; Cotton & Tuttle, 1986; Griffeth et al., 2000; Hom & Kinicki, 2001; Rubenstein et al., 2018; Somers, 1996; Trevor, 2001), performance and turnover (Mulla et al., 2013; Rubenstein et al., 2018; Zimmerman & Darnold, 2007), and the similarity of creativity and ingenuity, it is proposed that the facet of creativity will have a negative relationship with turnover.

Inquisitiveness and other similar facets of openness to experience (e.g., curiosity) related to understanding how the world around us works have been shown to have a relationship with turnover. For example, Woo et al. (2016) investigated the reasons and speed at which a person leaves an organization and found that inquisitiveness predicted both turnover speed and reasons. Moreover, Drasgow et al. (2012) found the curiosity facet of openness to experience to be a stronger predictor of employee turnover than the broad openness to experience factor. Based on the previous research presented, it is proposed that those high in inquisitiveness will be less likely to leave the organization.

The evidence linking intellectual orientation to turnover is derived from Woo et al. (2014) in which the authors investigated the impact of openness and the six facets of openness (intellectual efficiency, ingenuity, curiosity, aesthetics, tolerance, and depth) in predicting organizational outcomes such as turnover, task performance, and adaptive performance. As intellectual orientation encompasses interest and comfort with intellectual and conceptual matter, a similarity between intellectual efficiency (Woo et al., 2014) and intellectual orientation (facet included in *WorkFORCE*™ Assessment) is suggested. Results from Woo et al. (2014) indicated

that intellectual efficiency as a stronger negative predictor of turnover and a stronger negative predictor of task performance than the broad openness to experience factor. Due to the negative relationship between performance and turnover (Mulla et al., 2013; Rubenstein et al., 2018; Zimmerman & Darnold, 2007) and the similar nature of intellectual efficiency and intellectual orientation, it is proposed that intellectual orientation will have a negative relationship with turnover.

Based on previous research on the broad factor of openness to experience and the narrow facets that comprise it as well as their relationships with turnover, it is proposed that the facets of openness to experience will have a negative relationship with turnover.

Hypothesis 2: *Openness to experience facets of intellectual orientation, creativity, and inquisitiveness will be negatively related to turnover.*

The current study will also focus on using survival analysis techniques for predicting turnover from personality facets. Survival analysis, or failure analysis, examines the time it takes for an event (e.g., an employee leaving an organization) to occur (Sheskin, 2011). Typically, regression analysis techniques are used to investigate the impact of predictor variables such as personality on turnover (Morita et al., 1989; 1993).

However, in the current study survival analysis will be used to test the proposed study relationships as it may be a more suitable method for understanding turnover. Previous research has suggested that survival analysis methods are preferable to other methods when examining turnover (Morita et al., 1989; 1993). The advantage of using survival analysis methodology as compared to traditional regression analysis is that researchers will receive more information about the length of time to turnover since the analysis can take into account the number of days, weeks, months, or years it took for an event to occur rather than examining a dichotomous model

of “employed” or “no longer employed”. Numerous studies have successfully used survival analysis to investigate demographic and organizational antecedents of turnover. Thus, the last purpose of this study is to expand on previous research by investigating the use of survival analysis techniques to predict employee turnover timeline using the facets of openness to experience and conscientiousness as predictors. It is hypothesized that the conscientiousness facets of diligence, dependability, organization, and self-discipline and the openness to experience facets of intellectual orientation, creativity, and inquisitiveness will be negatively related to turnover.

Method

Participants

The data for this secondary analysis was initially collected by a project team at ETS to validate the *WorkFORCE*™ Assessment for Job Fit for predicting employee performance in the Production Associate job group. The sample initially included 411 incumbents within the Production Associate job group in the hiring process of a manufacturing company in the U.S. and Mexico. However, 205 employees were removed from the sample because their tenure and turnover data were missing, four employees were removed because their facet-level personality scores were missing, and 8 employees were removed because they did not consent to have their data used for further analyses. The final dataset included responses from 194 employees in the Production Associate job group.

The Production Associate job group includes employee's responsible for performing all tasks involved in the production of the company's products (e.g., metal, plastic, glass components). Participants were primarily male (62%), with a high school level education (50%), born in the United States of America (97%), and spoke English as their native language (99%). Ages ranged from 18 to 61 years with an average age of 31.21 years (*SD* = 10.38). In terms of employment status, 100 employees (51.5%) were no longer employed at their organization by the end of the data collection. Of those that left, 56% left due to voluntary turnover while 30% were involuntary turnover and the remaining 14% left for unknown reasons. Many of the employees left the organization after less than 30 days (26%), while others left between 31 and 60 days (12%), 61 to 91 days (6%), or stayed at the organization for longer than 90 days (57%). A full outline of participant demographic information can be found in Table 3.

Measures

ETS® WorkFORCE™ Assessment for Job Fit

Overview. The *WorkFORCE*™ Assessment for Job Fit is a 120-item pairwise preference personality assessment derived from the FFM of personality and the lower order facet taxonomy described in Drasgow et al. (2012). The assessment is administered using the FACETS™ core capability, a computerized adaptive testing environment based on forced-choice assessment (Naemi et al., 2014). Forced-choice assessments require participants to choose between two equally desirable statements and have been shown to be less susceptible to faking (Cao & Drasgow, 2019; Wetzel et al., 2021). In the *WorkFORCE*™ Assessment participants are offered two statements representing different personality facets and are asked to select the statement that is most like them. For instance, in the example provided by Naemi et al. (2014), a participant may need to select between following statements with the first representing high agreeableness and the second representing high conscientiousness:

1. I get along well with others.
2. I always arrive to meetings on time.

The *WorkFORCE*™ Assessment is constructed from 13 personality facets in which: conscientiousness is comprised of diligence, organization, dependability, and self-discipline; extraversion is comprised of assertiveness and friendliness; agreeableness is comprised of generosity and collaboration; openness to experience is comprised of intellectual orientation, creativity, and inquisitiveness; and emotional stability is comprised of optimism and stability. Different combinations of these facets are combined to provide composite scores for six behavioral competencies designed to reflect a wide range of job performance: initiative and perseverance, responsibility, teamwork and citizenship, flexibility and resilience, problem

solving and ingenuity, and customer service orientation. The assessment also provides an overall score index that represents how likely the candidate is to be successful in the specific job, with higher scores representing a higher likelihood of success. Due to the assessment being a computer adaptive test (meaning each participant saw different items) and the forced-choice nature of the items, a typical Cronbach alpha for reliability of the facet-level or factor-level scores cannot be provided. Kim (2017) suggested a tentative approach to estimate the reliability of the facet scores by using item response theory (IRT) and data simulation. The simulated data contained 1,000 simulated candidates with true trait values on the 13 facets. According to Kim (2017):

> this approach for estimating reliability is to calculate mean square error of the difference between the true trait value and estimated value from FACETS. This approach tries to reflect total error (including bias) and not just for standard error of estimates. Because this approach requires the true values of attributes, which are unknown in reality, only simulated data can be used for this approach. (p. 1)

Kim (2017) found the reliability for the facets of inquisitiveness, creativity, intellectual orientation, diligence, organization, dependability, and self-discipline were .73, .82, .80, .79, .82, .82, and .77, respectively.

Employee Turnover

Employee turnover data was provided by the manufacturing company. The organization provided turnover status (turnover or retained), total number of days on job for those who were not retained, and type of turnover (involuntary or voluntary) for those who were not retained. Number of months on the job was calculated by grouping participants based on the number of days on the job.

Procedure

Job incumbents in the Production Associate group completed the *WorkFORCE*™ Assessment for Job Fit online from a client of ETS during the hiring process a few years after the validation of the assessment completed by Naemi et al. (2014). Assessment scores were extracted in June 2016 and turnover metrics were supplied by the client organization. The initial research study was approved by the ETS IRB and ETS has allowed the author to use the data from the Production Associate job group study for a secondary analysis. Additionally, the secondary analysis was approved by the West Chester University IRB.

Results

First a correlation analysis was conducted to examine relationships between number of months on the job and the seven facet-level scores from the openness to experience and conscientiousness factors. Then a logistic regression was used to investigate the predictability of the facets on the binary employee turnover variable. Finally, survival analysis was used to investigate the time it took for employees to leave the organization and if those times differ based on their facet-level scores.

Correlation Analysis

To investigate the relationship between the factor and facet level scores and number of months on the job, a bivariate correlation was initially computed. Correlations are descriptive statistical measures used to estimate the degree of relationship between two or more variables (Tabachnick & Fidell, 2019). The specific correlation test used in this analysis is the Pearson product-moment correlation coefficient used to assess the relationship between two variables with interval/ratio data. Results showed a statistically significant negative relationship between number of months on the job and the organization facet of conscientiousness, $r(192) = -.158$, $p = .028$. However, all other factor and facet scores did not have a significant relationship with number of months on the job. Intercorrelations among study variables are presented in Table 4.

