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# THE FIRST DESTINATION FIT (FDF) SURVEY SCALE: CAN P-J FIT THEORY BE GENERALIZED TO ASSESS THE QUALITY OF RECENT GRADUATES' FIRST CAREER-RELATED POSITIONS?

Dissertation

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## Abstract

Higher education institutions are expected to improve the employability-related outcomes of their graduates. Previous assessments of graduate employability have largely focused on assessing the quality of a graduate's first career-related position after graduating, referred to as their first destination, under the assumption that graduates who secure higher quality first destinations are more highly employable. Previous assessments of first destinations have focused more on simple descriptive information (e.g., monetary compensation, number of hours worked per week, etc.) as opposed to evaluating more complex, multidimensional constructs related to employment quality. Assessing these types of constructs would not only provide institutions with more information on graduate employability outcomes, but could also improve the quality and utility of this information.

This study investigated whether the theory of Person-Job (P-J) Fit could be generalized to assess a new self-report employment quality construct for recent Bachelor's degree graduates called First Destination Fit (FDF). Using a mixed-methods research design, the study investigated the dimensionality of this construct, the extent to which the construct is invariant for graduates who secure employment first destinations versus all other types of first destinations (e.g., continued education, military service, etc.), and the extent to which the construct is associated with similar constructs as P-J Fit. Survey scale items were rigorously developed, evaluated, and refined using both quantitative and qualitative methodologies, including both exploratory and confirmatory factor analysis, as well as cognitive interviews.

The results suggested a four-dimensional framework for understanding FDF. These dimensions were Needs-Tasks fit, Needs-Field fit, Previous-Experience-Tasks fit, and Previous-Experience-Field fit. In large part, these dimensions were found to be related to similar

constructs as P-J fit has been found to be related to, particularly for graduates with employment-type destinations. However, this four-dimensional framework was found to be better fitting for graduates with employment-type destinations compared to graduates with non-employment destinations. The study contributes a newly developed and rigorously evaluated scale for HEIs to use to collect new, important information about their graduates' employability. It also began the process of validating this new scale using advanced psychometric testing. Implications for the scale and future directions for research are discussed.

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# Chapter 1: Introduction

## Background

Suppose that, one year after their graduation, all of the students in a cohort of graduates from a hypothetical university were unemployed. Of course, there could be multiple explanations for this dramatic and peculiar finding. There may have been a global hiring freeze due to a novel and severe viral pandemic, for example. But suppose, too, that graduates from other higher education institutions (HEIs) who graduated at the same time, and under the same economic circumstances, were able to secure career-related opportunities within that same year. Perhaps, then, there was some shared characteristic about that particular cohort of graduates that caused their unemployment situation. While there are still many possible explanations for what that characteristic is, or what that set of characteristics are, the hypothetical university from which the cohort graduated would greatly benefit from better understanding the causes of that cohort's unique situation, lest the cause of unemployment be attributed to the university itself.

The previous scenario depicts a situation, albeit extreme, where an HEI would desire not only to know about its students' experiences while they were enrolled at the HEI, but also to know more about students' experiences after they graduated from the institution. The specific postgraduate outcome related to students' employment, or lack thereof, is referred to as graduate employability. Simplistically, graduate employability can be defined as the extent to which alumni will secure career-related positions after college. To assess graduate employability, however, HEIs must further refine and operationalize that definition. For example, institutions must decide what constitutes a career-related position. Career-related positions can be defined in a variety of ways. For example, they can be thought of simply as traditional, full-time employment positions. Or, they can be thought of with more complexity, including different

types of employment positions (e.g., part-time, temporary, etc.) and even including other non-employment types of positions that might advance a graduate's career, such as continued education, internships, academic or research fellowships, military service, volunteer work, and more.

Further, HEIs must decide how long after graduation to collect employability data. Recent graduates may participate in career-related positions immediately after college that are vastly different than the career-related positions that they secure later after graduation. Waiting longer after a student has graduated to assess their employability might have substantively different results than collecting the data immediately after graduation. The problem with waiting to collect employability data, though, is that as time passes after graduation, the likelihood that graduates might be participating in other interventions (e.g., continued education in graduate school) that are positively affecting their employability increases. Therefore, the argument that the HEI had a strong and direct impact on the career-related position that a graduate secured is more easily confounded.

In an effort to standardize graduate employability assessment practices, the National Association of College and Employers (NACE) has created best practices for collecting graduate employability data by studying graduates' "first destinations" after college (NACE First-Destination Survey Task Force, 2019). A first destination can be understood as a career-related position that a graduate secures shortly after graduating. NACE defines four main types of career-related positions: employment (including internships and fellowships), continued education, volunteer service, and military service. In terms of a timeline for the collection of data, NACE allows for data to be collected on different timelines for graduates depending on when they graduated. For example, if a student graduated on May 1, 2020, as part of the class of

2020, then data could be collected on that student's first destination until December 31, 2020: 8 months after the student graduated. However, if a student graduated on December 31, 2019, as part of the class of 2020, NACE allows for data to be collected on that student's first destination until December 31, 2020, as well: 12 months after the student graduated. By this definition, data may be collected for some students in a single graduating class up to 18 months after they graduate to be considered first destination data.

While NACE allows for different types of data sources to be used to verify graduates' first destinations—such as interviews with graduates and employers, and postings on social media profiles (e.g., LinkedIn)—affiliated institutions most commonly collect data on graduates' first destinations via surveys. These surveys collect self-reported information from recent graduates on their first destinations, such as the type (e.g., employment, continued education, etc.), their compensation, and details about the organization or company that provides the career-related position.

Importantly, first destination data is not the only measure of graduate employability. Institutions might collect employability data from alumni who graduated more than a year in the past to examine more of their career achievements rather than just their first career achievements. Additionally, some definitions of graduate employability focus not on whether or not the graduates secured a career-related position after graduating, but instead focus on collecting data around certain employability characteristics or skills that the graduates have or do not have (e.g., Dacre Pool & Sewell, 2007; Minocha et al., 2017; Palmer et al., 2018). Ideally, HEIs would use multiple measures of employability to assess their graduates, each having unique strengths, so that the HEIs can obtain a more holistic view of their graduates' employability. Nevertheless, the strengths of national buy-in, standardized data collection practices, and short-term impact

implications have made first destination data particularly desirable to HEIs for evaluating graduate employability.

**Statement of the Problem**

Graduate employability, using first destination data, could be conceived of as simply as the percentage of graduates who secure one of the NACE-specified career-related positions, as assessed approximately one year after their graduation date college. HEIs with higher percentages of graduates in those positions would then be evaluated as having more employable graduates, and HEIs with lower percentages of graduates in those positions would be evaluated to have less employable graduates. The principal issue with this simple calculation of graduate employability is that it assumes that any first destination that a graduate attains is of equal quality to any other first destination. If this assumption is not true, and first destinations do have different levels of quality, then this type of calculation does not reward HEIs who have graduates that secure particularly high quality first destinations. HEIs with a substantive group of graduates who secure these types of high quality first destinations, then, would want to showcase not only their graduates' employment rate, but also have some measure to show that their graduates secure the best positions that were available to them. Additionally, prospective students and their families, as well as other financial stakeholders involved with HEIs, may also be interested in this type of employability data as it could factor into their financial decision-making.

While incorporating one or more measures of first destination quality into frameworks of graduate employability assessment may provide new and interesting information to these higher education stakeholders, it creates a new dilemma, which is how the quality of a first destination should be defined and assessed. Further, who should be involved in the creation of the definition, operationalization, and assessment of first destination quality?

HEIs should certainly be involved in this process since the consequences of such an assessment would be impactful to them. However, only including the perspectives of HEIs could create a problem in terms of the validity of the assessment. HEIs could be incentivized—by the prospective students, funders, and accrediting agencies, for example—to artificially inflate the quality of their graduates' first destination plans so that the institutions could claim that they had a positive impact on the employability of their graduates. The problem, then, becomes how to assess first destination quality without losing the purpose of the assessment to validly discern between high- and low-quality first destinations.

**Purpose of the Study**

The purpose of this study is to incorporate a second group of important stakeholders into the process of assessing first destination quality for the sake of increasing the validity of these assessments, and that group is the recent graduates themselves whose first destinations are being assessed. Recent graduates are an important source of information on the quality of first destinations because they are not subjected the same externally motivating influences as HEIs and first destination employers to provide positive assessment results. Additionally, recent graduates can offer a firsthand perspective on their first destinations, allowing for the collection of richer and more holistic information than can be assessed from an external perspective.

To accomplish the incorporation of graduates into the assessment of their first destinations, this study developed and began the process of validating a new self-report survey assessment of first destination quality called First Destination Fit (FDF). The FDF scale was designed to assess the extent to which recent graduates perceive their first destinations to be aligned, or misaligned, with their identities. If a graduate assesses their first destination as having

a high alignment with their identity—in other words, as having a high level of fit (Edwards, 1991)—this provides additional evidence of the quality of the first destination that they secured.

This measure contributes to the validity of existing first destination evaluation frameworks in two ways. First, as previously explained, it provides new, firsthand information from recent graduates on their own perceptions of their first destinations. Since graduates are not subjected to the same external pressures as HEIs to provide positive information about the quality of first destinations, this new information is expected to provide trustworthy insights from graduates regarding their secured postgraduate positions.

The second way that the FDF assessment developed by this study contributes to the validity of existing first destination evaluation frameworks is that it was rigorously developed. This study utilized a multi-stage, mixed-methods research design to test the psychometric validity of the new assessment measure. It is not enough to incorporate any measure of graduates' perspectives into an evaluative system of measures, because all measures do not have the same type or amount of evidence to support their validity. The measure produced by this study is grounded in the well-established theoretical framework of Person-Job (P-J) Fit theory (Edwards, 1991). The measure is also aligned to the *Standards of Educational and Psychological Testing* (American Educational Research Association et al., 2014) to further ensure its stringent development. Ensuring the rigor of the study allows HEIs to understand the validity of the measure more fully.

**Research Questions**

Given the purpose of this study to begin the process of developing a rigorous self-report survey instrument to assess FDF, this dissertation answered the following three research questions.

1. To what extent does the development of the FDF scale contribute to the theoretical understanding of the dimensionality of the latent psychological construct of FDF?
2. To what extent is the factor structure of the FDF scale invariant for graduates who secured traditional employment destinations compared to graduates who secured other types of first destinations (e.g., continued education, fellowships, military service, etc.)?
3. To what extent are scores produced by the FDF scale associated with other graduate employability outcomes for 4-year college degree recipients?

**Significance of Study**

This study was significant in that it developed and began the process of validating a new, important measure of FDF that can be used in conjunction with other evaluative measures of first destination quality to provide a more holistic and rigorous assessment. By better understanding the dimensionality of the latent construct of FDF, it not only informed the design of the current FDF scale, but also provides information to inform the development of additional FDF scales in the future. The research findings also impact the design of other scales related to different types of fit, such as Person-Job (P-J) fit scales. Further, by investigating whether the P-J fit framework could be conceptually generalized to apply to other career-related positions rather than just traditional employment positions, this study prompts new research questions regarding other populations of people with non-traditional career-related positions, and their perceptions of fit with those positions.

The study began the process of developing a measure which is significant to HEIs, graduates, and the broader educational research community. This measure is useful to HEIs for the purpose of providing descriptive and associative information on the ways in which, and the

extent to which, graduates perceive their first destinations to be well-fitting (American Educational Research Association et al., 2014, Standard 4.1; Standard 9.2; Standard 9.15). This aggregated information could be used internally for institutional decision-making, or externally for marketing and other reporting, such as accreditation.

In addition to being useful for HEIs, the measure is useful for the recent graduates themselves, as well as the broader educational research community. For recent graduates, the measure could empower them by providing them with a platform through which they can voice their perspective on the first destination plans that they secured. This provides graduates with an opportunity to express both positive and negative feedback about their postgraduate positions to the HEI from which they graduated. Simultaneously, they can use the assessment to reflect on the plans that they secured and their own identities, which contributes to both their own understanding of themselves, and their relationship to their secured position.

Additionally, the broader educational research community benefits from this measure. Research previously conducted on P-J fit can be replicated using the FDF scale and compared to examine whether the findings are consistent, or meaningfully differ. The measure can be used descriptively, providing new understandings of fit in employment and educational contexts. Additionally, the measure can be used to further study the variables that FDF predicts, as well as the variables that predict FDF.

To summarize, this research contributes to understanding the foundation of an FDF scale, which is to better understand the latent construct of FDF. By better understanding the dimensionality, generalizability, and associations of the construct, it allows for more accurate assessment items to be developed to measure this construct. These types of assessments are significant to HEIs, as well as graduates themselves in terms of their self-reflection, and the

broader community of professionals and researchers who are interested in better understanding the relationship between education and career-related positions.

## Chapter 2: Literature Review

This literature review focuses on answering two central questions. The first question is: how have the first destinations of recent graduates been empirically assessed in previous research? The second question is: how has Person-Job (P-J) fit been assessed by previous empirical studies? Two systematic literature searches were conducted to answer each of these questions. In this chapter, each search is described, and the results of the searches are summarized sequentially. Before the P-J fit search is described, the theory of P-J fit is described and contextualized concerning its relevance to this dissertation. The chapter concludes with a summary of the findings and how they relate to the proposed study.

### Research on First Destination Assessment

#### *Literature Search*

To locate research on first destinations, articles were collected systematically using a similar search across three relevant databases: Education Source, ERIC, and ProQuest Education. These databases were chosen based on a consultation with the university librarian in which the topic areas of the dissertation were explained. In each database, the search was limited to peer-reviewed articles written in English where either the term “first destination” or “first destinations” was contained anywhere in the text of the article, and the title contained any of the following terms: "first destination" OR "first destinations" OR college OR colleges OR university OR universities OR job OR jobs OR employed OR employment OR career OR careers OR occupation OR occupations OR work OR graduat*. The search was conducted on January 1, 2020, and yielded 131 articles, after removing duplicate articles across databases. Of those 131

articles, 76 were empirical studies, and of those empirical studies, only 38 focused centrally on first destinations. The remaining empirical studies only referred to first destinations tangentially in the introductions, literature reviews, or discussions of the articles. Only the 38 empirical studies that focused explicitly on first destinations are discussed in this review.

Most of these studies focused on assessing graduates' attainment of first destinations using different metrics. However, a small group of studies did not focus on the assessment of graduates' first destinations. These studies are reviewed first. Next, the studies which focused on assessments of graduates' first destinations are reviewed. Some of these studies only used one verifiable assessment related to graduates' first destinations, while others used multiple verifiable assessments. Verifiable assessment in this context refers to an assessment where information is self-reported that can be confirmed by another information source. For example, asking a graduate on a survey about the location of their first destination is an example of a verifiable assessment measure. A final, smaller group of studies focused on a combination of both verifiable and perception assessments of graduates' first destinations. These studies are most relevant to this dissertation as it developed a new perception assessment measure for graduating students to use to evaluate their first destination in terms of fit.

### *First Destination Research Not Focused on Attainment Measures*

As mentioned previously, there were only five studies located in this review that did not focus on assessments of graduates' first destinations, but instead focused on other research questions related to graduates' first destinations. The purpose of reviewing these studies is to illustrate that not all first destination research is focused on developing assessments of graduates' first destinations. Two of these studies were qualitative in nature. One of these qualitative studies explored graduates' expectations around their first destinations during their last year at college,

and found that graduates expected to find first destinations that were enjoyable, gave them opportunities that they wanted, and set them up to progress appropriately in their desired career (Maxwell & Broadbridge, 2017). The other qualitative study explored how graduates and employers in the hospitality industry related perceptions of a graduate's identity as a college graduate to their employability in the industry and found that, for both groups, graduate identity was largely irrelevant (Jameson & Holden, 2000).