Logistic Regression Analysis

Hypotheses 1 and 2 predicted that the facets of conscientiousness (diligence, organization, dependability, and self-discipline) and the facets of openness to experience (intellectual orientation, creativity, and inquisitiveness) would have a negative relationship with employee turnover. Binary logistic regression was conducted to investigate the predictability of the facets on employee turnover. Logistic regression “models the probability of presence and

absence given the observed values of the predictor variables" (Ozdemir, 2011, p. 127) and the goal of the analysis is to determine the best model to describe relationships between independent variables and a dependent variable (Lee, 2005; Ohlmacher & Davis, 2003).

A binary logistic regression was used as the dependent variable of employee turnover is dichotomous (1 = employee turnover, 0 = employee retained), however the independent variables in a logistic regression can be categorical or continuous (Edwards & Edwards, 2016). The current study includes continuous facet-level scores as the independent variables. The binary logistic regression model did not find any of the facet-level scores to be significant at predicting turnover, $\chi 2$ (7, N = 194) = 4.109, p = .767. The model explains 2.8% of the variance in turnover, Nagelkerke R^2 = .028. Thus, hypotheses 1 and 2 were not supported. Table 5 provides regression results and beta values for each facet. Another binary logistic regression was used to investigate the predictability of the overall factors of conscientiousness and openness to experience. Results were similar in that the factors were not significant in predicting turnover, $\chi 2$ (2, N = 194) = 1.874, p = .392. The model explained 1.3% of the variance in turnover, Nagelkerke R^2 = .013. Table 5 provides regression results and beta values for both factors.

Survival Analysis

Survival analysis includes a set of statistical procedures that evaluate the amount of time that occurs between an initial observation (i.e., hired employee) and the occurrence of an event (i.e., employee leaving the organization; Sheskin, 2011). In the case of examining employee turnover, a survival function is constructed to provide an estimate of the likelihood an employee will still be employed beyond a specific time period. *Censoring* is a method used in survival analysis and it refers to the data that is not available for certain participants. Data is either *right censored* or *left censored.* In turnover analysis, *right censored* data refers to participants who

were still employed in the organization by the end of the data collection. The current study used right censoring for the 94 participants still employed by the conclusion of the study. The retained participants did not have data for the total number of days or months spent on the job before leaving the organization as these employees were retained, therefore the longest reported months on the job (8 months) was used as the number of months on the job for all retained employees. *Left censoring* was not required in the current study therefore the method is not described.

Table 6 shows the survival function calculations on the data from 194 employees using the Kaplan-Meier estimate (Kaplan & Meier, 1958). The Kaplan-Meier estimate or product-limit method is a commonly used nonparametric measure to estimate survival function (Tabachnick & Fidell, 2019). The *number at risk* shown in the table represents the number of employees remaining in the organization at that time. Additionally, the cumulative survival for each month is presented in the table. For instance, before the first month was over 46 employees left the organization, therefore 148 employees were still at risk and the cumulative survival (i.e., probability of surviving this month) was 0.763 or 76.3%. The chance of surviving at least one month decreased by nearly 12%, meaning there was a 64.4% cumulative survival. The cumulative survival again decreased by 6.2% for those still employed after two months with an estimate of 58.2% survival. Furthermore, the chance of survival for three months, four months, five months, and six months decreased by a few percentage points at 55.2%, 53.6%, 52.1%, and 51.5%, respectively. The results for seven months are not reported because no employees left the organization during this time. Finally, the chance of survival after eight months was 48.5% in which all 100 employees left the organization and 94 employees were retained.

Survival curves are also calculated when using the Kaplan-Meier method. Figure 1 shows the survival plot. The curve is shown in ‘steps’ because the cumulative survival stays the same

until the next month that a person leaves the organization. Furthermore, in survival curves the censored observations are represented with a vertical dash (Stel et al., 2011).

While the previous analysis provided information about how many months employees were likely to survive in the organization, the next analysis investigated if differences in the facet-level scores of the openness to experience and conscientiousness factors are linked to differences in the number of months an employee is likely to survive at an organization. To allow for easier interpretation of the results for this survival analysis, the facet-level composite scores were grouped into four categories based on the z-score: scores -1 or below, scores -1 to 0, scores 0 to +1, and scores 1 or above. This grouping was chosen arbitrarily to compare participants scoring lower than average, somewhat lower than average, somewhat above the average, and above the average, respectively.

The Kaplan-Meier method was again used to estimate the survival function of the seven facets. Additionally, the Mantel-Haenszel log rank test, a test of statistical significance, was used to compare the equality of survival distributions in which all time points are weighed equally (IBM, 2019). However, the test does not provide a confidence interval or an estimate of the size of the difference between groups (Stel et al., 2011).

The facets of openness to experience showed no significant difference in survival distributions, however the results from one facet were near significant. The creativity facet results showed a near significant difference in survival distributions across the four z-score groupings, $\chi 2$ (3, N = 194) = 7.508, p = .057. Table 7 shows the survival table and Figure 2 shows the survival curve for the creativity score analysis. Additionally, the inquisitiveness facet results showed no significant difference in survival distributions across the four z-score groupings, $\chi 2$ (3, N = 194) = 2.522, p = .471. Table 8 shows the survival table and Figure 3

shows the survival curve for the inquisitiveness score analysis. Finally, the intellectual orientation facet results also showed no significant difference in survival distributions across the four z-score groupings, $\chi 2$ (3, N = 194) = 4.835, p = .184. Table 9 shows the survival table and Figure 4 shows the survival curve for the intellectual orientation score analysis.

The results from the facets of conscientiousness were also non-significant. The dependability facet results showed no significant difference in survival distributions across the four z-score groupings, $\chi 2$ (3, N = 194) = 1.087, p = .780. Table 10 shows the survival table and Figure 5 shows the survival curve for the dependability score analysis. The diligence facet results showed no significant difference in survival distributions across the four z-score groupings, $\chi 2$ (3, N = 194) = 3.303, p = .347. Table 11 shows the survival table and Figure 6 shows the survival curve for the diligence score analysis. Additionally, the organization facet results showed no significant difference in survival distributions across the four z-score groupings, $\chi 2$ (3, N = 194) = 3.799, p = .284. Table 12 shows the survival table and Figure 7 shows the survival curve for the organization score analysis. Finally, the self-discipline facet results showed no significant difference in survival distributions across the four z-score groupings, $\chi 2$ (3, N = 194) = .437, p = .932. Table 13 shows the survival table and Figure 8 shows the survival curve for the self-discipline score analysis.

Survival analysis was also used to investigate the overall factors of conscientiousness and openness to experience. The conscientiousness factor showed no significant difference in survival distributions across the four z-score groupings, $\chi 2$ (3, N = 194) = 3.660, p = .300. Table 14 shows the survival table and Figure 9 shows the survival curve for the dependability score analysis. The openness to experience factor showed no significant difference in survival distributions across the four z-score groupings, $\chi 2$ (3, N = 194) = 4.837, p = .184. Table 14

shows the survival table and Figure 9 shows the survival curve for the dependability score analysis. Table 16 provides a summary of the differences in cumulative survival across the seven facets and two factors.

Discussion

The purpose of this study was to investigate if the personality factors and facets of conscientiousness and openness to experience were predictive of employee turnover using scores from the ETS® *WorkFORCE*™ Assessment for Job Fit. In the current study, conscientiousness was comprised of diligence, organization, dependability, and self-discipline while openness to experience was comprised of intellectual orientation, creativity, and inquisitiveness. A secondary purpose of this study was to use survival analysis techniques for predicting employee turnover. Survival analysis is a statistical method used to evaluate the time it takes for an event, such as an employee leaving an organization to occur (Sheskin, 2011). As discussed in the literature review, previous research has suggested using survival analysis techniques over more commonly used regression methods for predicting turnover because survival analysis provides more information about the length of time to turnover (Morita et al., 1989; 1993).

As discussed in the results section, our findings indicate that the organization facet of conscientiousness showed a significantly negative relationship with turnover, however logistic regression analyses did not indicate that factors or facets of conscientiousness and openness to experience significantly predict turnover. Furthermore, survival analysis methods did not show a significant difference between the z-score groupings across the seven facets examined in this study. However, the differences in scores for the creativity facet of openness to experience were nearly significant in predicting turnover.