The other three studies in this group used survey research methods but did not assess graduates' first destination outcomes with those methods. Instead, they used this methodology to answer other questions related to first destination research. For example, one of these studies compared first destination outcome data collected using social media to the first destination outcome data collected using a survey, and found that the data sources matched 75% of the time (Panke Makela & Hoff, 2019). The second study surveyed senior civil engineering students about what factors they found important in choosing their first destination positions, and found that male and female students had different perceptions regarding the importance of location and salary (Wilkinson, 1996). The final study of this group was a mixed-methods case study that examined the process of collecting first destination data from graduates, and found that improved knowledge rates require a heavy burden on multiple educational administrators in terms of their effort and time (Kelly & Walters, 2016).

### *Single-Measure Verifiable Assessments of First Destination Outcomes*

The remaining 33 studies located for this review all focused on assessments of graduates' first destinations. Thirteen of these 33 studies used only a single verifiable assessment of graduates' first destinations. About half (n = 6) of these thirteen studies explored the associations between a dichotomous variable indicating whether graduates attained a specific type of first

destination with other variables of interest. One of these studies explored whether graduates who earned a higher mean mark at graduation were more likely to secure either an employment or a further study first destination, and found evidence that an Upper Second class mean mark did have a positive association with first destination attainment (Di Pietro, 2017). Another study explored associations between whether graduates were more likely to be self-employed or employed by another organization for their first destination with several other variables, and found that there were significant associations between age, gender, parental occupations, area of study, and certain career-orientations with having a self-employment destination (Greene & Saridakis, 2008). A third study predicted whether graduates attained an employment or further education first destination compared to all other outcomes and found that graduates from colleges with a stronger research culture were more advantaged in terms of securing the two types of first destinations of interest (Urwin & Di Pietro, 2005). A fourth study focused on better understanding a particular cohort of graduating students' graduate and postgraduate experiences, and found that the large majority of these graduates secured employment-related first destination plans after graduation (Leonard et al., 2004). Another study examined whether a group of teacher candidates who participated in extended subject knowledge enhancement courses were more likely than graduates who did not participate in those courses in securing teaching jobs after graduation, and found no statistically significant difference between these two groups of graduates (Tynan et al., 2014). The final study of these six longitudinally explored the association between graduates' gender, major, and university with the type of first destination that they attained (e.g., employment, further study, etc.) and found that there were significant associations between a graduate's university and their major on the type of first destination that they attained (Kerr, 1986).

Four additional studies in this group of 13 studies that focused on a single verifiable assessment of graduate first destinations examined the association between graduates securing "higher-quality" first destinations—defined using verifiable measures like the position title and industry—and other variables of interest. One of these studies examined the association between graduating with a joint-honors degree and securing "highly-skilled" employment or further study as a first destination, and found a negative overall association between the two variables (Pigden & Moore, 2018). Similarly, another study examined the association between graduates' demographic characteristics such as race and gender with securing a "professional-level" job or further study first destination and found that gender had a significant association such that males secured these types of positions at higher rates than females (Black & Turner, 2016). A third study examined the association between participating in a college's work-study program with securing a "graduate-level" first destination, and found that graduates who participated in the program did have higher rates of securing these types of first destinations (A. R. Taylor & Hooley, 2014). The last of these four studies predicted whether graduates secured "graduate-level" jobs as first destinations using a variety of predictor variables, and found that structured work experiences during college and employer involvement in course design positively predicted whether graduates secured these types of first destinations (G. Mason et al., 2009).

Two more of the 13 studies that focused on one verifiable assessment of graduates' first destinations examined the associations between length of time that it took for graduates to secure first destinations. One of these studies examined the length of time that it took for a group of graduates to secure their first destination, and found that most of these graduates secured their first destination position between 1 and 3 months after graduation (Marzban et al., 2014). The other study examined the length of time that it took a graduate to secure their first employment

destination after graduation as a predictor of whether they would repeat the same studies at the same university if they were given the choice, and found only a weak positive association between the related variables (Martínez & Toledo, 2013). The final study of the 13 that focused on only a single, verifiable assessment of graduates' first destinations examined the association between the aggregated unemployment rate of graduates across multiple universities with the subject mix of the university (J. Taylor, 1986). The study found that subject mix had a strong effect on the unemployment rate at the university level.

***Multi-Measure Assessments of First Destination with Verifiable Measures Only***

The next group of 11 studies located for this review used similar verifiable assessment measures of graduates' first destinations as the previous group of studies, but combined them to create a multi-measure assessment of graduates' first destinations. Some of these studies (n = 4) focused only on verifiable assessments for graduates who secured employment first destinations as opposed to other destinations. One of these four studies used full-time employment rate and unemployment rate as separate verifiable assessment metrics of graduates' first destination attainment, and found that graduates who participated in sandwich courses were more likely to have higher full-time employment rates, and lower unemployment rates after graduation compared to full-time traditional graduates (Blackwell et al., 2001). Another compared graduates by gender on multiple verifiable assessments of graduates' first destination attainment, such as employment rate by sector type and wages, and found that women were more likely than men to work in the public sector as opposed to the private sector, and they were more likely to earn less for their wages than men (Chevalier, 2002). A third study explored associations between participating in extra-curricular activities during college and multiple verifiable first destination assessments, such as contract type, job position, size of employing firm, wages, and

unemployment rate, and found that certain types of extra-curricular activities that promoted leadership tended to have a more positive impact across all of these verifiable first destination measures than others (Tchibozo & Pasteur, 2007). The fourth study examined the first destinations of doctoral students at two universities using a variety of verifiable assessment measures, including employment rate, employment permanence, sector, industry, and position type, and compared these metrics to national trends from the nations that each respective university was situated within (Neumann & Tan, 2011).

The other seven studies in this group combined multiple verifiable assessments of graduates' first destinations across multiple first destination types rather than just employment first destinations. For example, one study compared the first destinations of graduates in 1962 to those of graduates in 2002 on multiple verifiable measures, such as first destination type and first destination sector, and found that more graduates in 1962 found employment work in the education sector compared to graduates in 2002 (Bourner & Rospigliosi, 2008). A second study focused on mathematics graduates and compared them to graduates with other degrees across multiple verifiable measures, including first destination type, industry, position title, and whether or not the position was "graduate-level" and found that mathematics graduates were more likely to go onto further education, get jobs in the business sector, and have "graduate-level" or administrative positions (Bourner et al., 2009). A third study focused on accounting graduates and descriptively examined their first destinations using multiple verifiable metrics, including time to find first destination and industry of the first destination, and found that most majors located their first employment position before they graduated and the position was typically a public accounting position (Saunders & Stivason, 2010). Another study compared the first destinations of two groups of graduates from the same university with similar, but different,

degrees related to education on multiple verifiable assessments related to their first destinations, such as length of time taken to find a destination and level of education required for the position (Engelberg & Limbach-Reich, 2012). This study found that the groups differed in how long it took them to find a position, but not in terms of finding positions equivalent to their level of education. A fifth study examined the first destinations of outdoor education graduates using multiple verifiable assessment metrics such as percent employed, first destination type, and industry of the position, and found not only that higher percentages of these students secured employment first destinations than other graduates, but also that they were less likely to pursue further education, and that they were most likely to find instructor, teacher, or freelance positions (Stott et al., 2014). An additional study within this group was a case study that examined graduates' first destinations from a single university in terms of the multiple verifiable metrics of first destination rate and first destination type, and found that most graduates found some type of first destination after graduation, and most commonly decided to pursue full-time employment (Laguilles, 2016). The last of these studies compared the first destination types of traditional-age graduates to mature graduates on a variety of verifiable measures, such as first destination type, employment type, whether or not the position was "graduate-level", and salary, and found that mature graduates were slightly advantaged across outcome measures compared to traditional graduates (Woodfield, 2011).

***Multi-Measure Assessments of First Destinations with Perception Measures***

Only eight of the studies located for this literature review included a perception assessment of graduates' first destination positions in addition to one or more of the verifiable measures of quality that have been reviewed thus far. The first of these studies was qualitative in nature and assessed the success of recent entrepreneur graduates using verifiable assessments,

such as how long after graduation they established their business, the location of their business, but also perception assessments, such as issues at the establishment of their business and during development (McLarty, 2005).

The second of these studies reported collecting information on whether the first destination position that graduates' secured were related to their long-term career plans, but did not include details regarding how the relation between the graduates' plans and their first destinations was assessed (Pitcher & Purcell, 1998). Similarly, another study descriptively examined the first destinations of graduates from one university using multiple verifiable assessment metrics, such as first destination type, employment rate, length of time to secure a position, and location of the employment, but also the perception metric of the position's relevance to a graduate's major (Nel & Neale-Shutte, 2013). However, the perception measure was not described. A fourth study of this group used a single item to collect perception satisfaction data from graduates who secured first destinations (Wood et al., 1987). This item appears to have been measured using a single 3-point Likert-type scale that asked participants to rate their satisfaction with their first destination as either "Satisfactory", "Neutral", or "Unsatisfactory".

The remaining three studies in this group used multi-item measures when asking graduates to evaluate their first destination plans. One study collected information from graduates across multiple years on verifiable assessment metrics, such as first destination type, employment location, employer type, job category, industry, and starting salary, but then also asked graduates to evaluate their starting salary expectations, job satisfaction, match with their education, and match with their major (Changjun & Liping, 2019). Starting salary expectations were measured using a single item with a 3-point scale from "lower than expected" to "higher

than expected. Job satisfaction was measured using a single item with a 4-point scale from "extremely satisfied" to "very dissatisfied". Match with education was measured using a single item with a 3-point scale from "undereducated" to "overeducated". Last, match with major was measured using a single item with a 4-point scale from "wholly unrelated" to "extremely well matched".

Another of these studies collected information on how well graduates' first destinations met their expectations in terms of their ideal position across 16 job characteristics (van der Merwe, 2009). This data was analyzed descriptively using the percentage of respondents for each job characteristic who indicated that either their ideal or actual job aligned with the characteristic to "a medium" or "a great" extent. The measure was not described in terms of the response options presented to the participants. Similarly, another survey study claimed that graduates rated their first destination as "closely" or "somewhat" related to their degree, and as "meeting their expectations", but did not describe the survey items that participants answered to indicate this alignment (Keane, 2016).

The final study in this group collected information on whether graduates were satisfied with their first destinations and whether they felt successful based on their secured positions (Moores & Reddy, 2012). Career satisfaction was measured with five items developed by the researchers and participants responded using a 5-point Likert-type scale ranging from "very dissatisfied" to "very satisfied". Career success was measured using four items developed by the researchers, and participants responded to both scales using a 5-point Likert-type scale ranging from "very unsuccessful" to "very successful". Total scores were calculated for each of the two scales, and those total scores were analyzed using a Mann-Whitney U test to determine if there were differences between the career satisfaction and career success ratings of graduates who

participated in a placement year compared to those who did not. No psychometric evidence for the validity of the measures was presented in the study.

### *Summary*

As shown throughout this review of first destination research, most has focused on ways to assess graduate first destinations, and how those characteristics of first destination quality relate to other variables of interest. Far fewer studies focused on perception measures of first destination quality, as assessed by recently graduated students, compared to verifiable measures of first destination quality. Further, even of those studies that did include perception measures of first destination quality, the research questions of these studies did not explore the validity of those perception measures that were implemented, nor do they cite previous research that affirmed the validity of the measures. There also does not appear to be any consensus among researchers about which perception measures to include, nor about which assessments are best to measure these perception constructs of interest. Therefore, there is a gap in the research regarding developing a rigorously validated perception measure of first destination quality, rooted in a pre-existing conceptual framework.

## Person-Job (P-J) Fit Theory

P-J fit theory is the theoretical framework that provides a foundation for developing a new perception measure of first destination quality. An integrative conceptual framework for P-J fit was developed by Edwards (1991). In this framework, Edwards defined P-J fit theory as the congruence between a person and their job. This congruence has two dimensions. The first dimension is referred to as the Needs-Supplies (N-S) dimension. This dimension is defined by the congruence between employees' desires—which include their needs, goals, values, interests, and preferences—and what the job can supply to them. The second dimension is referred to as

the Demands-Abilities (D-A) dimension. This dimension is defined by the congruence between employees' abilities—which include their skills, experiences, and education—and the demands of the job.

A few years later, Kristof (1996) integrated P-J fit into a larger framework of Person-environment (P-E) fit theory, which suggests that P-J fit is one of many dimensions of related research that studies the fit between a person and the career context in which they are situated. For example, another commonly studied dimension of P-E fit is Person-Organization (P-O) fit. This dimension of fit focuses on the congruence between a person and the organization that employs them. However, P-J fit is the dimension most relevant to this dissertation, since employment is a type of career-related position, and first destinations are operationalized in this study as career-related positions.

The next section of this literature review describes the empirical research that has already been conducted on P-J fit, with a specific focus on how P-J fit has been assessed. It concludes by explaining how a generalized measure of P-J fit could be developed that assesses the alignment between any type of career-related position, rather than just focusing on employment-type positions, making it appropriate for use in the assessment of graduates' first destinations. This contributes to the previously outlined gap in the current literature of first destination assessment research that uses valid perception measures to assess first destination quality.

***Literature Search***

Articles for this section of the literature review were collected systematically using a similar search across five relevant databases: Education Source, ERIC, ProQuest Education, PsycInfo, and PsycArticles. In each database, I searched for peer-reviewed articles written in English where the titles or the subjects contained either "Person-Job Fit" or "P-J fit". The search

was conducted on February 28, 2020 and resulted in a total of 145 articles, 38 of which were identified as duplicate articles across databases. After eliminating duplicates, 107 articles remained.

After reading the articles, they were sorted so that the most relevant articles to this dissertation, which were those articles that contained a single survey scale measuring P-J fit, were grouped together, totaling 66 articles. The remaining 41 articles did not contain single survey measure of P-J fit. Some of these articles were conceptual in nature, discussing topics such as potential predictors of P-J fit (Belletier et al., 2019; Wong & Tetrick, 2017), new proposed dimensions of P-J fit (Milliman et al., 2017), potential predictors of employer prioritization of P-J fit (Krishnan & Scullion, 2017; Sekiguchi, 2007), and proposed conceptual frameworks in which P-J fit was situated (H. M. Chen & Chang, 2010). Another study in this group was a meta-analysis that sampled 172 P-J fit studies and found strong correlations between P-J fit and job satisfaction, organizational commitment, and intent to quit (Kristof-Brown et al., 2005). Two studies focused on measuring the importance of P-J fit rather than P-J fit itself (Chuang & Sackett, 2005; Nolan et al., 2016). The other 32 articles in this group that did not use a single measure of P-J fit still assessed the construct, but rather used alternative methods to do so. These alternative methods of measuring P-J fit will be briefly summarized first, then the single measures will be discussed in more detail.

### *Alternative Methods of Measuring P-J Fit*

The 32 articles that did not contain a single survey measure of P-J fit measured P-J fit using alternative methods. Most of these studies asked participants to rate themselves on two complimentary self-report dimensions, then mathematically combined the two sets of ratings. Some of these studies had participants rate their ideal job on a set of characteristics, then rate

their actual job on the same set of characteristics, and compared the ratings to determine P-J fit (Cao & Hamori, 2019; Hardin & Donaldson, 2014; Maden & Kabasakal, 2014; Warr & Inceoglu, 2012, 2018). Similarly, another study asked participants to rate a set of job characteristic statements and compared those ratings to participants' responses regarding their personal motivations to determine P-J fit (Brandstätter et al., 2016). Another similar study asked participants a set of items to assess their work-related values, then modified the items slightly to ask about the extent to which their jobs supplied them with opportunities to do what they valued, and compared the two sets of ratings to determine P-J fit (Hecht & Allen, 2005). A final study similar to the others of this group asked participants to assess their actual and perceived levels of job formalization across four pairs of items and compared the two sets of ratings to determine P-J fit on this specific dimension (Lee & Antonakis, 2014).