These results are somewhat inconsistent with previous research on conscientiousness. For instance, as discussed in the literature review, many researchers have found a significant negative relationship between employee turnover and conscientiousness (David & Holladay, 2015; Drasgow et al., 2012 ; Salgado, 2002 ; Singh et al., 2014; Zimmerman, 2008) or the facets

it is comprised of (Timmerman, 2006). On the other hand, the results from this study do align with reports from additional researchers who found no relationship between conscientiousness and turnover (Khalid et al., 2013). Additionally, Abbas (2019) found a negative relationship between conscientiousness and turnover when employees were exposed to challenge stressors, suggesting inconsistency in the direction of the relationship. Even though the majority of the results regarding conscientiousness were not significant in this study, results did suggest a small negative relationship between turnover and conscientiousness or the facets of conscientiousness, thus, it may be that with an increased sample size these findings may become significant. However, the current finding suggests a clear direction between conscientiousness and turnover does not seem to exist.

Given the current finding that the relationship could be positive or negative, researchers may want to examine situational factors that could influence the relationship between conscientiousness and turnover. For example, because people high in conscientiousness value structure and order, if they work in a low structure job, that might cause them to get frustrated and leave their job. This particular situation suggests a positive relationship in that those high in conscientiousness would be more likely to leave an organization. However, if an employee is high in conscientiousness and works at a high structure job, they may be less likely to leave the organization, suggesting a negative relationship between conscientiousness and turnover.

On the other hand, future research could also explore this slight negative relationship between turnover and the conscientiousness factors and facets by conducting survival analysis with different groupings of scores from the conscientiousness factor and facets. Future research could also investigate if turnover significantly increases or decreases at a particular score. This information would be beneficial for organizations to use, particularly during recruitment and

selection to take into account if an employee is likely to leave the organization at a certain point based on their personality scores.

The results are also somewhat inconsistent with previous research on openness to experience. The direction of the relationship between openness to experience and employee turnover has been reported as both negative (Barrick and Mount, 1991; Salgado, 2002; Timmerman, 2006) and positive (Zimmerman, 2008). Additional research on the facets of openness to experience has shown a negative relationship with turnover (Drasgow et al., 2012; Woo et al., 2014). However, other researchers have reported no significant relationship between openness to experience and turnover (Singh et al., 2014). The insignificant results from this study are not very surprising given the inconsistent findings regarding the relationship between openness to experience and employee turnover. The results of this study primarily showed a slight positive relationship between the openness to experience factor and facets and employee turnover.

Due to the inconsistent findings from previous research, as well as the findings from the current study indicating that the relationship could be positive or negative, researchers may want to examine the relationship between openness to experience and turnover in specific situations. For example, because people high in openness tend to be curious and creative, they may be more likely to leave an organization if they are not engaged. Therefore, a positive relationship may exist between openness to experience and turnover if there is low engagement. On the other hand, a negative relationship between openness to experience and turnover could be present if an employee high in openness to experience is engaged, as they may be less likely to leave the organization.

Future research could also investigate the predictability of other factors and facets of personality on employee turnover. For instance, researchers may want to examine the factor and facets of agreeableness because this personality factor has shown to be a more consistent negative predictor of employee turnover than openness to experience.

Limitations

Due to limited data availability, this study had somewhat of a small sample size (N=194). This small sample size limited the ability to conduct further analyses such as investigating differences between involuntary and voluntary turnover. The sample size all together was 194 participants, however, to investigate differences in types of turnover, the 94 participants who were retained in the organization would need to be removed for analysis, leaving only 100 participants. Of those 100 participants, 56 left the organization voluntarily, 30 left involuntarily, and the reason for leaving was unknown for the other 14 participants. Of most interest would be analyses investigating voluntary turnover to explore differences in the employees that leave the organization by their own choice rather than it being the organization's decision. Furthermore, previous research has examined predictability of personality, specifically only on involuntary turnover (Barrick et al., 1994) or voluntary turnover (Khalid et al., 2013), however this study investigated both types of turnover together which may be one reason for the inconsistency in findings with previous research. Future researchers interested in exploring turnover should investigate relationships with voluntary or involuntary turnover using larger sample sizes. Researchers could also investigate differences between personality factors and facets of those employees who leave voluntarily compared to those who leave involuntarily.

Another limitation of this study is the arbitrary groupings of the factor and facet z-score groups for the survival analysis. Scores were grouped into four categories based on the z-score:

scores -1 or below, scores -1 to 0, scores 0 to +1, and scores 1 or above. The author did not find previous literature with suggestions on if/how to group personality scores in order to interpret survival analysis results. These groupings were chosen to represent participants scoring lower than average, somewhat lower than average, somewhat above the average, and above the average score within the specific facet. Another issue with the z-score groupings is the uneven representation of participants across these groups within each of the facets and factors. For instance, in the inquisitive facet of openness to experience there were only 13 participants in the -1 or below category, however there were 53 participants in the -1 to 0 group, 87 participants in the 0 to 1 group, and 41 participants in the 1 or above group. These inconsistent and uneven groups may have impacted the possibility of finding significant differences between scores. Different grouping methods should be considered. For example, using three groups instead of four groups may be more beneficial to examine differences as a smaller number of groupings would allow for a larger number of participants included in each group. On the other hand, researchers may want to try using only two groups—participants with scores below the mean and participants with scores above the mean—to determine if one group is more likely to turnover than the other. If differences do exist between the two groups, organizations could use this information when administering a personality assessment during the selection process to consider if a person is more likely to leave the organization based on their personality score.

Finally, this study did not fully investigate if the personality facets demonstrated incremental validity over their personality factors. Future research should examine the incremental validity of personality facets in predicting turnover. Instead of only taking into account a potential employee's personality factor score, organizations may find more benefit in

using personality facet scores if findings show the facets to be better predictors of employee turnover.

Implications

Although most results were not significant, important research implications emerged from this study. First and foremost, to the author's knowledge, this study was the first to use survival analysis techniques to investigate the impact of personality facet-level scores on predicting turnover. Researchers suggest using survival analysis methods rather than traditional regression methods when predicting employee turnover as survival analysis provides more information about the length of time to turnover (Morita et al., 1989; 1993). Additionally, an issue regarding the method of how to group continuous variables for easier interpretation of survival analysis results emerged. Future research could fill this gap by further investigating the use of personality scores or other continuous variables such as personality when predicting turnover via survival analysis methods and determining methods of grouping scores to allow for interpretation of results. In addition to the implications regarding survival analysis, one correlation was significant between the organization facet of conscientiousness and employee turnover. Future researchers could further explore this finding by attempting to replicate the results. Providing more evidence for a relationship between the organization facet of conscientiousness and turnover could support the need for further work to continue exploring the predictability of scores from the organization facet on employee turnover.

The results of this study also have practical implications, particularly for the manufacturing field where the data for this study was collected. For instance, while the results of this study did not report significant differences in personality scores on turnover, the initial survival function did provide information about when Production Associate employees in this

study tended to leave the company. Before the first month was over, employees only had a 76.3% of being retained at the organization and that number dropped to 64.4% by the end of the first month. Moreover, the survival rate dropped to 58.2% by the end of the second month. Then, the chance of survival slowly decreased each month from the end of the third month to the study completion at the end of the eighth month. These results indicate that the majority of employees leave before the end of the second month and if they do make it past the end of the second month, their chance of staying in the organization remains relatively the same. This information has practical implications for the organization as interventions such as realistic job previews (Hom et al., 1998) or stay interviews (Robeano, 2017; Vignesh & Babu, 2014) to decrease employee turnover may be most effective if implemented in the first two months.

Conclusion

Organizations aim to reduce employee turnover due to the numerous monetary, time, performance, and human capital implications that result from an employee leaving an organization. This study contributed to the literature by investigating the use of personality factors and facets as predictors of turnover, particularly with the use of survival analysis techniques. While results did not indicate that the personality factors or their individual facets significantly predicted turnover, survival analysis results did provide useful information regarding when an employee is likely to leave an organization. Future research in this area is suggested as it would be helpful for organizations to know if employees who are high or low in a certain personality facet are (a) likely to leave the organization and (b) when they are likely to leave the organization.

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Table 1

Facet Traits Comprising the Big Five Factors Across Research Studies

Big Five Factor	Assessment *Research Study*		
	NEO-PI-R *Luminet et al. (1999)*	IPIP *Chauvin et al. (2007)*	TAPAS *Drasgow et al. (2012)*
Conscientiousness	**Order**	**Orderliness**	Diligence
	Dutifulness	**Dutifulness**	Rule Following
	Self-discipline	Conscientiousness	**Self-discipline**
	Achievement Striving	**Organization**	**Organization**
	Deliberation	Cautiousness	Character
	Competence	Rationality	Dependability
		Perfectionism	
		Efficiency	
		Purposefulness	
Extraversion	**Assertiveness**	**Assertiveness**	**Assertiveness**
	Gregariousness	**Gregariousness**	Experience Seeking
	Warmth	**Friendliness**	**Friendliness**
	Activity	Poise	
	Excitement-seeking	Leadership	
	Positive Emotions	Provocativeness	
		Self-disclosure	
		Talkativeness	
		Sociability	
Openness to Experience	**Aesthetics**	Ingenuity	**Aesthetic Taste**
	Fantasy	**Introspection**	**Introspectiveness**
	Feelings	**Intellect**	**Intellectual Orientation**
	Actions	**Creativity**	**Creativity**
	Ideas	Competence	Open-mindedness
	Values	Reflection	Inquisitiveness
		Quickness	
		Imagination	
		Depth	
Agreeableness	**Tendermindedness**	**Tenderness**	Thoughtfulness/ Compassion
	Straightforwardness	Cooperation	Collaboration
	Altruism	Sympathy	Generosity
	Compliance	Empathy	
	Modesty	Morality	
	Trust	Understanding	
		Warmth	
		Pleasantness	
		Nurturance	
Emotional Stability	**Impulsiveness**	**Impulse Control**	Optimism
	Anxiety	**Stability**	**Stability**
	Angry Hostility	**Calmness**	**Calmness**
	Depression	Happiness	

	Self-consciousness	Moderation
	Vulnerability	Imperturbability
		Toughness
		Tranquility
		Cool-headedness

Table 2

Personality Trait Taxonomy for Existing FACETS Framework

Big Five Dimension	Lower Order Facet Name	Brief Description
Conscientiousness	Diligence	Feelings and behaviors associated with working toward goals and other positive outcomes
	Organization	Behaviors and intentions related to the ability to plan and organize tasks and activities
	Dependability	Feelings and actions related to a sense of duty or being answerable for one's behavior
	Self-discipline	Thoughts and behaviors centered around impulsiveness, the ability to focus on tasks without distraction, and the consideration of consequences before taking action
Extraversion	Assertiveness	Behaviors associated with being direct and decisive
	Friendliness	Interest in engaging in friendly social interactions
Openness to experience	Inquisitiveness	Interest and behaviors directed toward understanding how the world around us works
	Creativity	Thoughts and behaviors associated with imagination and original thinking
	Intellectual orientation	Interest in and comfort with intellectual and conceptual matters
Agreeableness	Collaboration	Behaviors and intentions centered on a desire to work or act with others for a common benefit
	Generosity	Behaviors associated with activities such as helping and doing things for others, giving to charity, and volunteering for community improvement
Emotional stability	Stability	Feelings and behaviors associated with various degrees of insecurity and anxiety
	Optimism	Thoughts and behaviors associated with an individual's general emotional tone and world outlook

Note. Modified from "Examining the WorkFORCE™ assessment for job fit and core capabilities of FACETS™", by Naemi, B., Seybert, J., Robbins, S., & Kyllonen, P., 2014, *ETS Research Report No. RR-14-32*, p. 4.

Table 3

Participant Demographics

Demographic Characteristic	Frequency N = 194 n (%)
Gender[a]	
Female	72 (38%)
Male	119 (62%)
Level of Education[b]	
Elementary/primary school	2 (1%)
Lower secondary education (grades 7-10)	1 (1%)
Upper secondary education (grades 10-12)	12 (6%)
General secondary school (junior high school)	19 (10%)
Secondary school for university entrance qualification or equivalent (high school)	94 (50%)
Vocational/technical high school	22 (12%)
Vocational/technical school after high school	12 (6%)
Community/junior college (for associate's degree)	11 (6%)
Undergraduate college or university (for bachelor's degree)	7 (4%)
Graduate or professional school (for master's or doctoral degree)	1 (1%)
Other	9 (5%)
Native Country[c]	
United States of America	187 (97%)
Armenia	2 (1%)
Guatemala	1 (1%)
United Kingdom	1 (1%)
Other	2 (1%)
Native Language[c]	
English	191 (99%)
Armenian	1 (1%)
Other	1 (1%)
Employment Status	
Turnover	100 (52%)
Retained	94 (49%)
Turnover Type[d]	
Voluntary	56 (56%)
Involuntary	30 (30%)
Unkown	14 (14%)
Number of Days on Job	
Less than 30 days	50 (26%)
31 to 60 days	23 (12%)
61 days to 90 days	11 (6%)
More than 90 days	110 (57%)

[a]Missing 3 data points
[b]Missing 4 data points
[c]Missing 1 data point
[d]N is out of 100 not 194 as category does not include retained employees.

Table 4

Correlation of Factor and Facet Scores with Number of Months on the Job

Variable	Number of Months on Job
Openness to experience	0.052
Creativity	0.043
Inquisitiveness	0.058
Intellectual Orientation	0.015
Conscientiousness	-0.083
Dependability	-0.030
Diligence	-0.064
Organization	-.158*
Self-Discipline	0.006

* Correlation is significant at the 0.05 level (2-tailed).

Table 5

Binary Logistic Regression Analysis of Facet and Factor Scores on Employee Turnover

Level	Facet/Factor	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
								Lower	Upper
Facet	Creativity (O)	-0.169	0.184	0.843	1	0.359	0.845	0.589	1.211
	Inquisitiveness (O)	-0.031	0.196	0.025	1	0.873	0.969	0.661	1.422
	Intellectual Orientation (O)	0.051	0.179	0.083	1	0.774	1.053	0.742	1.494
	Dependability (C)	-0.012	0.173	0.005	1	0.944	0.988	0.703	1.388
	Diligence (C)	0.128	0.189	0.460	1	0.498	1.136	0.785	1.645
	Organization (C)	0.252	0.184	1.884	1	0.170	1.287	0.898	1.844
	Self-Discipline (C)	-0.052	0.171	0.094	1	0.760	0.949	0.679	1.326
	Constant	0.022	0.188	0.013	1	0.908	1.022		
Factor	Conscientiousness	0.322	0.239	1.807	1	0.179	1.380	0.863	2.206
	Openness	-0.203	0.250	0.665	1	0.415	0.816	0.500	1.331
	Constant	-0.045	0.173	0.067	1	0.795	0.956		

Table 6

Cumulative Survival Table by Months on Job

Time in months	Number at risk	Number of employee turnover	Number of retained employees (censored)	Cumulative proportion surviving at the time	Standard Error
0	148	46	0	0.763	0.031
1	125	69	0	0.644	0.034
2	113	81	0	0.582	0.035
3	107	87	0	0.552	0.036
4	104	90	0	0.536	0.036
5	101	93	0	0.521	0.036
6	100	94	0	0.515	0.036
8	94	100	94	0.485	0.036

Table 7

Cumulative Survival Table by Months on Job Grouped by Creativity Score

Creativity score group	Time in months	Number at risk	Number of employee turnover	Number of retained employees (censored)	Cumulative proportion surviving at the time	Standard Error
-1 or below	0	21	1	0	0.955	0.044
	1	19	3	0	0.864	0.073
	2	15	7	15	0.682	0.099
-1 to 0	0	48	27	0	0.640	0.055
	1	43	32	0	0.573	0.057
	2	38	37	0	0.507	0.058
	3	35	40	0	0.467	0.058
	5	34	41	0	0.453	0.057
	6	33	42	0	0.440	0.057
	8	29	46	29	0.387	0.056
0 to 1	0	50	11	0	0.820	0.049
	1	40	21	0	0.656	0.061
	2	37	24	0	0.607	0.063
	3	34	27	0	0.557	0.064
	4	33	28	0	0.541	0.064
	5	32	29	0	0.525	0.064
	8	30	31	30	0.492	0.064
1 or above	0	29	7	0	0.806	0.066
	1	23	13	0	0.639	0.080
	4	21	15	0	0.583	0.082
	5	20	16	20	0.556	0.083