Another set of studies measured P-J fit in a similar way in terms of combining ratings to two sets of complimentary survey items, but instead had employees provide one set of ratings related to their needs and values, and then had employers provide the second set of ratings regarding the demands or other characteristics of the job. One of these studies used employer recruiters as subject matter experts to rate whether a set of 52 job characteristics were relevant for 132 career fields, then had recruits rate their level of interest in each of the same 52 job characteristics to determine which career field was most well-fitting with the recruits' interests (Johnson et al., 2020). Similarly, another study had subject matter experts rate a set of knowledge, skill, and ability items ordinally in terms of how important they were to a given job, averaged the ratings, then had job incumbents ordinally rate the same items in terms of their own competence, and compared the two sets of ratings to determine P-J fit (Caldwell & O'Reilly, 1990). Another of these studies had supervisors rate employees on their social capital, then had

employees rate themselves on their social capital to determine an employee's social capital P-J fit (Zhang & Lin, 2016). An additional study asked new teachers to rate their interests in 60 different work activities, and then had experienced professional teachers rate the same activities in terms of their importance to the profession to determine the new teachers' P-J fit (Kaub et al., 2016). A final study of this group had business students and managers take the Myer's-Briggs Type Indicator and defined P-J fit as the extent to which the student profile matched the manager's (Järlström & Valkealahti, 2010).

Another set of studies that used a measure of P-J fit that was not a single survey scale used employee ratings in combination with different coding or categorization schemes for jobs or job tasks developed by researchers. For example, one study had employees rate their jobs on communal and agentic characteristics, and then compared those ratings to the researchers' expected categorization of the jobs (Hogue et al., 2019). Another study had employees rate the extent to which their jobs involved altruistic work and compared those ratings to the researcher's coding of jobs into relational and non-relational categories (Y. Choi, 2016). In a third study in this group, the researcher picked two groups of employees that were expected to have different job demands in terms of time urgency, and then had the employees rate their time urgency predisposition and defined the congruence between the time urgency ratings and the researchers' expectations about the jobs as P-J fit (Greenberg, 2002). The final study in this group was similar in that examined a group of teachers as employees, set expectations for what an ideal teacher would be motivated by, then had the teachers rate their implicit and explicit motives (Wagner et al., 2016). P-J fit was then determined using the congruence between the researchers' expectations and the teachers' motive ratings.

A fourth set of studies that used alternative measures of P-J fit focused on one or more specific needs of an employee and compared them to corresponding job characteristics to assess P-J fit. For example, one study assessed the employee value of work-family centrality and the job characteristic of work-related use of information and communication after hours (Shi et al., 2018). Another study defined P-J fit as the congruence between the employee characteristic of emotional stability and two job characteristics: job autonomy and job meaning (Muldoon et al., 2017). A third study defined P-J fit as the congruence between an employee's extraversion and the extent to which a job requires an employee to interact socially (Huang et al., 2016). Another examined the relationship between employees' proactive behaviors with the extent to which they were responsible at their job for negative outcomes that occurred (Schmitt et al., 2015). Some studies examined the relationship between employee personality traits and the demands of their jobs that were expected to be congruent or incongruent with those traits (Christiansen et al., 2014; Ehrhart & Makransky, 2007; Molleman et al., 2004). Another focused on an individual's level of empowerment and compared it to the extent to which they felt overqualified at their job to assess P-J fit (Erdogan & Bauer, 2005). The last study in this group looked at the relationship between an employee's communication apprehension and the communication requirements of their job to assess P-J fit (Harville, 1992).

Two other studies that did not use a single survey measure of P-J fit created P-J fit scenarios that were randomly assigned to participants in an experimental context to read and then rate. One of these studies developed P-J fit scenarios about an imaginary job candidate and had potential employers evaluate the candidate's quality (Sekiguchi & Huber, 2011), while the other study developed P-J fit scenarios about an imaginary work environment and asked participants to evaluate the quality of the work environment (A. L. Kristof-Brown et al., 2002). Two additional

studies assessed P-J fit using qualitative methods including conducting semi-structured interviews and coding transcripts for related themes (Hennekam & Ananthram, 2020; Hoek et al., 2016). Finally, two studies used a combination of multiple types P-J fit measures and analyzed each measure separately with the expectation that the measures would corroborate one another (Maynard et al., 2006; Thompson et al., 2015).

As illustrated by the literature reviewed in this section, most of these alternative measures of P-J fit still use multiple survey measures, either answered by the employees themselves or by others who know the employee or the position, and then combine the multiple survey measures with one another to make claims about P-J fit. While P-J fit can be, and has been, assessed using other methods, it is far less common. This could be due to the logistical ease of designing and distributing surveys compared to using other types of methodologies, such as observations or interviews. Or, perhaps certain aspects of fit are not observable, or employees would not be honest about certain aspects of fit in an interview setting, which could make survey methodology a more valid way to assess fit. In any case, survey research appears to be the most popular means by which P-J fit is assessed.

### *Single Item Survey Measures*

The remainder of the studies located for this review all assessed P-J fit using a single survey measure. A small group of these studies used single items to measure P-J fit. Only four studies were located for this review that used this type of measure. One of these studies measured P-J fit at two timepoints: once during employees' orientation, and once three months later (Riordan et al., 2001). The first P-J fit measure was a single item that read "Thinking of all the things you want, value, need, or desire from a job, and based on what you know up to this point, how well do you believe your present job will fulfill those expectations?" Participants

could respond using a 7-point Likert-type scale that ranged from “greatly below my expectations” to “greatly above my expectations”. The second P-J fit measure was also a single item that read “Thinking of all the things you want, value, need, or desire from a job, how well does your present job fulfill those expectations?” For this measure, participants could respond using a 5-point Likert-type scale with the same scale anchors as the first measure. Using regression analyses, the study found that the first measure of P-J fit was positively related to fixed and serial institutionalized socialization tactics, job satisfaction, and organizational commitment. Further, it was significantly and negatively related to turnover intentions and actual turnover. The second measure of P-J fit was significantly and positively related to job satisfaction and organizational commitment, and negatively related to turnover intentions and actual turnover. Finally, this study found that the second measure of P-J fit at least partially mediated the association between fixed institutionalized socialization tactics with job satisfaction, between serial institutionalized socialization tactics with organizational commitment, and the association between serial institutionalized socialization tactics with turnover intentions.

In a second study, P-J fit was measured using the single survey item, “I have the necessary competencies to lead dialogue seminars,” which participants responded to using a 5-point Likert-type scale with anchors “strongly disagree” and “strongly agree” (Nielsen et al., 2020). Using multiple regression analyses, the study found that there was a stronger relationship between a pre-survey measure of job satisfaction and a post-survey measure of job satisfaction for employees who had higher levels of P-J fit before an organization intervention occurred compared to employees with lower levels of P-J fit.

In a third study that used a single item to measure P-J fit, the assessment item read, “To what extent does trying to prevent contamination at work fit with how you like to do things?” and food safety employee participants could respond to this item using a 7-point Likert-type scale from “not at all” to “completely” (E. S. Park et al., 2015). Using regression analyses, the study found that P-J fit did significantly predict job effectiveness, job satisfaction, task efficacy, task enjoyment, and job involvement. Further, P-J fit completely mediated the relationships between employee focus on prevention with job effectiveness, task efficacy, and job involvement. P-J fit partially mediated the relationships between employee focus on prevention with job satisfaction and task enjoyment.

The last study that used a single item to measure P-J fit only measured the demands-ability fit dimension, and used the item, “My current job fits my knowledge and skills,” where participants could select from a 5-point Likert-type scale from “strongly agree” to “strongly disagree” (Sylva et al., 2019). Using structural equation modeling, the study found that, for both the employees who stayed in their same positions and for employees who changed positions, there was a significant positive association between career initiative and demands-ability fit. Additionally, they found that employee growth in career initiative was associated with employee growth in demands-ability fit. Finally, the study found that high measures of demands-ability fit significantly predicted a lower likelihood of employee turnover, and employees who experienced turnover were significantly more likely to show growth in their demands-ability fit over the period of the study.

### *P-J Fit Survey Scales*

The remainder of the studies in this group used more than a single item to measure P-J fit. There were three P-J fit survey scales that were used across many more studies compared to the

rest. The studies that used, or adapted, any of these three survey scales will be reviewed first. Then, the remaining studies that used different P-J fit survey scales will be reviewed.

**Saks and Ashforth (1997), and Cable and Judge (1996).** The most commonly adapted unidimensional P-J fit survey scale identified by this literature review, which was cited by 22 studies, was a 4-item scale developed by Saks and Ashforth (1997, 2002).[1] This scale was comprised of four items to measure participants' overall perceptions of P-J fit using 5 Likert-type response options ranging from "to a very little extent" to "to a very large extent". An example item is "To what extent do your knowledge, skills, and abilities match the requirements of the job?" This scale was published briefly after a second P-J fit scale developed by Cable and Judge (1996), which was less commonly cited, but was sometimes cited in conjunction with Saks and Ashforth's scale. This was especially true for studies that created an adapted version of the scale. Cable and Judge's scale contained three items designed to measure overall P-J fit, and the items were designed to be answered using a 5-point Likert-type scale with response options ranging from "not at all" to "completely". An example item is, "To what degree do you think you possess the skills and abilities to perform this job?" This scale will be discussed in this review in conjunction with Saks and Ashforth's scale since they were published in close proximity, and since some studies cited both scales when discussing the measure of P-J fit that was used.

Only three studies used the scale identically as it was designed by Saks and Ashforth. The first of these studies used hierarchical multiple regression analyses and found a significant

[1] These authors conducted a second study in 2002 investigating P-J fit using the same survey scale that they developed in 1997. This has led some researchers thereafter to cite the authors' 2002 article as opposed to citing the authors' original article about the scale's development written in 1997. For this literature review, all articles that cited either Saks and Ashforth's 1997 study, or their 2002 study, or both studies, are identified as using the Saks and Ashforth P-J fit scale developed in 1997. Additionally, some publications found in this literature review have cited Saks and "Ashford" in 1997 or 2002 rather than Saks and Ashforth. Since no publication could be found for this investigation written by Saks and Ashford in either 1997 or 2002, all Saks and Ashford citations are assumed to be incorrect citations of Saks and Ashforth.

association between P-J fit and job search self-efficacy (Saks, 2006). Another study used independent samples t-tests where participants were grouped into high and low motivational spiritual gift groups using cluster analysis, but the study did not find a statistically significant association between P-J fit and motivational spiritual gifts (Tomlinson & Winston, 2011). [2] The final study located by this review that used Saks and Ashforth's scale without any adaptations used structural equation modeling, and found that participants with higher P-J fit felt and expressed desirable emotions at work more than participants with low P-J fit (Lam et al., 2018). Additionally, there was a significant interaction effect between P-J fit and P-O fit on emotional labor such that there was a more positive association between P-J fit and expressed desirable emotions at work for participants with higher P-O fit. The authors also found that the relationship between P-J fit and service interaction quality, as well as the relationship between P-J fit and customer satisfaction, were both mediated by emotional labor variables.

Several studies were located that made modifications to Saks and Ashforth's original scale, although no explanations were given for why or on what grounds the scale was adapted. One of these studies adapted Saks and Ashforth's scale by simply reducing the total number of survey items (Anaza, 2015). The study used two measures of P-J fit. For a sample of cooperative extension service employees, P-J fit was measured using two items from a pre-existing survey scale (Cable & Judge, 1996), and the response scale was adapted from a 5-point Likert-type scale to a 7-point Likert-type scale with the same anchors: "not at all" to "completely". For a sample of nurses, P-J fit was measured using three of the four total items from Saks and Ashforth's survey scale with the same 5-point Likert-type response scale and response anchors. Using structural equation modeling, the study found, first, that P-J fit was positively associated with

[2] It is assumed that the Saks and Ashforth scale was not adapted in any way for this study since the study did not specify any changes made to the scale.

employee-customer identification in the cooperative extension service employee sample, but not in the nurse sample. Second, P-J fit was found to be positively associated with organizational identification in both samples. Finally, the study found a significant indirect effect of P-J fit on employee-customer identification through organization identification in both samples.

Most studies, however, made multiple modifications to Saks and Ashforth's original scale, such that items were removed, items were added, the grammatical structure of the items was changed, the number of response options was changed, and/or the wording of the response options were changed. A common modification made by multiple studies was adapting, at least, the grammar of the survey items so that they could be answered on a response scale from "strongly disagree" to "strongly agree". One of these studies used regression analyses and found that gender moderated the positive, significant relationship between P-J fit with preferring to be employed versus retired such that the positive relationship was stronger for women than it was for men (Noone et al., 2018). The study also found that the relationship between P-J fit with preference to be employed was stronger for participants with lower levels of financial pressure compared to those participants with higher levels of financial pressure. A second study made the same modification to the scale and, using structural equation modeling, the study found that P-J fit was positively related to job satisfaction, and also that self-efficacy partially mediated that positive relationship (Peng & Mao, 2015).

Two more studies that modified Saks and Ashforth's P-J fit scale to have response options ranging from "strongly disagree" to "strongly agree" also increased the number of answer options contained in the Likert-type scale. In one of these studies, P-J fit was measured using four items based on Saks and Ashforth's scale, but the items were modified so that respondents could answer using a 6-point Likert-type scale (de Beer et al., 2016). Using latent

variable modeling with Bayesian estimation, the study found that work engagement was a better predictor of P-J fit at all timepoints compared to how well P-J fit predicted work engagement at all timepoints. The second of these two studies measured P-J fit using four items that were borrowed from a combination of Saks and Ashforth's scale and Cable and Judge's scale and were adapted so that participants could respond using a 7-point Likert-type scale where response options ranged from "strongly disagree" to "strongly agree" (Jiang, 2016). Using structural equation modeling, the study found that P-J fit was positively associated with career adaptability, and negatively associated with job content plateau. Further, they found that P-J fit partially mediated the relationship between career adaptability and job content plateau.

One study was located that changed the response options of Saks and Ashforth's scale to range from "strongly disagree" to "strongly agree", and also increased the number of scale items from 4 to 6 (Ehrhart, 2006). The study had two phases. Using hierarchical linear modeling, the first phase of study found that there was a significant interaction between extraversion and customer interaction beliefs to predict P-J fit, such that the relationship between customer interaction beliefs and P-J fit was more positive for people who were more extraverted. In this phase, the study also found an interaction between extraversion and organizational interaction beliefs such that the relationship between organization interaction beliefs and P-J fit was more positive for people who were more extraverted. Additionally, in this phase, the study also found a significant interaction effect between emotional stability and complexity beliefs in predicting P-J fit, such that the relationship between complexity beliefs and P-J fit was more positive for participants with lower emotional stability. Phase two of the study found evidence for two of the three significant interactions from phase one: the interaction between extraversion and customer interaction beliefs, and the interaction between extraversion and organizational interaction

beliefs. Additionally, the study found a new significant interaction between agreeableness and customer interaction beliefs to predict P-J fit, such that the relationship between customer interaction beliefs and P-J fit was more positive for participants who were more agreeable.

The last two studies that modified Saks and Ashforth's survey scale so that the answer options ranged from "strongly agree" to "strongly disagree" changed both the number of points in the Likert-type scale as well as the number of survey items in the scale. In one of these studies, P-J fit was measured by adapting 3 items from Saks and Ashforth's scale, but the items were reworded slightly so that participants could respond using a 7-point Likert-type scale from "strongly disagree" to "strongly agree" (Shantz et al., 2014). Using structural equation modeling, the study found that there was a significant negative relationship between P-J fit and alienation.