Table 8

Cumulative Survival Table by Months on Job Grouped by Inquisitiveness Score

Inquisitiveness score group	Time in months	Number at risk	Number of employee turnover	Number of retained employees (censored)	Cumulative proportion surviving at the time	Standard Error
-1 or below	0	9	4	0	0.692	0.128
	1	8	5	0	0.615	0.135
	2	7	6	0	0.538	0.138
	3	6	7	6	0.462	0.138
-1 to 0	0	37	16	0	0.698	0.063
	1	32	21	0	0.604	0.067
	2	29	24	0	0.547	0.068
	3	27	26	0	0.509	0.069
	5	25	28	0	0.472	0.069
	6	24	29	24	0.453	0.068
0 to 1	0	72	15	0	0.828	0.040
	1	62	25	0	0.713	0.049
	2	55	32	0	0.632	0.052
	3	53	34	0	0.609	0.052
	4	51	36	0	0.586	0.053
	5	50	37	0	0.575	0.053
	8	47	40	47	0.540	0.053
1 or above	0	30	11	0	0.732	0.069
	1	23	18	0	0.561	0.078
	2	22	19	0	0.537	0.078
	3	21	20	0	0.512	0.078
	4	20	21	0	0.488	0.078
	8	17	24	17	0.415	0.077

Table 9

Cumulative Survival Table by Months on Job Grouped by Intellectual Orientation Score

Intellectual Orientation score group	Time in months	Number at risk	Number of employee turnover	Number of retained employees (censored)	Cumulative proportion surviving at the time	Standard Error
-1 or below	0	19	8	0	0.704	0.088
	1	16	11	0	0.593	0.095
	2	15	12	0	0.556	0.096
	3	14	13	0	0.519	0.096
	5	13	14	0	0.481	0.096
	6	12	15	12	0.444	0.096
-1 to 0	0	39	13	0	0.750	0.060
	1	30	22	0	0.577	0.069
	2	23	29	0	0.442	0.069
	3	22	30	0	0.423	0.069
	4	21	31	0	0.404	0.068
	8	20	32	20	0.385	0.067
0 to 1	0	66	15	0	0.815	0.043
	1	57	24	0	0.704	0.051
	2	54	27	0	0.667	0.052
	3	52	29	0	0.642	0.053
	4	51	30	0	0.630	0.054
	8	46	35	46	0.568	0.055
1 or above	0	24	10	0	0.706	0.078
	1	22	12	0	0.647	0.082
	2	21	13	0	0.618	0.083
	3	19	15	0	0.559	0.085
	4	18	16	0	0.529	0.086
	5	16	18	16	0.471	0.086

Table 10

Cumulative Survival Table by Months on Job Grouped by Dependability Score

Dependability score group	Time in months	Number at risk	Number of employee turnover	Number of retained employees (censored)	Cumulative proportion surviving at the time	Standard Error
-1 or below	0	7	3	0	0.700	0.145
	1	6	4	0	0.600	0.155
	2	5	5	5	0.500	0.158
-1 to 0	0	42	15	0	0.737	0.058
	1	35	22	0	0.614	0.064
	2	30	27	0	0.526	0.066
	4	29	28	0	0.509	0.066
	5	28	29	0	0.491	0.066
	8	25	32	25	0.439	0.066
0 to 1	0	50	17	0	0.746	0.053
	1	46	21	0	0.687	0.057
	2	42	25	0	0.627	0.059
	3	39	28	0	0.582	0.060
	6	38	29	0	0.567	0.061
	8	36	31	36	0.537	0.061
1 or above	0	49	11	0	0.817	0.050
	1	38	22	0	0.633	0.062
	2	36	24	0	0.600	0.063
	3	33	27	0	0.550	0.064
	4	31	29	0	0.517	0.065
	5	29	31	0	0.483	0.065
	8	28	32	28	0.467	0.064

Table 11

Cumulative Survival Table by Months on Job Grouped by Diligence Score

Diligence score group	Time in months	Number at risk	Number of employee turnover	Number of retained employees (censored)	Cumulative proportion surviving at the time	Standard Error
-1 or below	0	14	4	0	0.778	0.098
	1	12	6	0	0.667	0.111
	2	10	8	0	0.556	0.117
	6	9	9	9	0.500	0.118
-1 to 0	0	41	13	0	0.759	0.058
	1	38	16	0	0.704	0.062
	2	34	20	0	0.630	0.066
	3	32	22	0	0.593	0.067
	4	31	23	0	0.574	0.067
	5	30	24	0	0.556	0.068
	8	28	26	28	0.519	0.068
0 to 1	0	44	12	0	0.786	0.055
	1	38	18	0	0.679	0.062
	2	35	21	0	0.625	0.065
	3	33	23	0	0.589	0.066
	5	32	24	0	0.571	0.066
	8	31	25	31	0.554	0.066
1 or above	0	49	17	0	0.742	0.054
	1	37	29	0	0.561	0.061
	2	34	32	0	0.515	0.062
	3	32	34	0	0.485	0.062
	4	30	36	0	0.455	0.061
	5	29	37	0	0.439	0.061
	8	26	40	26	0.394	0.060

Table 12

Cumulative Survival Table by Months on Job Grouped by Organization Score

Organization score group	Time in months	Number at risk	Number of employee turnover	Number of retained employees (censored)	Cumulative proportion surviving at the time	Standard Error
-1 or below	0	12	1	0	0.923	0.074
	1	10	3	0	0.769	0.117
	2	9	4	9	0.692	0.128
-1 to 0	0	54	10	0	0.844	0.045
	1	48	16	0	0.750	0.054
	2	43	21	0	0.672	0.059
	3	40	24	0	0.625	0.061
	4	38	26	0	0.594	0.061
	5	36	28	0	0.563	0.062
	6	35	29	0	0.547	0.062
	8	32	32	32	0.500	0.063
0 to 1	0	57	23	0	0.713	0.051
	1	46	34	0	0.575	0.055
	2	43	37	0	0.538	0.056
	4	42	38	0	0.525	0.056
	5	41	39	0	0.513	0.056
	8	38	42	38	0.475	0.056
1 or above	0	25	12	0	0.676	0.077
	1	21	16	0	0.568	0.081
	2	18	19	0	0.486	0.082
	3	15	22	15	0.405	0.081

Table 13

Cumulative Survival Table by Months on Job Grouped by Self-Discipline Score

Self-Discipline score group	Time in months	Number at risk	Number of employee turnover	Number of retained employees (censored)	Cumulative proportion surviving at the time	Standard Error
-1 or below	0	10	1	0	0.909	0.087
	1	8	3	0	0.727	0.134
	2	7	4	0	0.636	0.145
	3	6	5	6	0.545	0.150
-1 to 0	0	28	8	0	0.778	0.069
	1	23	13	0	0.639	0.080
	2	19	17	0	0.528	0.083
	3	18	18	0	0.500	0.083
	4	17	19	0	0.472	0.083
	5	16	20	16	0.444	0.083
0 to 1	0	49	23	0	0.681	0.055
	1	46	26	0	0.639	0.057
	2	42	30	0	0.583	0.058
	3	40	32	0	0.556	0.059
	6	39	33	0	0.542	0.059
	8	36	36	36	0.500	0.059
1 or above	0	61	14	0	0.813	0.045
	1	48	27	0	0.640	0.055
	2	45	30	0	0.600	0.057
	3	43	32	0	0.573	0.057
	4	41	34	0	0.547	0.057
	5	39	36	0	0.520	0.058
	8	36	39	36	0.480	0.058

Table 14

Cumulative Survival Table by Months on Job Grouped by Overall Conscientiousness Score

Conscientiousness score group	Time in months	Number at risk	Number of employee turnover	Number of retained employees (censored)	Cumulative proportion surviving at the time	Standard Error
-1 or below	1	3	2	0	0.6	0.219
	2	2	3	2	0.4	0.219
-1 to 0	0	32	12	0	0.727	0.067
	1	29	15	0	0.659	0.071
	2	24	20	0	0.545	0.075
	3	23	21	0	0.523	0.075
	5	22	22	0	0.5	0.075
	6	21	23	0	0.477	0.075
	8	20	24	20	0.455	0.075
0 to 1	0	74	22	0	0.771	0.043
	1	66	30	0	0.688	0.047
	2	63	33	0	0.656	0.048
	3	59	37	0	0.615	0.05
	4	57	39	0	0.594	0.05
	8	53	43	53	0.552	0.051
1 or above	0	37	12	0	0.755	0.061
	1	27	22	0	0.551	0.071
	2	24	25	0	0.49	0.071
	3	23	26	0	0.469	0.071
	4	22	27	0	0.449	0.071
	5	20	29	0	0.408	0.07
	8	19	30	19	0.388	0.07

Table 15

Cumulative Survival Table by Months on Job Grouped by Overall Openness to Experience Score

Openness to Experience score group	Time in months	Number at risk	Number of employee turnover	Number of retained employees (censored)	Cumulative proportion surviving at the time	Standard Error
-1 or below	0	7	1	0	0.875	0.117
	3	6	2	6	0.75	0.153
-1 to 0	0	44	19	0	0.698	0.058
	1	38	25	0	0.603	0.062
	2	32	31	0	0.508	0.063
	5	31	32	0	0.492	0.063
	6	30	33	0	0.476	0.063
	8	29	34	29	0.46	0.063
0 to 1	0	78	23	0	0.772	0.042
	1	63	38	0	0.624	0.048
	2	57	44	0	0.564	0.049
	3	52	49	0	0.515	0.05
	4	50	51	0	0.495	0.05
	5	48	53	0	0.475	0.05
	8	45	56	45	0.446	0.049
1 or above	0	19	3	0	0.864	0.073
	1	17	5	0	0.773	0.089
	4	16	6	0	0.727	0.095
	8	14	8	14	0.636	0.103

Table 16

Summary of Survival Function Differences in Months on Job Across Facets and Factors

Level	Facet/Factor	$\chi 2$	df	Sig.
Facet	Creativity (O)	7.508	3	.057
	Inquisitiveness (O)	2.522	3	.471
	Intellectual Orientation (O)	4.835	3	.184
	Dependability (C)	1.087	3	.780
	Diligence (C)	3.303	3	.347
	Organization (C)	3.799	3	.284
	Self-Discipline (C)	0.437	3	.932
Factor	Conscientiousness	3.660	3	.300
	Openness	4.837	3	.184