In the other study, the researchers modified Saks and Ashforth's Likert-type scale to be 6-points ranging from "strongly disagree" to "strongly agree", and added a fifth item (C.-C. Chen et al., 2012). Using structural equation modeling, the researchers found that P-J fit mediated the association between job preview and organizational attraction, but did not mediate the association between compensation and organizational attraction, even though it was positively and significantly correlated with compensation.

Three other studies located for this review also made modifications to the answer options of Saks and Ashforth's original scale, but did not modify the scale to range from "strongly agree" to "strongly disagree". Two of these studies modified the scale to range from "not at all" to "completely". The first of these studies modified Saks and Ashforth's survey scale by consolidating the items from four to two, and by changing the grammar of the items so that they could be answered using a 5-point Likert-type scale ranging from "not at all" to "completely" (Carr et al., 2006). Using proportional hazard models and mediation testing methods, the study

found that pre-entry P-J fit perceptions significantly mediated the negative relationship between prior occupational experience and voluntary turnover. In the second of these studies the survey scale was changed to a 7-point Likert-type response scale from “not at all” to “completely” (Carless, 2005). Using mediation testing, the study found that pre-selection perceptions of P-J fit were positively and significantly related to organizational attraction and intentions to accept a job offer. The study also found that the relationship between P-J fit and intentions to accept a job offer were partially mediated by organizational attraction.

The third of these studies adapted the answer options to Saks & Ashforth’s scale neither using the anchors “strongly disagree” to “strongly agree”, nor “not at all” to completely”, but rather used a 5-point scale ranging from “not important at all” to “very important” (Yen, 2017). Using multiple paired-samples t-tests and repeated measures ANOVA tests, the researchers found evidence that P-J fit had a stronger, positive association with the likelihood of making the decision to apply to a position, maintaining their applicant status for a position, and making the decision to accept a job offer.

A final study in this group modified Saks and Ashforth’s original scale since the study’s scale contained 5 items and the original scale only contained 4 items; however, the study did not describe the answer options of the scale that was used (van Loon et al., 2017). Using structural equation modeling, the study found that public service motivation was a significant predictor of both P-O fit and P-J fit. However, P-O fit did not mediate the relationship between public service motivation and in-role behaviors, nor did it mediate the relationship between public service motivation and extra-role behaviors. P-J fit did significantly mediate the relationship between public service motivation and in-role behaviors.

Although both Saks and Ashforth's and Cable and Judge's original scales were designed as unidimensional measures of the overall construct of P-J fit, some studies have used these scales, either separately or combined, to measure the needs-supplies and demands-abilities dimensions of P-J fit separately. The first of these studies argued that Saks and Ashforth's scale only measured needs-supplies fit, rather than both needs-supplies and demands-abilities fit (Klaic et al., 2018). Needs-supplies fit was measured using the original 4 items from Saks and Ashforth's scale, but the grammar of the survey items was changed so that a new 5-point Likert-type response scale could be used with anchors "strongly disagree" and "strongly agree". Using multi-level structural equation modeling, the study found evidence that needs-supplies fit partially mediated the positive relationship between individual-focused transformational leadership style and job satisfaction, and also partially mediated the negative relationship between individual-focused transformational leadership style and work-related strain.

The remaining studies in this group used Saks and Ashforth's scale to measure both needs-supplies as well as demands-abilities dimensions of P-J fit. Three of these studies used Saks and Ashforth's scale alone, without combining it with another P-J fit scale, to measure these two dimensions of P-J fit. One of these three studies argued that three of the four original items from Saks and Ashforth measured needs-supplies fit, while the fourth item measured demands-ability fit (Chang et al., 2010). The researchers did not modify the grammar of the items, nor the response scale used. Using hierarchical regression, the study found evidence of a three-way interaction between demands-ability fit, P-O fit, and perceived training investment on turnover intentions. The study found that, for employees with high demands-ability fit and high P-O fit, the relationship between perceived training investment and turnover intentions was more

negative compared to the same relationship for employees with all other combinations of demands-abilities fit and P-O fit levels.

A second study measured perceptions of P-J fit using 6 items adapted from Saks and Ashforth's original scale, and the scale was changed to a 5-point Likert-type scale ranging from "strongly disagree" to "strongly agree" (Schmidt et al., 2015). Three items were specified to measure needs-supplies fit and three items were specified to measure demands-abilities fit. Using a mediation analysis, the study found that applicant perceptions of their fit with a job was associated with the applicant's attraction to the position. Additionally, the study found that the relationship between applicants' perceptions of their needs-supplies fit and applicant attraction to the job position was higher for applicants with higher perceptions of their own marketability.

In the third study, P-J fit was measured by modifying Saks and Ashforth's original scale to include 8 items, 4 that measured needs-supplies fit and 4 that measured demands-abilities fit, and further modifying the items so that they could be answered using a 5-point Likert-type scale ranging from "strongly disagree" to "strongly agree" (Chung-Kai & Chia-Hung, 2010). Using structural equation modeling where P-J fit was measured using a second-order factor model comprised of the two dimensions of P-J fit, the study found evidence of significant positive associations between P-J fit and traditional literacy, computer literacy, task performance, and organizational citizenship behaviors. The study also found that P-J fit partially mediated the relationships between traditional literacy and task performance, computer literacy and task performance, and computer literacy and individual-targeted organizational citizenship behaviors.

The final three studies that adapted Saks and Ashforth's scale also measured both the demands-abilities and needs-supplies dimensions of P-J fit, but did so by combining the scale with Cable and Judge's scale. One of these studies combined Saks and Ashforth's scale with

Cable and Judge's scale to create a four item needs-supplies fit scale and a four item demands-abilities fit scale (Luksyte et al., 2011). Both scales were adapted so that participants could respond using a 5-point Likert-type scale with answer options ranging from "strongly disagree" to "strongly agree". Using mediation analyses, the study found a negative significant association between needs-supplies fit and perceived overqualification. However, no evidence was found that either dimension of P-J fit mediated the relationship between over qualification and counterproductive work behaviors.

A second study combined Saks and Ashforth's P-J fit scale with Cable and Judge's P-J fit scale to create two four-item subscales, one to measure demands-abilities fit and one to measure needs-supplies fit (Resick et al., 2007). The items of the scale were adapted so that participants could respond using a 5-point Likert-type scale ranging from "strongly disagree" to "strongly agree". Using regression modeling, the study found a significant association between both dimensions of P-J fit and internship satisfaction, with a significant interaction between needs-supplies fit and P-O fit in predicting internship satisfaction such that the relationship between P-O fit and internship satisfaction was more positive for participants with low needs-supplies fit. The study also found a positive significant relationship between needs-supplies fit and job choice intentions, as well as a significant interaction between demands-ability fit and P-O fit in predicting job choice intentions such that the relationship between P-O fit and intent to accept a job offer was more positive for participants with low demands-ability fit.

The final study that combined Saks and Ashforth's scale with Cable and Judge's scale to measure two dimensions of P-J fit was divided into two phases (Guan et al., 2010). In the first phase, demands-ability fit was measured by combining two items from Cable and Judge's scale with a single item from Saks and Ashforth's scale, and changing the grammar of the items so that

they could be answered using a 7-point scale with answer options ranging from “strongly disagree” to “strongly agree”. Needs-supplies fit was measured using the other three items from Saks and Ashforth’s scale, but the grammar was modified so that the items could be answered using the same response scale as the demands-abilities scale. Using hierarchical regression analyses, the study found significant interaction effects between each dimension of P-J fit with need for closure in predicting job satisfaction. For participants with a high need for closure, the associations between needs-supplies fit and job satisfaction, and between demands-ability fit and job satisfaction, were both more positive compared to participants with low need for closure. In the second phase of the study, demands-ability fit was measured using one item from Cable and Judge’s scale and the same item from Saks and Ashforth’s scale that was used in the first phase, with the same response options. Needs-supplies fit was measured using two of the three original items from Saks and Ashforth’s scale, and using the same response options from the first phase of the study. Using hierarchical regression analyses, the second phase of the study found the exact same significant interactions as the first phase of the study. However, the second phase of the study also found a significant interaction between demands-ability fit and turnover intention, such that the association between demands-ability fit and turnover intentions was more negative for participants with high need for closure compared to those with a low need for closure.

**Cable and DeRue (2002).** Five years after Saks and Ashforth developed their unidimensional P-J fit scale, Cable and DeRue (2002) developed a multi-dimensional P-J fit scale in which they measured both the needs-supplies and demands-abilities dimensions of P-J fit. Of the 66 studies that used a single survey measure of P-J fit, 18 of them cited that they used or adapted this scale to measure P-J fit. The scale consists of two subscales, one to measure each dimension of P-J fit. Each subscale contains three items, which participants can respond to using

a 7-point Likert-type scale ranging from “strongly disagree” to “strongly agree”. An example item from the needs-supplies fit subscale is “There is a good fit between what my job offers me and what I am looking for in a job”. An example item from the demands-abilities fit subscale is “The match is very good between the demands of my job and my personal skills”.

Five of the studies located for this review used Cable and DeRue’s scale exactly as it was originally designed. The first three of these five studies all had a relatively similar format of testing associations between P-J fit and other variables using hierarchical linear regression. The first of these three studies was divided into two phases (Erdogan & Bauer, 2005). In the first phase, the study found that P-J fit moderated the association between proactive personality and career satisfaction, such that the association was more positive for participants with high P-J fit. In the second phase, the study did not find the same moderating effect of P-J fit from the first phase. However, in this second phase, the study found that P-J fit significantly moderated the association between proactive personality and career success, such that this association was more positive for participants with high P-J fit.

A second study that used Cable and DeRue’s scale without any adaptations was also divided into two phases (H. I. Park et al., 2011). In the first phase, the study found that needs-supplies fit had a significant positive relationship with happiness, while demands-abilities fit had a significant negative relationship with depression. Further, the first phase of the study found evidence that core self-evaluation moderated the association between needs-supplies fit and happiness such that the association was more positive for participants with lower core self-evaluations. In phase two of the study, the findings were that needs-supplies fit was positively related to happiness. The study also found that demands-abilities fit was positively related to happiness, and negatively related to depression. Additionally, the study found that P-O fit

moderated the associations between both needs-supplies and demands-ability fit with happiness, such that both associations were more positive for participants who had high P-O fit. The third study that used Cable and DeRue's scale exactly as it was designed found that needs-supplies fit and demands-ability fit both partially mediated the relationship between transformational leadership and follower task performance (N.-W. Chi & Pan, 2012).

The other group of two studies that used Cable and DeRue's scale exactly as it was designed also tested relationships between P-J fit with other variables, but used structural equation modeling rather than hierarchical linear regression. The first of these studies found that leadership management exchange did significantly moderate the relationship between P-O fit and both dimensions of P-J fit such that the relationships were more positive for employees with higher leadership management exchange (Boon & Biron, 2016). The study also found evidence that leadership management exchange moderated the relationship between demands-ability fit and employee turnover such that the relationship was more positive for employees with higher leadership management exchange.

The last study that used Cable and DeRue's scale exactly as it was designed, and used structural equation modeling for the analysis, used only the needs-supplies subscale (Dahling & Librizzi, 2015). The study found that there was a negative, significant relationship between needs-supplies fit and turnover, and this relationship was partially mediated by job satisfaction. Additionally, the researchers found that avoidant attachment significantly moderated the relationship between needs-supplies fit and job satisfaction, such that the relationship was more positive for participants with low avoidant attachment.

Although only five studies used Cable and DeRue's scale exactly as it was designed, nine additional studies kept the items and scale anchors of the scale the same, but modified the scale's

range from 7-points to 5-points, although no explanation was provided for the reason that the adaption was made, nor was any evidence presented that the adaptation made the scale more valid. Of these studies, two used general linear modeling to test associations between P-J fit and other variables, three used hierarchal linear modeling, and four used structural equation modeling. The first study that adapted Cable and DeRue's scale from 7-points to 5-points, and used general linear modeling for the analysis, found that the needs-supplies dimension of P-J fit was significantly positively related to job satisfaction and significantly negatively related to turnover intentions (Chhabra, 2016). The demands-abilities dimension was only significantly related to job satisfaction. Further, the study found that the needs-supplies dimension of P-J fit moderated the relationship between the work role stressor of role ambiguity and job satisfaction, such that this relationship was more negative for employees with lower needs-supplies fit. The demands-abilities dimension of P-J fit moderated the relationship between a different work role stressor of role overload and job satisfaction, such that this relationship was more negative for employees with higher demands-abilities fit.

The second study that adapted Cable and DeRue's original scale from 7-points to 5-points, and that used general linear modeling for the analysis found that, while there was no significant effects of the intervention under investigation, there were significant positive associations between the needs-supplies dimension of P-J fit and both types of job crafting (Kooij et al., 2017). There was also a significant positive association between the demands-abilities dimension and job crafting towards employee strengths. Additionally, the study found that the significant associations between job crafting toward employee strengths and both dimensions of P-J fit were moderated by age such that all of the significant relationships between

P-J fit and job crafting were more positive for older employees, and were negative for younger employees.

Three additional studies adapted Cable and DeRue's scale from 7-points to 5-points and used hierarchical linear modeling to test the associations between P-J fit and other variables. The first of these studies found a significant positive association between high performance HR practices and P-J fit (Boon et al., 2011). The study also found that P-J fit partially mediated the association between high performance HR practices and intention to quit, as well as the association between high performance HR practices and job satisfaction. Last, the study found two moderating effects of P-J fit. P-J fit significantly moderated the association between high performance HR practices and intention to quit such that this association was more negative for employees with low P-J fit. P-J fit also significantly moderated the association between high performance HR practices and job satisfaction such that the association was more positive for employees with low P-J fit.

The second of these studies that adapted Cable and DeRue's scale to 5-points, and used hierarchical linear modeling, found that P-J fit was positively related to job satisfaction at both levels of analysis, but there was only partial evidence found for the associations between P-J fit with positive and negative affect (Gabriel et al., 2014). The third study in this group found that demands-ability fit did significantly moderate the relationships between work engagement and autonomy, work engagement and task variety, and work engagement and feedback such that all relationships were more positive when demands-ability fit was low (Maden-Eyiusta, 2016). Further, the study found that needs-supplies fit did significantly moderate the relationships between work engagement and individual innovation and voice such that both relationships were more positive when employees had higher needs-supplies fit.

The remaining four studies that adapted Cable and DeRue's scale from 7-points to 5-points, but kept the same items and answer option anchors, used structural equation modeling to explore the associations between variables. In the first of these studies, positive significant associations were confirmed between P-J fit with job engagement, and P-J fit with job crafting (C.-Y. Chen et al., 2014). Additionally, the study found that P-J fit fully mediated the positive association between collaborative job crafting and job engagement, and partially mediated the positive relationship between individual job crafting and job engagement. A second study in this group found that there was a significant, positive relationship between P-J fit and psychological ownership (Han et al., 2015). The third study in this group found that there was a positive relationship between transformational leadership and work engagement, and that P-J fit did partially mediate that relationship (Bui et al., 2017). The last study in this group focused only on the demands-abilities dimension of P-J fit, and found evidence that understanding-based emotional intelligence moderated this relationship such that the significant negative association between employment gap length and P-J fit was only significant at low levels of emotional intelligence (Dust et al., 2018).

An additional study adapted Cable and DeRue's scale in almost the same way as the previous group by changing it from 7-points to 5-points and using the same items, but also changed the scale anchors slightly so that the response options ranged from "totally agree" to "totally disagree" (Tims et al., 2016). Using structural equation modeling, the study found that job-crafting was significantly associated with both dimensions of P-J fit, but job meaningfulness was only significantly associated with the demands-ability dimension of P-J fit. Additionally, the study found that only the demands-ability dimension of P-J fit partially mediated the association between job crafting and job meaningfulness.

Only one study located for this review adapted Cable and DeRue's scale from 7-points to 6-points, removing the neutral option, and keeping the same number of items and same anchor scales of "strongly disagree" to "strongly agree" (Lu et al., 2014). Using structural equation modeling, the study found a significant positive association between demands-ability fit and physical job crafting, while the study found a significant negative association between needs-supplies fit and relational job crafting. Additionally, the study found that the positive associations between both dimensions of P-J fit with work engagement were partially mediated by the two types of job crafting.

Two additional studies that adapted Cable and DeRue's scale changed both the answer options of the original scale and the number of items in the scale. The first of these studies measured P-J fit by adapting both of Cable and DeRue's subscales (Abdalla et al., 2018). The needs-supplies scale was adapted to contain five items instead of three, and the demands-abilities scale was adapted to contain four items instead of three; additionally, both subscales had five response options that ranged from "strongly disagree" to "strongly agree". Using structural equation modeling, the study first found positive, significant associations between P-J, P-O, and Person-Group (P-G) fit. For P-J fit specifically, the study found that needs-supplies fit was significantly and negatively related to turnover intention, but demands-ability fit was not significantly related to turnover intention. Finally, the study found that there was evidence that P-J and P-G fit partially mediated the relationship between P-O fit and turnover intention.

In the final study that adapted Cable and DeRue's scale, P-J fit was measured using 4 of the total 6 items from a pre-existing survey scale, and the answer options were changed to a 5-point Likert-type scale where answer options ranged from "fully disagree" to "fully agree" (Sirén et al., 2018). As expected, P-J fit was positively and significantly associated with internal

psychological career mobility, and negatively and significantly associated with external psychological career mobility. Additionally, P-J fit significantly moderated both positive associations between self-directed career management and psychological career mobility such that the positive relationship between self-directed career management and internal psychological career mobility was even stronger for employees with high P-J fit, and the positive relationship between self-directed career management and external psychological career mobility was weaker, but not negative, for employees with high P-J fit.

**Other P-J fit survey scales.** While the three scales developed by Saks and Ashforth, Cable and Judge, and Cable and DeRue were the most commonly cited among the articles located for this review, there were 26 additional articles that either cited or developed other P-J fit survey scales. Three of these studies cited a unidimensional P-J fit scale developed by Lauver and Kristof-Brown (2001). This scale was designed as a unidimensional measure of P-J fit, and consisted of five items that respondents could answer using a 7-point Likert-type scale ranging from "strongly disagree" to "strongly agree". An example item is "There is a good match between the requirements of this job and my skills".

Only one study located in this review used Lauver and Kristof-Brown's scale exactly as it was originally designed (Aktaş, 2014). Using hierarchical linear modeling, the study found that P-J fit had a positive, significant association with job satisfaction and organizational commitment, and a negative association with turnover intentions. The other two studies that cited Lauver and Kristof-Brown's scale adapted the scale in some way. The first of these studies adapted Lauver and Kristof-Brown's scale by changing the total number of items from five to three, while keeping the same number of answer options with the same response anchors (Farzaneh et al., 2014). Using structural equation modeling, the study found that P-J fit was

positively related to both organizational commitment and organization citizenship behavior, and that organizational commitment mediated the positive relationship between P-J fit and organizational citizenship behavior. The other study that adapted Lauver and Kristof-Brown's scale also only used three items, kept the same answer option anchors, but changed the number of response options from seven to five (Quratulain & Khan, 2015). Using hierarchical multiple regression analyses, the study found that P-J fit was positively associated with both job satisfaction and public service motivation. Additionally, the study found that public service motivation partially mediated the relationship between participants' P-J fit and job satisfaction. Finally, the study found that work pressure significantly moderated both the direct relationship between P-J fit and job satisfaction, as well as the indirect relationship between P-J fit and job satisfaction through public service motivation, such that these relationships were more positive for participants with low work pressure.

Two studies were located for this review that appear to have used a scale developed by Speier and Venkatesh (2002).[3] This scale was a three-item, unidimensional measure of P-J fit. The answer options for the scale were not provided, but an example item was "I fit right into the job". The first study to cite adapting this scale used the same number of items as the original scale, but each item was worded completely differently from the original scale. Participants could respond using a 7-point Likert-type scale that ranged from "strongly disagree" to "strongly agree" (Prakash Mulki et al., 2006). Using structural equation modeling, the study found a significant negative association between P-J fit and emotional exhaustion, and a significant positive association between P-J fit and job satisfaction. The other study that adapted Speier and

[3] Speier and Venkatesh cited that they either used or adapted a pre-existing P-J fit scale, and did not develop their own scale. However, the reference that they cited for the pre-existing scale (Peters et al., 1981) did not contain the P-J fit scale that they used, nor any reference to P-J fit. Therefore, for the purposes of this literature review, the P-J fit items from Speier and Venkatesh are considered to be developed by Speier and Venkatesh.

Venkatesh's P-J fit scale used the exact same adaptations as the Mulki et. al. (2006), including the exact same modifications to the language of the survey items (S. B. Choi et al., 2017). Using structural equation modeling, this study found that inclusive leadership had a positive association with P-J fit, and that P-J fit had a positive association with both employee wellbeing and innovative behavior. Additionally, the study found that P-J fit significantly mediated the positive association between inclusive leadership and employee wellbeing, and the positive association between inclusive leadership and innovative behavior.

Six additional studies located for this review used or adapted a pre-existing P-J fit scale, but each used a different P-J fit scale. In the first of these studies, P-J fit was measured using a four item, 5-point, Likert-type, unidimensional scale with answer options ranging from "strongly disagree" to "strongly agree" (Kolenko & Aldag, 1989). An example item from the scale was "Being a marketing representative gives me a chance to do the things I can do best". Using ANOVA, the study found that there was a significant association between P-J fit and recruitment source, such that employees who found their jobs through referrals and self-initiated applications had higher levels of P-J fit compared to employees who found jobs using college placement offices or direct solicitation by an agency representative (Werbel & Landau, 1996).

Another pre-existing P-J fit scale that was cited was developed by Scroggins (2003). This scale was designed to measure both the needs-supplies and demands-ability dimensions of P-J fit. The needs-supplies scale contained seven items, and the demands-ability scale contained six items. All items in both subscales used a 7-point Likert-type response scale ranging from "strongly disagree" to "strongly agree". An example item from the needs-supplies subscale is "My job allows me to engage in activities compatible with the idea of the person I desire to be". An example item from the demands-ability subscale is "I have the skill and ability to

successfully perform the tasks required in my job". The study that cited this scale did not modify the scale, and found, using hierarchical linear regression, that needs-supplies fit was a significant, positive predictor of both job satisfaction and organizational commitment, but also that demands-ability fit did not significantly predict either (Scroggins, 2007). However, both types of fit negatively and significantly predicted intention to quit.

The third additional pre-existing P-J fit scale used by a study located for this review was developed by Brkich et al. (2002). This unidimensional scale was designed to measure global P-J fit using 9 items that respondents could answer using a 7-point Likert-type scale with answer options ranging from "strongly disagree" to "strongly agree". An example item from the scale is "My abilities, skills, and talents are the right type for this job". The study located for this review that used this P-J fit scale used regression analysis and found that P-J fit was significantly and positively associated with organizational commitment, job motivation, and job satisfaction (Nur Iplik et al., 2011).

A fourth P-J fit scale located for this review that only a single study cited was a scale developed by Chi et al. (N. W. Chi et al., 2008).[4] The study that cited and used this P-J fit scale used contained 18 items where participants could respond using a 5-point Likert-type scale with answer options ranging from "strongly disagree" to "strongly agree" (Lin et al., 2014). Using regression analyses, the study found that there were significant positive associations between P-J fit and well-being, and between P-J fit and job performance. The study also found evidence that well-being partially mediated the positive association between P-J fit and job performance.

The next P-J fit survey scale located for this review was developed by Chuang et al. (2016). Although this scale is labeled as multidimensional, it is analyzed as if it is a 4-item

[4] An English version of this article could not be found. Therefore, this scale is only discussed as it was presented by Lin et al. (2014). It is unclear whether the scale was adapted or used as originally designed.

unidimensional measure of P-J fit, where participants could answer each item using a 7-point Likert-type scale ranging from “no match” to “complete match”. An example item from the scale is “How would you describe the match between your interests (e.g., social vs. unsocial, artistic vs. inartistic, and conventional vs. unconventional) and those you desire for a job?” The study that cited this scale modified it so that participants responded to the items using a 5-point response scale as opposed to a 7-point response scale (Enwereuzor et al., 2018). Using regression analyses, the study confirmed the significant positive relationship between transformational leadership and work engagement, and confirmed a significant positive relationship between P-J fit and work engagement. The study also confirmed a significant moderation effect of P-J fit such that employees with higher levels of P-J fit showed a stronger relationship between transformational leadership and work engagement.

The final P-J fit scale cited was the Areas of Worklife scale (Leiter & Maslach, 2003). This is a six-dimension P-J fit scale in which participants rate their agreement on 29 items using a 5-point Likert-type scale ranging from “strongly disagree” to “strongly agree”. The six dimensions that the scale assesses are workload, control, reward, community, fairness, and values. An example item from the scale is “Working here forces me to compromise my values.” The study located for this literature review modified the scale so that the response options for the 5-point Likert scale ranged from “I completely disagree” to “I thoroughly agree” (Chirkowska-Smolak, 2012). The study also added a seventh subscale to measure a seventh dimension of P-J fit: relationship with supervisor. Using regression analyses, the study found that most of the P-J fit dimensions were significantly related to both burnout and engagement, with the exception of relationship with coworkers and fairness.

The last studies located for this review that included a single survey measure of P-J fit used a newly developed multi-item measure of P-J fit. Only one of these studies was solely focused on the development of a reliable and valid P-J fit scale (Brkich et al., 2002). P-J fit was measured using 9 items with a 7-point Likert type response scale ranging from "strongly disagree" to "strongly agree". An example item was, "I feel that my goals and needs are met in this job". Using exploratory and confirmatory factor analyses, the study found that the scale measured a single, global dimension of P-J fit that was reliable and correlated significantly and positively with most dimensions of empowerment and job satisfaction.

Five additional studies also used an agree-disagree continuum for their P-J fit scales. Three of these five studies used a 5-point Likert-type response scale with answer options ranging from "strongly disagree" to "strongly agree". In the first of these studies, P-J fit was measured using four items, and an example item was, "A job in the tourism and hospitality industry enhances my professional skills" (Song & Chon, 2012). Using structural equation modeling, the study found that vocational interests and P-J fit mediated the positive association between general self-efficacy and choice goals. The study also found that the positive association between general self-efficacy and P-J fit was partially mediated by vocational interests, and the positive association between vocational interests and choice goals was partially mediated by P-J fit. In the second of these studies, P-J fit was measured using three items, and an example item from the P-J fit scale was, "I have a good fit with my new job" (Singh & Greenhaus, 2004). Using regression modeling, the study found that rational decision making was positively associated with P-J fit, and that this association was fully mediated by both self-awareness and environment awareness. The study also found three significant interaction terms when predicting P-J fit: one between rational decision making and intuitive decision making, one between rational decision

making and dependent decision making, and one between intuitive decision making and dependent decision making. The third of these studies used 6 items to measure P-J fit, but did not provide example items from the scale (Behery, 2009). Using regression analyses, the study found that P-J fit was positively associated with P-O fit, psychological contract, and organizational affective commitment. Further, the study found that psychological contract was a partial mediator between P-J fit and organizational affective commitment.

In one of the two additional studies that measured P-J fit using an agree-disagree response continuum, P-J fit was measured with 5 items that teacher respondents could answer using a 4-point Likert-type scale from "strongly disagree" to "strongly agree" (Player et al., 2017). An example item from the scale was, "I would certainly become a teacher if I had to go back and start over". Using a generalized structural equation model, the results of the study showed that higher P-J fit was associated with lower odds of a teacher leaving the profession, and lower odds of a teacher leaving their school. In the second additional study, P-J fit was measured using three items developed by the researchers that were answered on a 7-point Likert-type scale where answer options ranged from "totally agree" to "totally disagree" (Tseng & Yu, 2016). An example item was "I have a good fit with my job." Using partial least squares analysis, the study found that there was a significant negative relationship between P-J fit and intention to quit, a significant positive relationship between P-J fit and cooperative learning, and a significant positive relationship between P-J fit and support in the organization.

Three of the additional studies that used a newly developed measure of P-J fit used a response continuum that was more specific to the construct of P-J fit rather than a generalized response continuum of agree-disagree. In one of these studies, P-J fit was measured using a four-item Likert-type scale where participants could choose one of five responses ranging from "very

poor match" to "very good match" (Ellis et al., 2017). Example items from the scale were not provided. Using structural equation modeling, the researchers found that together, P-J fully mediated the relationship between having an accurate job preview and job satisfaction, while P-O fit mediated the relationship between having an accurate job preview and satisfaction with the school campus. In the second of these studies, P-J fit was measured using a 6-item 5-point Likert-type scale with answer options ranging from "very little" to "very much" (Sortheix et al., 2015). An example item was, "To what extent do your knowledge, skills and abilities match the requirements of your work?" Using structural equation modeling, the study found that participants' intrinsic work values did have a positive association with their P-J fit. In the last of these studies, P-J fit was measured using two items with a 5-point Likert-type response scale ranging from "very poor fit" to "very good fit" (A. Kristof-Brown et al., 2002, p.). Example items were not provided. Using structural equation modeling, the study found that applicant self-promotion was significantly related to recruiter perceptions of P-J fit.

The final two studies that used a newly developed measure of P-J fit did not specify the response options for their scales. In one study, P-J fit was measured using a two-item measure in one sample and a three-item measure in another sample, and both were rated by participants using a 5-point Likert-type response scale, the anchors of which were not specified (Prysmakova & Vandenabeele, 2019). An example item was, "My job enables me to realize the goals I personally deem important". Using regression analyses, the authors found that a combination of person-job fit, and person-organization fit at least partially mediated the relationship between public service motivation and job satisfaction in both samples. In the other study, P-J fit was measured using 3 items with a 7-point Likert type response scale (Allen, 1993). Neither the anchors of the scale nor example items were specified. The study used the scale ratings to

separate participants into high-fit and low-fit groups, and using the acts frequency approach, identified a list of 10 typical work behaviors that participants in the high-fit group all had in common compared to the participants in the low-fit group.

**Summary**

To summarize, many research studies have been conducted that have measured P-J fit using a single perception survey scale measure. Although there are alternative methods of measuring P-J fit, single survey measures are by far the most common in the literature located for this review. The findings of this research have been broad and have gathered evidence of a variety of associations between P-J fit and other constructs of interest, most commonly using regression or structural equation analyses. Across these studies, researchers have framed their findings positively, claiming that increasing P-J fit leads to increases in other positive employment outcomes (e.g., job satisfaction), and decreases in negative employment outcomes (e.g., turnover).

However, there were few studies located in this review that focused specifically on the psychometric evaluations of these scales. While some studies included reports of Cronbach's alpha values, or found that other variables that were correlated in expected theoretical directions with scale scores generated from these P-J fit scales, these investigations were tangential to the central research questions of the studies. Detailed explanations for how the content for the items was developed were lacking, and existing scales were adapted without any examination of how those adaptations positively or negatively affected the validity of the scales.

A more rigorous psychometric investigation of this construct would allow for users of these scales to be more confident in the validity of the scales, as well as the relationships between the scale scores and other variables of interest. Part of this psychometric investigation

should examine whether the construct of P-J fit could be generalized to career-related positions that were not necessarily employment positions, such as further study in graduate or profession school, internships, volunteer work, academic or research fellowships. This would allow for a wider variety of research to be conducted in the future, and allow for the inclusion of more research participants that are involved in career-related positions that are not traditional full-time employment positions. It would also allow for the comparison of fit between different types of career-related positions.