Figure 1

Survival Curve by Months on Job

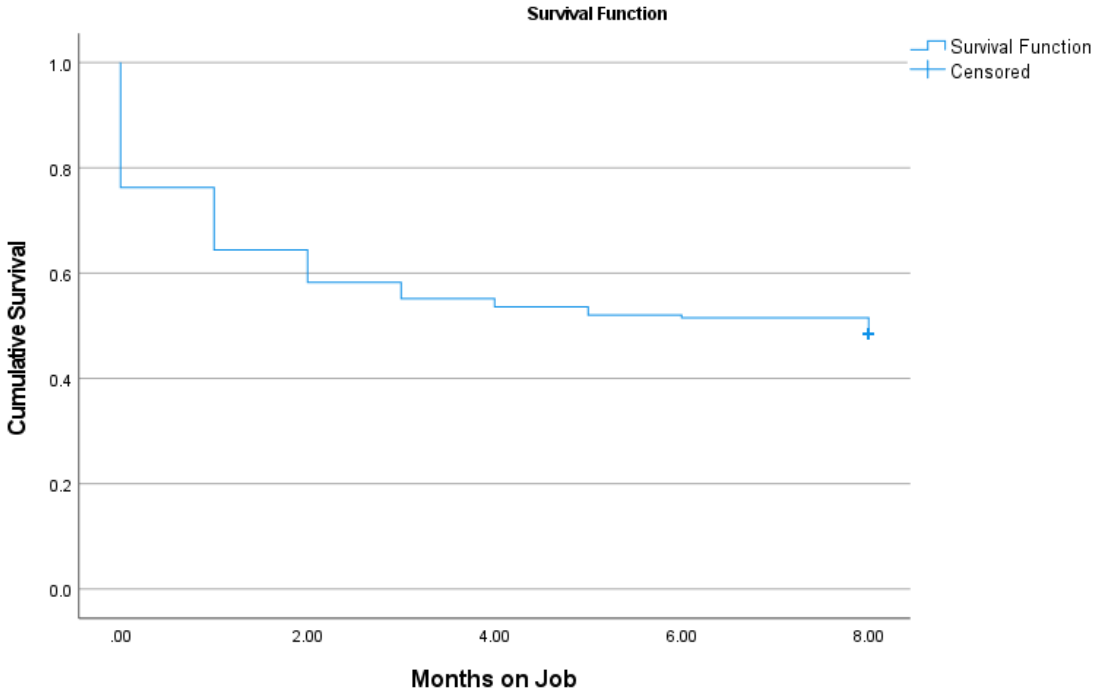

Figure 2

Survival Curve by Months on Job Grouped by Creativity Score

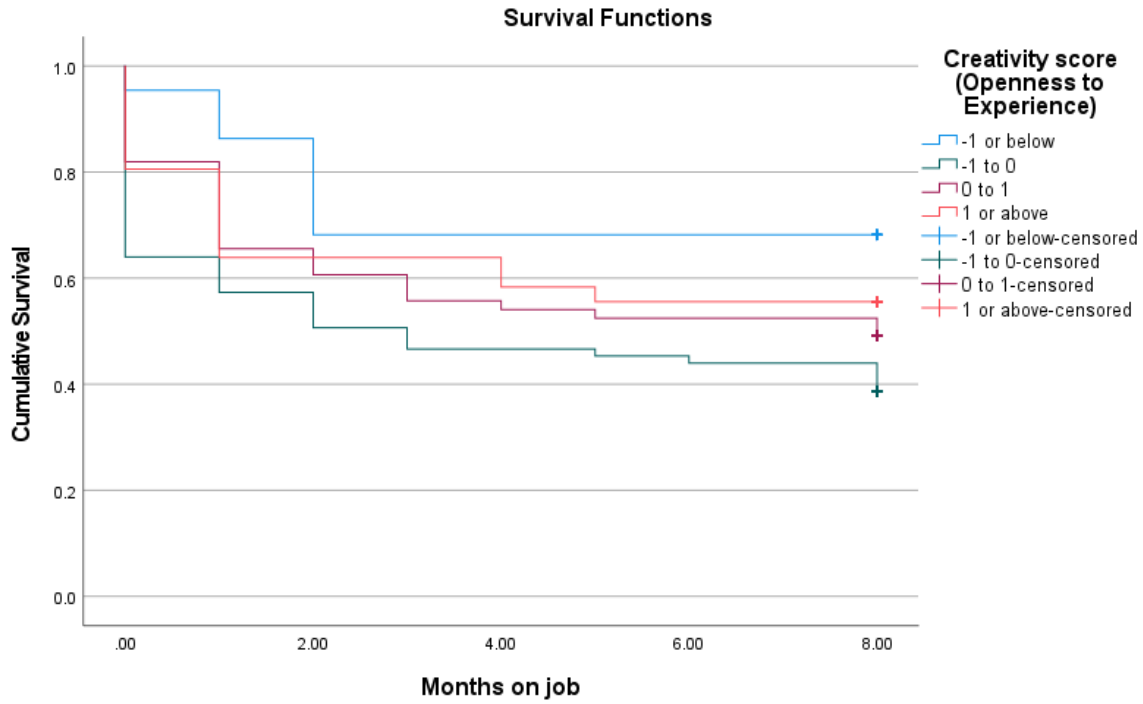

Figure 3

Survival Curve by Months on Job Grouped by Inquisitiveness Score

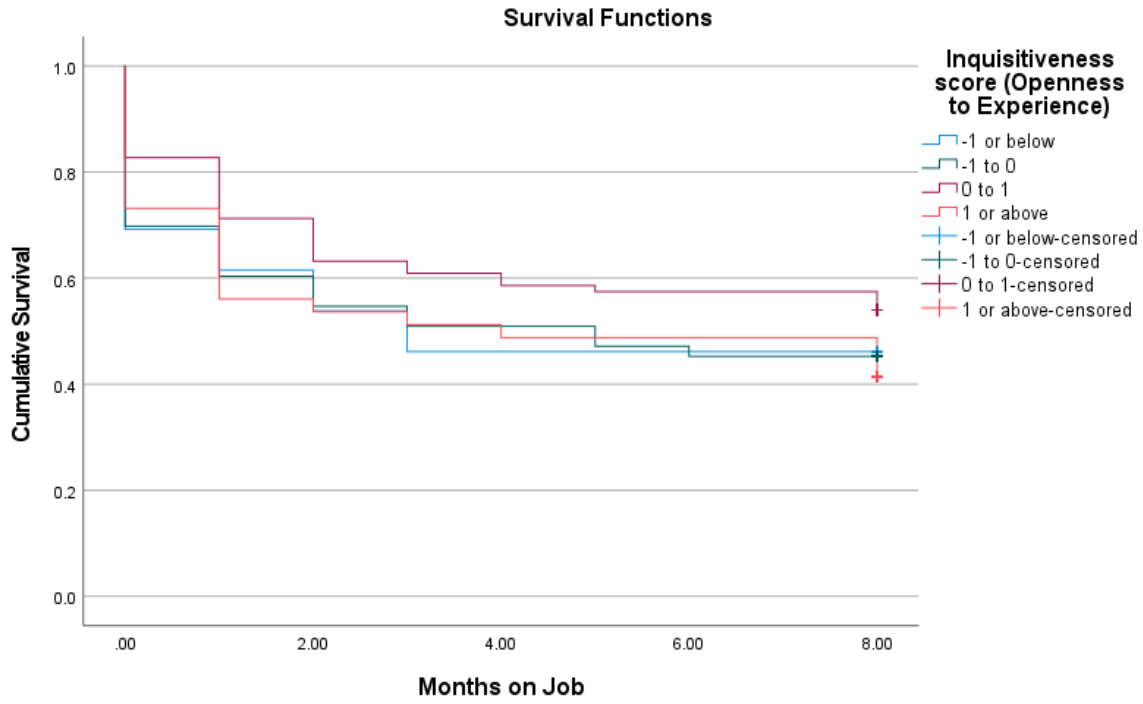

Figure 4

Survival Curve by Months on Job Grouped by Intellectual Orientation Score

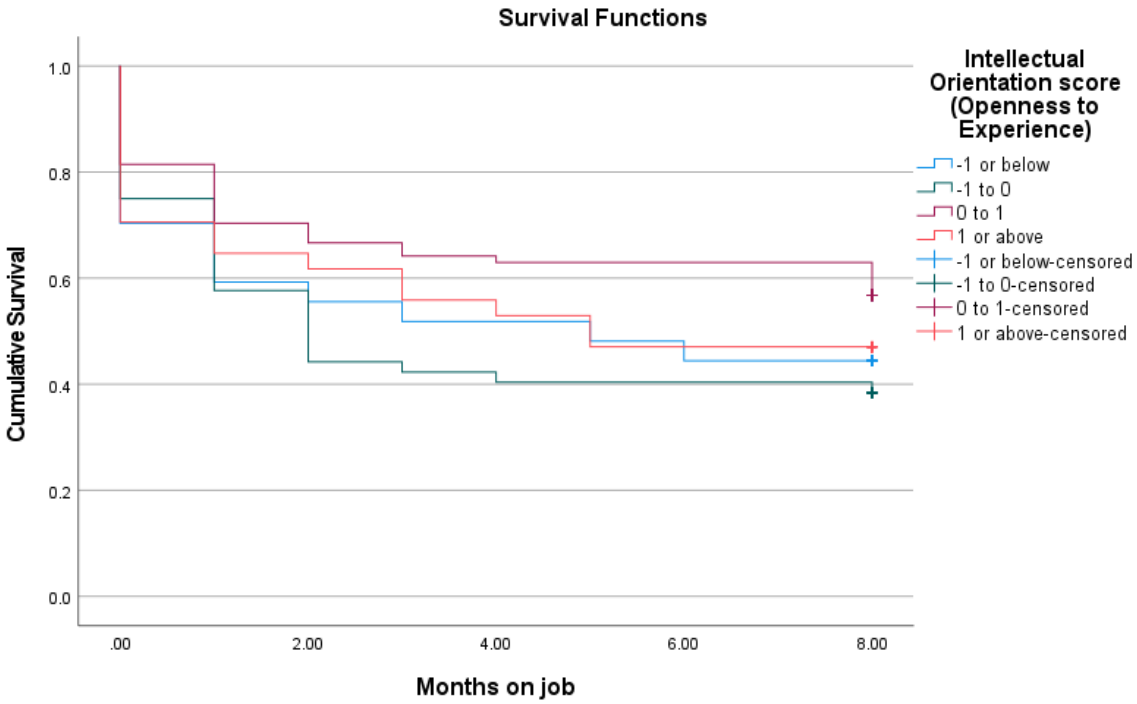

Figure 5

Survival Curve by Months on Job Grouped by Dependability Score

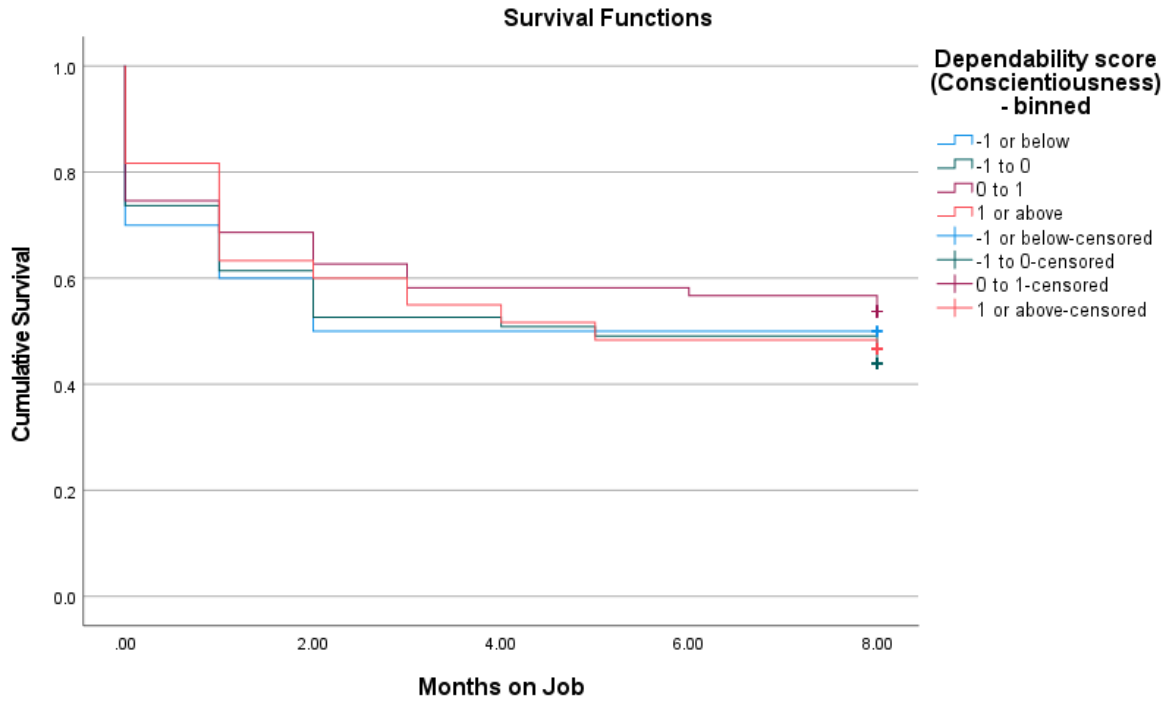