Consequently, this dissertation developed and tested a new self-report, perception survey scale to measure the fit of recent college graduates' first career-related destinations after college. The First Destination Fit (FDF) scale was grounded in a generalized version of the existing P-J fit theory that proposes a recent graduate's identity can be well-fitting or not well-fitting with any career-related plan that they secure after college, rather than just traditional employment plans. The previous research reviewed in this chapter related to P-J fit was used to inform not only the item development of the scale, but also the other constructs that this newly developed scale should be theoretically related to if it is validly measuring the fit of recent college graduates' first destinations, such as other dimensions of P-E fit (e.g., P-O fit), job satisfaction, and turnover or intent to quit.

# Chapter 3: Methodology

## Item Development

### *Defining FDF*

Prior to developing items for the First Destination Fit (FDF) scale, the construct of FDF needed to be clearly defined. There are multiple purposes for clearly defining the construct of FDF. First, the scores of an assessment cannot be interpreted validly if the construct that the

assessment intends to measure is not clear (American Educational Research Association et al., 2014, Standard 1.1; Standard 1.4). Second, since the validity of the assessment is based in part on the alignment between the assessment items with the construct of FDF, the construct must be well defined in order for this alignment to be evaluated (American Educational Research Association et al., 2014, Standard 1.11; Standard 12.4).

FDF can be conceived of as a generalized version of Person-Job (P-J) fit. P-J fit can be defined as the alignment between an employee's identity and their employment position. To generalize this definition, FDF can be conceived of as the alignment between a recent graduate's identity and their first destination position. As described in Chapter 2, this alignment within the context of P-J fit has been defined as a match between an employee's needs, goals, values, interests, preferences, education, experience, and skills with their employment position (Edwards, 1991). These same elements are defined to comprise FDF as it relates to recent graduates and their first destination positions. Table 1 displays operational definitions for each of these elements as they relate to FDF. These definitions were constructed for this study using P-J fit theory as a foundation.

Table 1

*Defining the Elements that Comprise the Construct of FDF*

| | |
|---|---|
| Education | The career-related knowledge that a recent graduate has accumulated. |
| Experience | The events or occurrences that a recent graduate has had that have prepared them for career-related work. |
| Goals | The plans that recent graduates have for their future that are relevant to their career-related work. |
| Interests | The aspects of career-related work that graduates find to be engaging. |
| Needs | The essential criteria that graduates have for their career-related work. |
| Preferences | The liking of a career-related work opportunity compared to other work opportunities that the recent graduates may have wanted to secure. |
| Skills | The career-related skills or abilities that graduates have attained. |
| Values | The beliefs that recent graduates have about what makes career-related work important or meaningful to them. |

### *Defining the Target Population*

The target population for which the FDF scale is intended also needed to be defined to properly validate the measure. In part, this is to ensure the appropriateness of certain design features of the scale for the intended population, such as the vocabulary used, the complexity of measurement tasks, etc. (American Educational Research Association et al., 2014, Standard 1.1; Standard 1.11; Standard 4.1). Another reason the target population should be defined is so that the samples of participants recruited for validating the scale can be evaluated in terms of their representativeness of the target population (American Educational Research Association et al., 2014, Standard 1.11). A third reason that it is important to define the target population is so that the inclusion and exclusion criteria of the population can be critiqued in order to ensure that

relevant subgroups of people within that population are not excluded from the validation process (American Educational Research Association et al., 2014, Standard 3.1).

The target population for this measure is recent graduates from 4-year higher education institutions (HEIs) who received a 4-year degree (e.g., a Bachelor's degree) and secured a career-related position within two years after graduating college. The large majority of these graduates are expected to be in their early 20s, but some are expected to be older if they did not continue immediately into postsecondary education from secondary education. The scale is not intended for participants who are younger than 18 years old, or who have a lower level of education, since the language used in the scale may not be developmentally appropriate for those audiences. Recent graduates from all 4-year HEIs should be able to be validly assessed using this scale, including both public and private institutions, and including institutions both within and outside of the U.S., so long as the participants are English-speaking. Career-related positions will be defined in-line with the NACE Standards as employment (including internships and academic or research fellowships), continued education, volunteer service, and military service (NACE First-Destination Survey Task Force, 2019).

### *Initial Item Pool Development*

The next phase of the development of this scale involved the development of an initial item pool (American Educational Research Association et al., 2014, Standard 4.7). The purpose of the item pool is to better ensure the content validity of the scale, or the extent to which the scale represents the universe of items that could have been chosen for inclusion (DeVellis, 2012; Netemeyer et al., 2003). To develop an initial item pool, the scale anchors and the grammatical format of the response options were determined first. Most existing P-J fit measures use a scale with response options ranging from "strongly agree" to "strongly disagree". However, these

answer options were not considered for this study because this type of response option scale has been critiqued for multiple flaws, including measuring more than one unique dimension (i.e., an emotional and a cognitive dimension), sorting people into dichotomous groups regardless of how many groups are believed to exist in a population, and being simplistic or generic in terms of its grammatical form (Fowler et al., 1995). Additionally, survey scales with item-specific response options have been shown to outperform agree-disagree survey scales in terms of reducing measurement error (Saris et al., 2010). Given these previous negative findings regarding the validity of agree-disagree survey scales, items were developed with the following response anchors in mind: "very good match" and "very bad match". This response continuum is item-specific since the FDF scale intends to measure the alignment between graduating seniors' identities and their secured first destination positions.

Multiple considerations affected the total number of response options. One factor was that the number of response options needed to be high enough to capture the true variability among the respondents so that the scale could effectively discriminate between respondents' levels of FDF (DeVellis, 2012). However, each response option also needed to be qualitatively meaningful to participants so that the variability was not caused solely by measurement error (DeVellis, 2012). A final consideration was whether to include an odd or even number of response options, allowing participants to respond in the middle of the scale's continuum, which typically reflects a "neutral" response (DeVellis, 2012; Fowler et al., 1995). In light of these considerations, the final response scale that was developed to measure FDF that was accessible for the intended population of recent Bachelor's degree recipients was:

1. Very bad match
2. More of a bad match than a good match

3. Sort of a good match and sort of a bad match
4. More of a good match than a bad match
5. Very good match

Each answer option has a distinct qualitative meaning from every other, and they range in a clear linear continuum from low to high. A neutral answer option was included because it was logical that certain aspects of graduates' first destination could be approximately equally a good match and a bad match. For example, in terms of the fit between graduates' first destinations and their previous experiences, graduates could have an approximately equal amount of previous experiences that were a good match with their first destination as the amount of work experiences that were a bad match with their first destination.

After finalizing the response options, an initial item pool of approximately 250 items was developed by generating sets of items intentionally designed to holistically measure FDF based on the 8 elements of FDF: goals, interests, needs, values, preferences, experiences, skills, and education (Appendix A). The purpose of this process was to ensure that the construct of FDF was comprehensively represented in the item pool (American Educational Research Association et al., 2014, Standard 4.12; Standard 12.4). It was essential for the items to be grounded in an existing theory because, without a theory, there would be no basis against which to judge the content validity of the scale (DeVellis, 2012). No negatively worded items were generated because of the expected length of the survey; with long surveys, reverse-worded questions can confuse participants (DeVellis, 2012).

More items were generated for the item pool than were expected to be included in the pilot and final versions of the scale. It is recommended in survey scale development that the initial pool of items developed should contain between 2 to 4 times as many items as the final

scale, and in the case of multidimensional latent constructs, even more initial items are recommended (DeVellis, 2012; Netemeyer et al., 2003). While the dimensionality of FDF was uncertain prior to the study, it was expected that there would be no more than 8 dimensions, one per element. The final iteration of the scale was expected to be no less than three items per dimension of FDF, resulting in a minimum of 24 items if there was evidence of 8 unique dimensions of FDF. The suggested item pool size based on this criterion would be between 48 and 96 items. The initial pool of developed for this study far exceeded this recommendation.

***Content Expert Review***

After the pool of items was developed, it was important for the study's validity to have experts who are knowledgeable in the content areas related to the FDF scale to review the pool of items and assist in critiquing and selecting items. This was important to the process to ensure the content validity of the scale so that construct-irrelevant characteristics were minimized (American Educational Research Association et al., 2014, Standard 3.1; Standard 3.2) and so that scores from the measure could be validly interpreted (American Educational Research Association et al., 2014, Standard 1.9; Standard 4.7; Standard 4.8; Standard 7.5). A total of two groups of expert reviewers were recruited to review the item pool for its content validity. The first group of expert reviewers was comprised of two reviewers: one with expertise in assessment and evaluation in higher education contexts, and one with expertise in career development in higher education. The main purpose of this initial review was to identify the most important items for measuring the construct of FDF, and eliminating other items that were less important, or that were expected to be less clear to graduating students. These two experts reviewed the items sequentially such that the expert in assessment and evaluation reviewed the items first, eliminating certain items from the pool that were judged as unclear, lengthy, or redundant; then,

the second expert in career development reviewed a smaller pool of items, excluding the items that the first reviewer had already eliminated. Prior to their review, both experts were provided with some background context around the study's aims and the definition of FDF as defined by the study. The first reviewer eliminated 159 items from the item pool, revised one item, and added one item to the preferences dimension, "your preferred alternative." The second reviewer eliminated an additional 20 items from the item pool and added 4 items: "what you expected to secure for a plan," "your personal history," "your major," and "your knowledge." In total, this process narrowed the initial item pool for the FDF scale down to 88 items.

The second group of reviewers consisted of six expert reviewers. All experts recruited had expertise in one or more of the following content areas: psychometrics, scale development, assessment, evaluation, higher education, or career development. Unlike the first review, the experts all received the same revised pool of items that was produced by the first review, and each expert did not see feedback about, or modifications to, the pool of items based on the comments of other reviewers. All experts received an explanation of the goal of the study, as well as a working definition of FDF, prior to their critique. Items were eliminated from the initial pool based on the reviewers' critiques, and items were added to the pool if the reviewers determined that an aspect of FDF was underrepresented by the items. In cases where the reviewers' critiques contradicted one another in terms of whether an item should be removed, the item was included in the pilot scale to be tested in order to provide more data on whether it was problematic to participants. The final pilot scale produced by this process contained 37 items (Appendix B).

## Data Collection and Analysis

### *Pilot Survey*

**Participants.** Participants for the collection of quantitative pilot data were recruited using Amazon's Mechanical Turk (MTurk) marketplace. MTurk is an online platform that brings together workers and requestors in a labor market in order to complete one or more human intelligence tasks (HITs) for compensation. Previous research has shown that MTurk can produce samples for social science research projects that are diverse, low cost, and equally reliable as traditional sampling methods (Buhrmester et al., 2011; W. Mason & Suri, 2012; Paolacci, 2010). Previous research has also shown that there is a high proportion of MTurk workers who are between ages 20 and 30 (W. Mason & Suri, 2012). Since the majority of college students in the U.S. graduate with their Bachelor's degree in their early 20s, this supported the use of this platform to recruit a sample for the current study.

Recruitment procedures are described in detail so that they can be evaluated and replicated (American Educational Research Association et al., 2014, Standard 1.10; Standard 3.1; Standard 3.4; Standard 4.9; Standard 7.8; Standard 9.12; Standard 9.15). The survey for this study was advertised on MTurk with a description explaining that the survey will ask participants about their education and career experiences. Participants qualified for compensation by indicating that they had received their Bachelor's degree within the last 24 months, and that they had secured career-related plans. Importantly, because of the way that these questions were worded, participants were not clued in about how to respond in order to qualify for the study. This prevented participants from providing false information about themselves simply to receive the monetary incentive. Additionally, qualifying participants had to answer the majority of the "attention-check" survey items correctly throughout the survey in order to receive the survey

incentive. Attention-check questions are survey items that directly instruct a participant on how to respond (e.g., “Select ‘strongly disagree’ for this question to qualify for your incentive”). Participants who are quickly answering questions throughout the survey without fully reading them are expected to also not read these attention check questions, and should therefore answer them incorrectly. Three of these questions were embedded throughout the survey to ensure that participants were carefully responding.

All MTurk participants were eligible and were invited simultaneously to participate in a survey to determine whether they qualified for the study. Participants were invited in batches to qualify on a first-come-first-serve basis and were paid $0.15 for attempting to qualify for the study. Preliminary batches consisted of only 50 participants at a time so that the data could be explored for any errors. Then, batches were gradually increased so that up to 1,000 participants were invited to qualify for the study. There were 4,428 MTurk workers who responded to the qualification portion of the pilot survey. Of those 4,428 workers, 159 (4%) qualified to participate in the study.

Participants who did qualify to participate were then invited to respond to the full survey and paid $2.00 for their participation. Of the 159 workers who qualified to participate in the study, 70 (44%) responded to the main survey. Further, two of these 70 participants were excluded from the study, one because they did not answer any FDF scale item questions, and one because they did not answer the majority of the attention check items on the survey correctly. This resulted in a total pilot survey sample size of 68 participants.

The survey participant demographics of the pilot survey sample are presented in Table 2. The sample had a higher proportion of participants that identified as men (60.3%) compared to women (39.7%), and the majority identified as having a racial identity of white, non-Hispanic

(46.2%). Most, but not all, participants lived in the U.S. (69.1%), spoke English as their primary language (77.9%), and were age 25 or younger (63.2%). In terms of their college experience, most participants graduated in 2019 (64.7%), but some graduated in 2020 (35.3%). A majority of participants graduated from a public, secular higher education institution (HEI) (66.2%), but at least four participants graduated from each of the HEI types listed on the survey. For most participants, the HEI from which they graduated was located in the U.S. (72.1%). In terms of participants' first destination positions, most participants attained an employment destination (76.5%). No participants were recruited that participated in volunteer work or an academic/research fellowship as their first destination after graduating. Missing data was handled through listwise deletion, which is discussed further in Chapter 4. There were only 6 cases that contained missing data, which were removed prior to analysis. Table 2 also displays the participant demographics after removing those 6 cases of missing data. The proportions of each demographic group represented in the sample remained consistent compared to before the deletion. No demographic groups became completely unrepresented after the deletion that were represented prior to the deletion.

Table 2

*Frequency Statistics for Pilot Survey Sample*

| | All Cases | | Complete Cases Only | |
|---|---|---|---|---|
| | **N** | **%** | **N** | **%** |
| **Participant Demographics** | | | | |
| Gender | | | | |
| Man/Transgender Man | 41 | 60.3% | 37 | 59.7% |
| Woman/Transgender Woman | 27 | 39.7% | 25 | 40.3% |
| Race | | | | |
| White, non-Hispanic | 29 | 42.6% | 27 | 43.5% |
| White, Hispanic | 15 | 22.1% | 14 | 22.6% |
| Black | 13 | 19.1% | 11 | 17.7% |
| Asian | 8 | 11.8% | 8 | 12.9% |
| Multi-racial | 3 | 4.4% | 2 | 3.2% |
| Living in U.S? | | | | |
| Yes | 47 | 69.1% | 43 | 69.4% |
| No | 21 | 30.9% | 19 | 30.6% |
| English is Primary Language | | | | |
| Yes | 53 | 77.9% | 49 | 79.0% |
| No | 15 | 22.1% | 13 | 21.0% |
| Age | | | | |
| 25 or younger | 43 | 63.2% | 39 | 62.9% |
| 26 or older | 25 | 36.8% | 23 | 37.1% |
| Graduation Year | | | | |
| 2019 | 44 | 64.7% | 40 | 64.5% |
| 2020 | 24 | 35.3% | 22 | 35.5% |
| **Higher Education Institution Demographics** | | | | |
| Higher Education Institution Type | | | | |
| Public, Religious | 4 | 5.9% | 2 | 3.2% |
| Public, Secular | 45 | 66.2% | 42 | 67.7% |
| Private, Religious | 5 | 7.4% | 5 | 8.1% |
| Private, Secular | 14 | 20.6% | 13 | 21.0% |
| Higher Education in U.S? | | | | |
| Yes | 49 | 72.1% | 45 | 72.6% |
| No | 19 | 27.9% | 17 | 27.4% |
| **First Destination Demographics** | | | | |
| First Destination Type | | | | |
| Employment | 52 | 76.5% | 48 | 77.4% |
| Graduate or professional school | 7 | 10.3% | 7 | 11.3% |
| Military service | 1 | 1.5% | 1 | 1.6% |
| Internship | 6 | 8.8% | 6 | 9.7% |

**Instrument.** Two separate survey instruments were used for data collection. The first was used simply to determine whether participants qualified for the study. This was a 3-question survey that asked participants whether they earned a Bachelor's degree, in what year they earned their Bachelor's degree, and whether they secured any career-related plans within 12 months of earning their Bachelor's degree. Participants who indicated that they earned a Bachelor's degree within the last two years, and that they were able to secure a career-related plan within 12 months of earning their Bachelor's degree, were then recruited to respond to the second survey.

The second survey contained the bulk of the survey items related to the research questions of this study. Principally, this included all 37 of the FDF pilot survey items that resulted from the context expert review. The FDF items were presented in 8 groups corresponding to the 8 elements of FDF. For example, all of the items related to the fit between the participants' goals and their position were displayed together. However, the order of the items within each subscale randomly varied to control for order effects. Additionally, the subscales were presented to participants in a random order to control for order effects.

The survey also included measures to provide evidence of the scale's construct validity by examining whether associations between the FDF scale and these other measures related as expected according to existing theories of P-J fit (American Educational Research Association et al., 2014, Standard 1.16; Standard 1.17; Standard 7.5). Since previous research has found that P-J fit was negatively related to turnover, turnover was also expected to be related negatively to FDF. Turnover was measured using a single item that reads "Are you still working in this position today?" with answer options of "Yes" and "No".

Another significant relationship discovered in previous research on P-J fit is the positive relationship between P-J fit and Person-Organization (P-O) fit. Likewise, a positive relationship

between FDF and a graduating senior's perceived fit with the organization offering their first destination position was expected. To measure P-O fit, a pre-existing set of three items were used (Cable & DeRue, 2002) where participants were able to respond using a 5-point Likert-type scale: Strongly agree, Agree, Neither agree nor disagree, Disagree, and Strongly disagree.

Previous research has also found that P-J fit is positively related to job satisfaction. Likewise, FDF was expected to be positively related to participants' satisfaction with their first destinations. The survey item that measured job satisfaction read "Please rate your level of agreement with the following statement: Overall, I was satisfied with this position." This item was modeled after previous P-J fit research studies that used single item survey measures of job satisfaction and found significant associations (Boon et al., 2011; Nielsen et al., 2020; Resick et al., 2007). Participants were able to respond to the item using a 5-point Likert-type scale: Strongly agree, Agree, Neither agree nor disagree, Disagree, and Strongly disagree.

Finally, demographic information was collected on participant characteristics, such as gender, race/ethnicity, age, ESL status, major(s), and whether or not participants live in the United States. Demographic information was also collected about the higher education institutions that participants attended, including whether the institution was public or private, whether the institution had a religious affiliation, and whether the institution was located in the U.S. All demographic data was collected at the end of the survey to avoid stereotype threat (Spencer et al., 2016). Participants had an unlimited amount of time to respond to both surveys (American Educational Research Association et al., 2014, Standard 4.2).

### *Cognitive Interviews*

In conjunction with the survey pilot data, additional data was collected via cognitive interviews with recent graduates. The purpose of these cognitive interviews was to collect

information on whether or not the items included in the FDF scale represented the construct of FDF fully and clearly, and whether any items were irrelevant to the construct, to inform revisions made to the scale and further contribute to the validity and fairness of the assessment (American Educational Research Association et al., 2014, Standard 1.11; Standard 3.2; Standard 4.13). Additionally, these interviews gave insight into the psychological processes that the participants underwent as they responded to the items included in the FDF scale (American Educational Research Association et al., 2014, Standard 1.12).

**Participants.** The cognitive interview pilot data collection occurred concurrently with the pilot survey data collection. Once again, recruitment procedures are described in detail so that they can be evaluated and replicated (American Educational Research Association et al., 2014, Standard 1.10; Standard 3.1; Standard 3.4; Standard 4.9; Standard 7.8; Standard 9.12; Standard 9.15). Participants for the qualitative pilot sample were recruited using convenience, snowball sampling techniques in order to purposively identify recently graduated seniors who secured career-related positions after college. This strategy was appropriate because access to the target population for the scale was limited, and snowball sampling methods can target a specific population of interest without having access to a list of potential participants prior to data collection (Naderifar et al., 2017). I used my personal social network to identify participants who recently graduated from college with their Bachelor's degree and secured a career-related plan within 12 months of graduating. Some participants were recruited directly via email. I also posted advertisements for the study via my personal social media accounts (e.g., Facebook).

Each interview occurred virtually over Zoom and lasted approximately one hour. All participants received a $20 Visa e-gift card for their participation. Afterward, participants were asked to recruit others who they knew that graduated from college with a Bachelor's degree and

secured a career-related position within 12 months of graduating. Through this process, 13 interview participants were recruited. Since the purpose of this qualitative research investigation was not to generalize, but rather was to better understand how participants are responding to the FDF scale and identify potential weaknesses, between 10 and 15 interview participants were sufficient for these purposes (Creswell, 2013).

Table 3 displays the descriptive statistics for those participants. This sample was more homogenous than the pilot survey sample. For example, all participants in the cognitive interview sample identified as white, although two participants identified as having a Hispanic ethnicity (15.4%). While three participants (23.1%) identified as having a second primary language, or a primary language that was not English, the other 11 participants (76.9%) all identified English as their primary and only language. All participants were also born and raised in the U.S., and attended HEIs in the U.S. Two trends in the cognitive interview sample were reversed from the pilot survey sample. In the cognitive interview sample, there were more participants that identified as women (61.5%) compared to men (38.5%), and there were more participants that identified being from private religious universities (61.5%) compared to public universities (38.5%). Similar to the pilot survey sample, most participants had an employment destination (76.9%). No participants were recruited that participated in volunteer work, an academic/research fellowship, or military service as their first destination after graduating.

Table 3

*Frequency Statistics for Pilot Cognitive Interview Sample*

| | | N | % |
|---|---|---|---|
| **Participant Demographics** | | | |
| Gender | | | |
| | Man/Transgender Man | 5 | 38.5% |
| | Woman/Transgender Woman | 8 | 61.5% |
| Race | | | |
| | White, non-Hispanic | 11 | 84.6% |
| | White, Hispanic | 2 | 15.4% |
| English is Primary Language | | | |
| | Yes | 10 | 76.9% |
| | More than one first language | 2 | 15.4% |
| | No | 1 | 7.7% |
| Graduation Date | | | |
| | December 2019 | 1 | 7.7% |
| | March 2020 | 1 | 7.7% |
| | May 2020 | 11 | 84.6% |
| **Higher Education Institution Demographics** | | | |
| Higher Education Institution Type | | | |
| | Public, Secular | 5 | 38.5% |
| | Private, Religious | 8 | 61.5% |
| Higher Education Location | | | |
| | Northeastern U.S. | 11 | 84.6% |
| | Midwestern U.S. | 2 | 15.4% |
| **First Destination Demographics** | | | |
| First Destination Type | | | |
| | Employment | 10 | 76.9% |
| | Graduate or professional school | 1 | 7.7% |
| | Internship | 2 | 15.4% |

**Instrument.** Cognitive interviews were conducted with the participants following a semi-structured interview protocol developed for this study (Appendix C). The goals of these interviews were to gain perspectives from those within the target population on the clarity of the FDF survey items, the clarity of the response options, and the extent to which the construct was well-represented by the set of items (Fowler et al., 1995). The interview protocol was reviewed

by three experts in assessment and qualitative educational research for its alignment with the interview's purpose, and potential problems that might arise with college-aged interviewees.

First, participants were asked introductory questions about their identities, the HEI they attended, and their first destination positions. The purpose of these questions was to evaluate the representativeness of the recruited sample to the target population (American Educational Research Association et al., 2014, Standard 1.8; Standard 4.9; Standard 7.5). Then, participants had the purpose of the study explained to them and were provided with information on the concept of FDF. After that, participants received an explanation of how the cognitive interview was going to be conducted.

Participants were presented with a Power Point slideshow of the FDF scale items. The items were grouped by element, as they were for the pilot survey. These groups of items were presented in a random order for each participant. Participants were asked to provide an answer to each item out loud and voice any other thoughts that they had as they were responding to each item, particularly if they had any difficulty responding to the item. After participants responded to all of the items in a group, they were asked probing questions about whether any of the items were difficult for them to answer, whether they viewed any of the items in the set as redundant, and whether they could think of any additional important items that should be added. This process was repeated until participants reviewed each of the eight groups of FDF pilot survey items. The purpose of the process was to collect information about the respondents' thought processes as they answered the pilot items. Combining "think-aloud" strategies where participants can freely articulate all of their thoughts with probing follow-up questions about the item sets capitalized on the strengths of both approaches. Namely, it allowed for the participants to be able to voice thoughts and concerns that are unanticipated, while also directly asking them

questions that are directly relevant to the purposes of the study (Fowler et al., 1995). The interviews then concluded with some questions regarding each participant's overall reaction to the set of survey items, and they were asked whether they believed anything should be added to the entire set of items in order for the scale to be as comprehensive as possible.

Participants were asked all of the questions on the protocol sequentially. For the first two interviews, though, participants were asked questions 3 through 7 after they responded to each item in a set of FDF items, then they were asked question 8 after they responded to all of the items in a set. Starting on the third interview, participants were asked to respond to all of the items in a set, then asked items 3 through 8 afterward, and it was found to be a more efficient strategy for asking all of the questions in the protocol while still obtaining rich, descriptive information from the participants about their thoughts on the FDF scale items. All participants were asked all of the questions on the protocol, with the exception of one participant who had technological difficulties over Zoom, and their interview was cut short by approximately 15 minutes. All interviews were recorded so that they could be reviewed and transcribed for data analysis.

### *Final Survey*

**Participants.** Data for the final analysis of the FDF scale were collected from recently graduated students from a private, Catholic, liberal arts college located in the Northeastern U.S. Once again, recruitment procedures are described in detail so that they can be evaluated and replicated (American Educational Research Association et al., 2014, Standard 1.10; Standard 3.1; Standard 3.4; Standard 4.9; Standard 7.8; Standard 9.12; Standard 9.15). The data were collected through an electronic survey created in Qualtrics similar to the quantitative pilot survey. The survey was distributed to the most recent cohort of graduates from this college, and was available

for participants to respond to for two months. Once again, participants had an unlimited amount of time to respond to the survey (American Educational Research Association et al., 2014, Standard 4.2). Each participant was entered into a lottery to win one of 158 available Visa e-gift cards. There were two $100 gift cards, six $50 gift cards, and 150 $10 gift cards available to win in the lottery.

A total of 196 recent graduates responded to the final survey. However, one participant did not provide their consent, and was eliminated from the analysis. Further, six participants either did not confirm their graduation date, or provided a graduation date that was more than 18 months in the past. These six participants were also excluded. Finally, ten additional participants reported not securing a current first destination by the time of the survey, causing them to be outside of the target population. Therefore, they were excluded as well, resulting in a total of 179 remaining participants. The demographic information for these 179 participants is reported in Table 4. The large majority of these respondents graduated in May 2020 (96.1%), which is a year prior the distribution of the survey. Most participants also had employment first destinations (68.7%), but there were participants that had other types of first destinations, such as continued education (17.3%), volunteer work (9.5%), military service (2.2%), an academic fellowship (0.6%), an internship (1.1%), and another career-related destination (0.6%). Approximately 20% of the participants in this sample did not answer the other demographic questions included in the survey. Even so, it is clear that the majority of the sample were women (57.0%), white, non-Hispanic (57.5%), and spoke English as their first and only language (67.6%).

Table 4

*Demographics for Final Survey Sample*

| | | N | % |
|---|---|---|---|
| Graduation Date | December 2019 | 3 | 1.7% |
| | May 2020 | 172 | 96.1% |
| | Other 2020 | 4 | 2.2% |
| Gender | Man (Trans- or Cis-gender) | 41 | 22.9% |
| | Woman (Trans- or Cis-gender) | 102 | 57.0% |
| | Missing | 36 | 20.1% |
| Race/Ethnicity | Asian | 10 | 5.6% |
| | Black | 6 | 3.4% |
| | White, Hispanic | 12 | 6.7% |
| | White, non-Hispanic | 103 | 57.5% |
| | Multi-Racial | 12 | 6.7% |
| | Missing | 36 | 20.1% |
| Age | 22 | 52 | 29.1% |
| | 23 | 83 | 46.4% |
| | 24 | 6 | 3.4% |
| | 25 | 1 | 0.6% |
| | Missing | 37 | 20.7% |
| ESL | English only as first language | 121 | 67.6% |
| | English and another language as first language | 5 | 2.8% |
| | English as second language | 17 | 9.5% |
| | Missing | 36 | 20.1% |
| First Destination Type | Employment | 123 | 68.7% |
| | Graduate or professional school | 31 | 17.3% |
| | Volunteer work | 17 | 9.5% |
| | Military service | 4 | 2.2% |
| | Academic fellowship | 1 | 0.6% |
| | Internship | 2 | 1.1% |
| | Other | 1 | 0.6% |

**Instrument.** The survey for the final data collection was similar in design to the pilot survey. It was electronic and distributed through Qualtrics. Students, first, were asked to confirm that they graduated recently from their college with a Bachelor's degree, and secured some type of career-related position. They were then asked descriptive questions about their career-related position, including their position title, affiliated organization, start date, field or industry, and compensation information. Next, they were presented with a revised version of the FDF scale

based on the analyses from the mixed-methods pilot study (Appendix D), followed by identical validation questions to the pilot around their P-O fit and job satisfaction. This was for the same purpose of confirming that the revised scale related to these constructs in the expected ways in order to provide evidence of the revised FDF scale's construct validity (American Educational Research Association et al., 2014, Standard 1.16; Standard 1.17; Standard 7.5). These revisions are explained in detail in Chapter 4. The turnover question from the pilot survey was replaced with a question about participants' intent to quit since all participants were expected to still hold their first destination positions at the time of the survey. Like turnover, intent to quit was expected to negatively correlate with FDF based on existing P-J fit literature. The intent to quit item read, "Are you actively seeking a new career-related position at this time (e.g., searching, applying, interviewing, etc.)?" and the answer options were "Yes" and "No".

The survey concluded by asking participants about their demographic data, including gender identity, race/ethnicity, age, ESL status, and major(s). Once again, the collection of demographic data provides a means to evaluate the extent to which the recruited sample is representative of the target population (American Educational Research Association et al., 2014, Standard 1.8; Standard 4.9; Standard 4.10; Standard 7.5).

## Data Analysis

### *Mixed-Methods Pilot Data Analysis*

The quantitative and qualitative pilot data were analyzed concurrently using a mixed-methods framework. A mixed-methods approach was beneficial in that it combined the strengths of quantitative methods (e.g., generalizability) with the strengths of qualitative research (e.g., complexity) (Miles et al., 2014). The purpose of the quantitative research was to reach a larger number of participants to test the psychometric properties of survey scale. The purpose of the

qualitative research was to examine in-depth how participants understand the survey items, respond to them, and evaluate them.