Figure 6

Survival Curve by Months on Job Grouped by Diligence Score

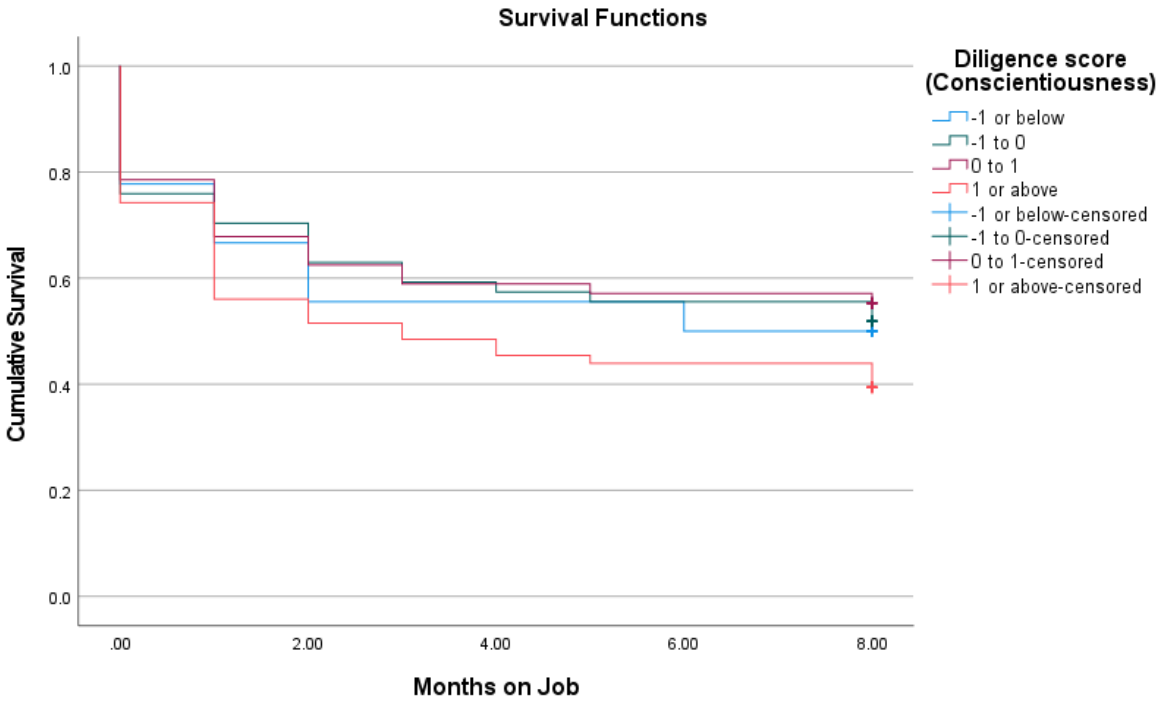

Figure 7

Survival Curve by Months on Job Grouped by Organization Score

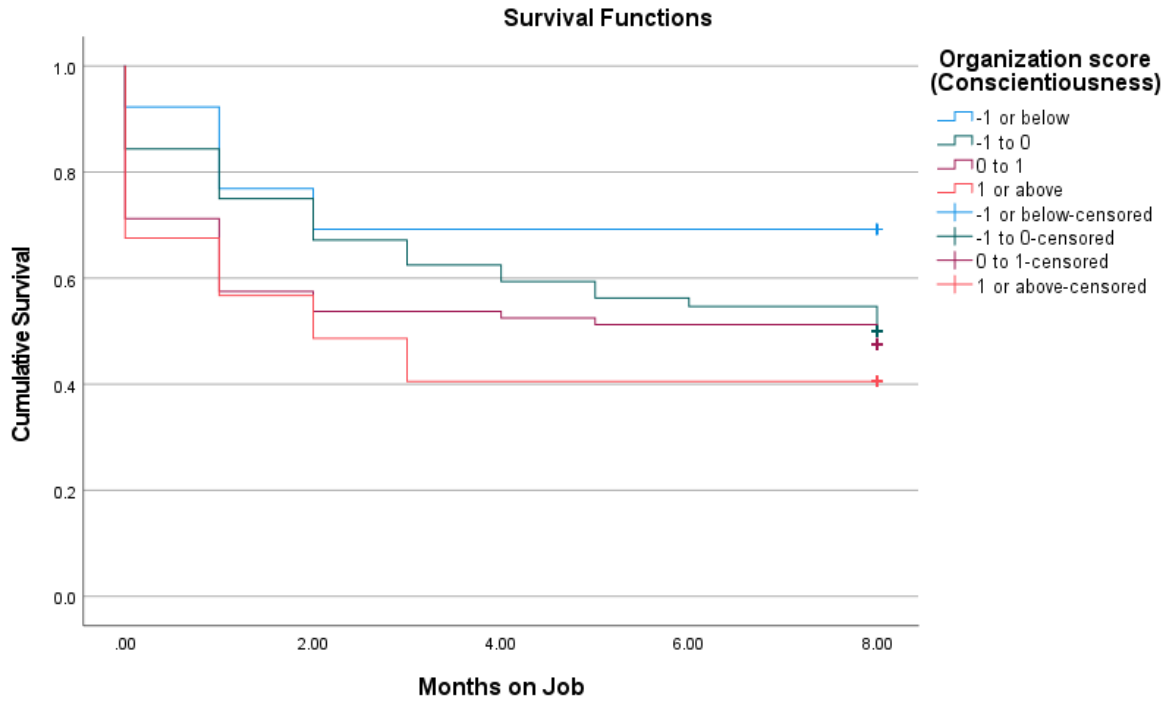

Figure 8

Survival Curve by Months on Job Grouped by Self-Discipline Score

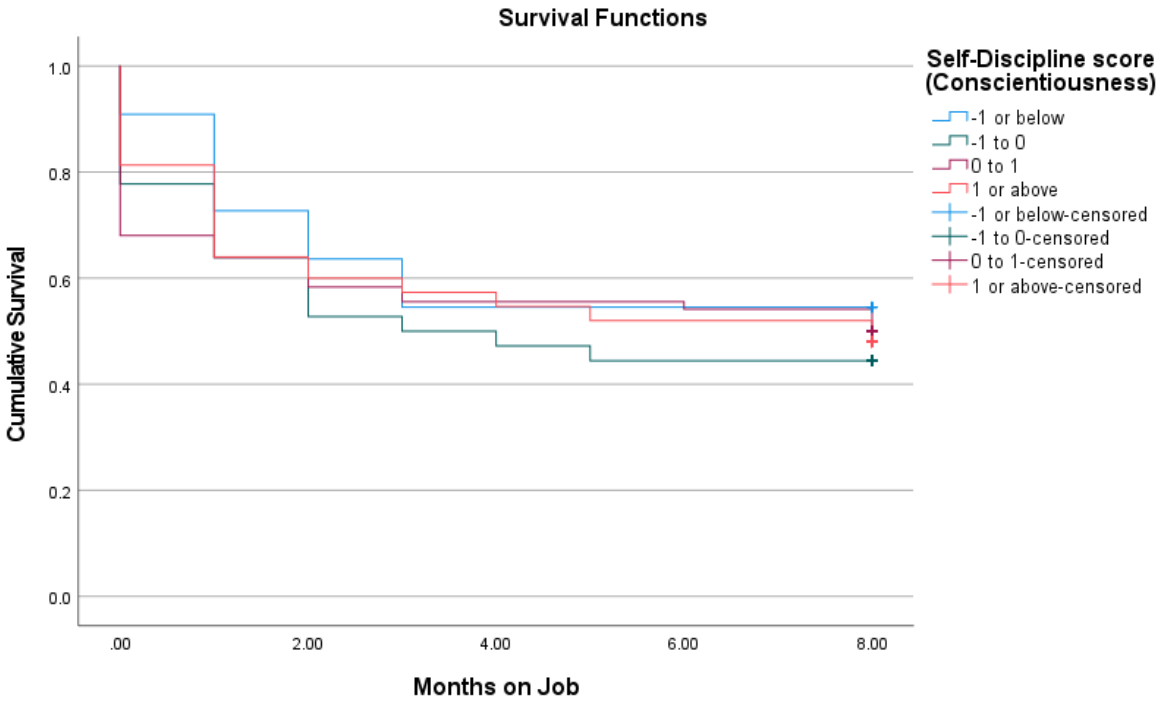

Figure 9

Survival Curve by Months on Job Grouped by Conscientiousness Score

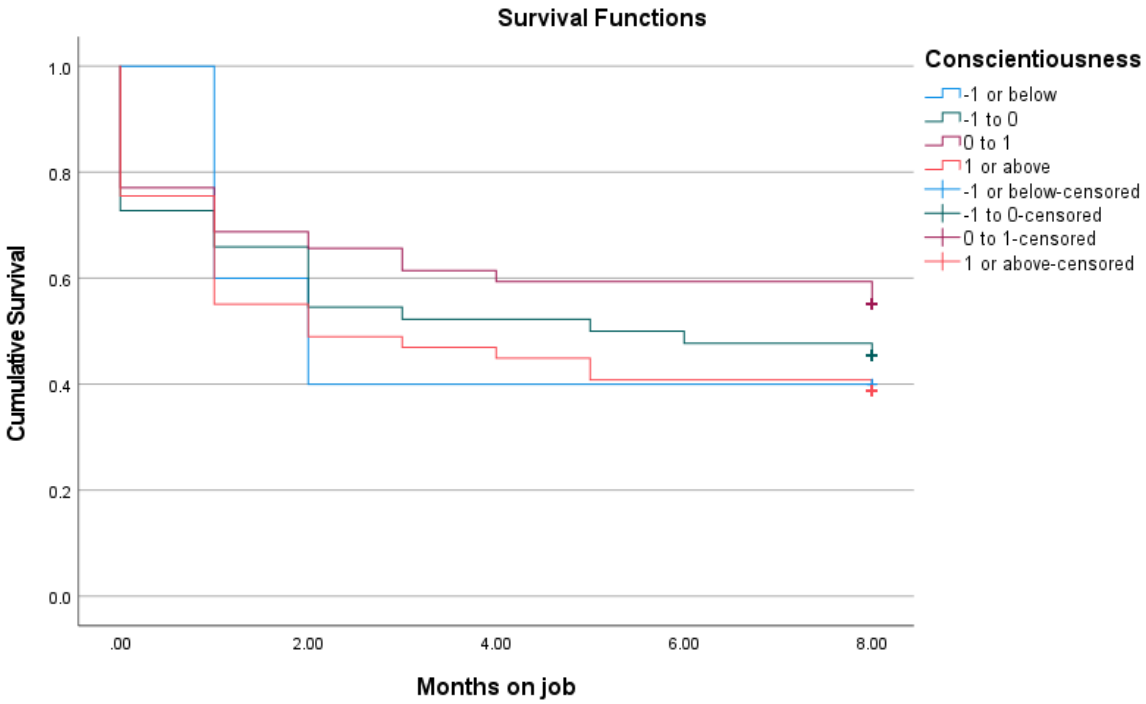

Figure 10

Survival Curve by Months on Job Grouped by Openness to Experience Score