**Quantitative analysis.** The analysis of the quantitative pilot data focused on testing the psychometric properties of the FDF scale items in terms of their reliability and validity (American Educational Research Association et al., 2014, Standard 4.10; Standard 7.4). Essentially, FDF scale items from the survey that consistently displayed statistics that did not align with criteria for well-fitting items were flagged and either re-written or removed. The criteria used for well-fitting items included the following:

1. Items that had disproportionate amounts of missing data
2. Items that showed restricted range or have other atypical response distributions
3. Items with low inter-item or item-total correlations
4. Items with low correlations with validation items
5. Items with low factor loadings and communalities
6. Items, or sets of items, with low internal consistency values

To begin the descriptive analysis, the FDF scale items as well as all of the items of the validation scales were explored in terms of their missing data, frequencies, and using measures of central tendency. Likert-type items were scored such that the lowest response option was scored 1, the next subsequent response option will be scored 2, etc. (American Educational Research Association et al., 2014, Standard 4.18). Frequency statistics were calculated for all items, including frequency of non-response for each item (i.e., missing data). The graduates who did not respond to a particular item or set of items were important to identify because many of the proceeding analyses could not be conducted with missing data. Therefore, it was important to

judge the extent to which missing data were present, then devise a plan appropriate to the prevalence to address the missing data concerns.

First, the prevalence of missing data was assessed for each item. If there was a substantive amount of missing data for particular scale items, but not for others, it provided evidence that there was a problem with those scale items that contained high amounts of missing data. These items were removed or revised. It was necessary for missing data to be handled prior to subsequent analyses because those analyses assume that no data is missing. In cases where the incidence of missing data was low, a test of whether or not the data was missing completely at random (MCAR) test was conducted (Little, 1988). If the test was not significant, it signified that the data was MCAR. If the data was MCAR, and the incidence of missing data was low, listwise deletion was used and descriptive statistics were re-examined using complete cases only. If the test was significant, and it signified that the data was not MCAR, the data was assumed to be MAR and full information maximum likelihood estimation was used to handle missing data. When possible, robust standard error estimates were used because that methodology was found to be more appropriate for ordinal data, such as the data produced by the FDF scale, compared to other methods (Enders & Bandalos, 2001).

The purpose of calculating a minimum and maximum score for each item was to evaluate whether any item exhibited restricted range. For each item, at least one participant should have selected the lowest answer option and at least one participant should have selected the highest answer option. This would provide evidence that all answer options were qualitatively meaningful to respondents, and that the sample was diverse in terms of levels of FDF. The median, mean, and mode statistics provided an estimate of each item's difficulty. As more graduates highly endorsed an item, the item's expected difficulty decreased. As fewer graduates

highly endorsed an item, the item's expected difficulty increased. For this reason, median, mean, and mode statistics that had values greater than the scale midpoint for an item could be considered to be easier items since the central tendency of the group's performance was high for those items. Oppositely, items with median, mean, and mode statistics lower than the scale midpoint could be considered to be harder items since the group's performance on those items was low. While items were expected to vary in their difficulty, no item was expected to exhibit restricted range. When particular items exhibited a restricted range, it suggested that those items were worded in a way that made a certain answer option too unlikely to endorse. When this was the case, the items were removed or revised before the final data collection.

After any issues with missing data were handled, inter-item and corrected item-total correlations were calculated for the set of FDF scale items and validation items. This was in order to provide information about the internal structure and construct validity of the scale (American Educational Research Association et al., 2014, Standard 1.17; Standard 1.18; Standard 1.3). A polychoric correlation matrix was calculated because of its appropriateness for ordinal data (Holgado–Tello et al., 2010; Olsson, 1979). All inter-item correlations were expected to be positive between FDF scale items. If the inter-item correlation between any pair of items was close to or less than zero, it provided evidence that the items were not measuring a shared latent construct. It was hypothesized that the average inter-item correlation between all of the FDF scale items should be greater than 0.15 (Clark & Watson, 1995).

The purpose of calculating corrected item-total correlations for each item was to estimate each item's ability to discriminate between individuals with higher levels of FDF and individuals with lower levels of FDF (DeVellis, 2012). The item-total correlation statistic measures the association between the observed scores for individuals on an item of a scale and the total scores

on the scale for those same individuals. This statistic was corrected by removing the item under study from the calculation of the total score because, if it was not removed, it would have inflated the correlation since an item correlates perfectly with itself. The commonly accepted standard for acceptable corrected item-total correlations is a value equal to or greater than 0.5 (Netemeyer et al., 2003). Item-total correlations were calculated for each latent dimension of FDF scale items. Item correlations were also calculated between the scale items and the items of the validation scales. All FDF scale items were expected to positively correlate with all scale items in the P-O fit and job satisfaction scales. Additionally, all FDF scale items were expected to negatively correlate with the turnover item.

Next, evidence regarding the internal structure of the scale was collected through a parallel analysis, a scree test, the Kaiser rule, and an examination of the percentage of variance extracted per factor using an exploratory factor analysis (EFA) using Promax oblique rotation methods (American Educational Research Association et al., 2014, Standard 1.3; DeVellis, 2012). Once the number of factors was determined using these methods, factor loadings and communalities were calculated for each of the scale items to determine whether certain items are problematic. Items were flagged as problematic if they loaded above 0.3 on multiple factors, did not load at least 0.3 on any factor, or had communality values less than 0.5 (Hair et al., 2010).

Finally, internal consistency values were calculated using Cronbach's alpha as a measure of reliability for each factor of FDF (American Educational Research Association et al., 2014, Standard 2.2; Standard 2.3; Standard 2.5). These values should have been approximately 0.8 or higher to be considered appropriately reliable (Netemeyer et al., 2003). Alpha-if-deleted values were also calculated for each item and compared to the corresponding Cronbach's alpha value to determine if particular items were negatively affecting the overall Cronbach's alpha value for the

respective latent factor associated with each item. The alpha-if-deleted values should not have been higher than the overall alpha value of the corresponding factor.

**Qualitative analysis.** The qualitative cognitive interviews were transcribed and coded both deductively and inductively using a combination of descriptive and evaluative coding methods (Miles et al., 2014). The purpose of the deductive coding was to search the transcriptions for any references to problematic scale items. For example, codes like "unclear" or "redundant" were used when graduates mentioned that certain items were difficult for them to understand, or were too similar to other items, so that those items could be identified and revised before the final iteration of the scale.

Inductive codes were also created that could not be specified prior to the analysis. For example, suppose a participant mentioned a new dimension of FDF that was not considered when creating the pilot scale. A code was then created for that specific dimension of FDF and was tracked across participant responses. Additionally, inductive codes were created for every critique that a participant mentioned about the survey items to gain an understanding of the ways in which participants believed the survey items could be improved. Similar inductive and deductive codes were merged, or grouped into themes, as appropriate (Miles et al., 2014).

Results are reported both as frequencies of participant mentions of different codes, as well as direct quotes from participants. When choosing quotes to present, multiple factors were considered. One of these factors was the intelligibility of the quote, and another was the relevance of the quote to the finding. Another factor in choosing quotes was representation, both in terms of the participants as well as the FDF scale items. Longer quotes were often chosen over shorter quotes as they provide readers with more information, explanation, and narrative surrounding participants' thought processes as related to their responses to the FDF scale items.

Identifying information found within the quotes (e.g., such as the exact position title of participants' first destination positions, names of employing companies or organizations, participant names, etc.) was redacted. Participant names were also redacted, and participants were assigned anonymous ID numbers.

All of the deductive codes are presented in this manuscript, whether they had one mention or not. However, not all of the inductive codes are presented. Inductive codes were evaluated in terms of whether or not they were related to the research questions of this study, or to the general validity of the FDF scale. If they were not relevant to either the research questions of the study, or the validity of the FDF scale, they were not reported. For example, one set of codes that were excluded dealt with participants' ideas for additional research in the area of FDF after the FDF scale was validated. Since these codes were not directly related to the validation of the FDF scale, but were rather related to additional research questions that could be asked and evaluated using this scale, they were not presented.

***Final Data Analysis***

As with the quantitative pilot, the final analyses focused on testing the psychometric properties of the FDF scale items in terms of their reliability and validity. That said, the same analyses that were conducted in the quantitative pilot data, including missing data analysis, restricted range analysis, analysis of response distributions, inter-item and item-total correlations, and an internal consistency analysis were conducted on the revised set of FDF scale items. A confirmatory factor analysis (CFA) was conducted in place of an EFA, as well as a larger structural equation model (SEM). Post-hoc power analyses were conducted once the CFA and SEM models were finalized after the pilot data was analyzed.

**Structural equation modeling.** The construct validity of the scales was tested using SEM. In SEM, both measurement models and relationships between latent constructs are specified and tested against collected data to evaluate whether there is evidence that the hypothesized relationships between the variables in the measurement model exist in the collected data. First, a confirmatory factor analysis (CFA) model was created and evaluated in order to provide information about the internal structure of the scale (American Educational Research Association et al., 2014, Standard 1.13). The parameters that were freely estimated included: all covariances between latent variables, factor loadings between each observed variable and the latent construct that it was designed to measure, the residual variances for each observed variable that were not explained by the respective latent variables (i.e., error variances), and any expected correlated error terms. The variance of each latent variable was fixed to 1 to identify the model and create standardized factor loading estimates. All other parameters were constrained to 0.

The model was evaluated for its overall fit based on the following statistics: the goodness of fit test, the comparative-fit index (CFI), the root mean square error of approximation (RMSEA), the standardized root mean residual (SRMR), the AIC, and the sample-size adjusted BIC. The CFI, RMSEA, and SRMR were evaluated against a set of criteria (Hair et al., 2010) that take into account the number of observed variables in the model as well as the sample size of the study. Based on a sample size of under 250 participants, and a number of observed variables greater than 30, the goodness of fit test was expected to be significant, the CFI was expected to be 0.92 or higher, the RMSEA was expected to be below 0.8, and the SRMR was expected to be below 0.9. The AIC and BIC values did not have set criteria, and are presented in order to compare model fit across models.

In addition to the overall fit, the model was evaluated in terms of each item's standardized factor loadings, which should have all been equal to or above 0.7 to be considered well-fitting (Hair et al., 2010). Modification indices and standardized residuals for the models were also computed. Standardized residuals greater than 2.57 were considered statistically significant, and modification indices greater than 3.84 were considered statistically significant (Netemeyer et al., 2003). After the model was finalized, construct reliability values and average variance explained (AVE) values were calculated for each latent factor. Construct reliability values greater than 0.7 and AVE values greater than 0.5 were expected to suggest a valid and reliable model (Hair et al., 2010).

In addition, the model was also evaluated for its factorial invariance based on first destination type (employment destinations versus all others) using a multi-group CFA model with a forward-approach. In other words, nested CFA models were specified and compared using an approach where configural invariance was tested first, followed by weak measurement invariance if the configural invariance model met the well-fitting standards, followed by strong measurement invariance if the weak measurement invariance model met the well-fitting standards, then followed by strict measurement invariance if the strong measurement invariance model met the well-fitting standards (Dimitrov, 2010). The purpose of this analysis was to test whether the FDF scale has the same internal structure for graduates who secured employment plans compared to graduates who secured other types of first destination plans.

After the CFA model was evaluated alone, an SEM model was created using the three validation constructs of P-O fit, intent to quit, and job satisfaction. This model of only the validation constructs was evaluated first, prior to adding the best fitting FDF CFA model, to confirm that the validation model was well-fitting using the same criteria from the CFA model

evaluation. Then, the CFA model was incorporated into this SEM model. The purpose of this was to provide evidence that the revised FDF scale was related to constructs that theory suggests it should be related to, and in the expected directions (American Educational Research Association et al., 2014, Standard 1.17; Standard 1.18; Standard 1.19). All covariances between latent variables were freely estimated. Factor loadings between each observed variable and the latent construct that those variables were designed to measure, and the residual variances for each observed variable that were not explained by the respective latent variables (i.e., error variances), were also freely estimated. However, in the cases where there was only one observed variable to measure a latent variable, as was the case for job satisfaction and turnover, residual variances were fixed to 0 and factor loadings were constrained to 1, in order to identify the model. The variance of each FDF latent variable was fixed to 1 to identify the model and the create standardized factor loading estimates, and the variance of P-O fit was also fixed to 1. All other parameters were constrained to 0, except in cases where there were expected correlated errors between revised FDF items. The model was evaluated using the same metrics and criteria that were used to evaluate the CFA model.

**Summary**

To summarize, the study was comprised of an item development phase, from which an initial FDF scale was created; then a pilot survey data collection using the FDF scale, concurrently with qualitative interviews with a second, separate sample of participants; and concluded with a final survey data collection with a revised set of FDF scale items based on the results of the previous data collection efforts. Several analyses were conducted on the collected data to gather supplementary evidence to support the validity of the FDF scale, as well as analyses directly aimed to answer the central research questions. For example, the diversity of

the recruited samples in relation to the target population was explored using a descriptive analysis of participant demographics. Additionally, participants were directly asked using qualitative methods to express any concerns or difficulty that they had with responding to the FDF scale items, and whether any of the FDF scale items were redundant from their perspective. Also, participants' responses to the FDF scale items were examined using descriptive analyses to study trends, item difficulty, item discrimination, and missing data, all of which impacted the subsequent analyses aimed to gather evidence to answer the proposed research questions.

Table 5 presents the alignment between research questions for this study with the analysis plan. As shown, evidence for research question 1, which focuses on collecting evidence around the dimensionality of FDF, was addressed using data from the pilot survey, the cognitive interviews, and the final survey. For the surveys, the correlational and reliability analyses, the EFA on the pilot survey data, and the CFA on the final data, all provided evidence to answer this research question. Additionally, recent graduates expressed perceptions about the dimensionality of the construct of FDF in their cognitive interviews that were identified using deductive and inductive coding.

Evidence for research question 2 was collected from only the final survey data. A multi-group CFA analysis was conducted on the data comparing the internal structure of the finalized CFA model from research question 1 for graduates who secured an employment destination to graduates who secured all other types of career-related destinations. Lastly, evidence for research question 3 was collected from both the pilot survey data and the final survey data. Correlational analyses were conducted between the FDF items with validation items on the pilot and final survey data. An SEM was conducted on the final survey data that incorporated the finalized CFA model that resulted from research questions 1 and 2, and also incorporated latent constructs

measured by the validation items, in order to examine the associations between the latent construct of FDF with the validation constructs.

Table 5

*Alignment of Research Questions with Data Sources and Analytic Methods*

| Research Question | Data Source | Analysis |
|---|---|---|
| **Research Question 1:** To what extent does the development of the FDF scale contribute to the theoretical understanding of the dimensionality of the latent psychological construct of FDF? | Pilot Survey Data | Correlation Analysis |
| | Pilot Survey Data | Exploratory Factor Analysis |
| | Pilot Survey Data | Reliability Analysis |
| | Cognitive Interviews | Deductive and Inductive Coding |
| | Final Survey Data | Correlation Analysis |
| | Final Survey Data | Confirmatory Factor Analysis |
| | Final Survey Data | Reliability Analysis |
| **Research Question 2:** To what extent is the factor structure of the FDF scale invariant for graduates who secured traditional employment destinations compared to graduates who secured other types of first destinations? | Final Survey Data | Multi-Group Confirmatory Factor Analysis |
| **Research Question 3:** To what extent are scores produced by the FDF scale associated with other graduate employability outcomes for 4-year college degree recipients? | Pilot Survey Data | Correlation Analysis |
| | Final Survey Data | Correlation Analysis |
| | Final Survey Data | Structural Equation Model |

## Chapter 4: Results

Chapter 4 is organized in the following manner. First, preliminary analyses are presented for the pilot survey and final survey, focusing on an analysis of missing data and relevant

descriptive statistics. Next, analyses related directly to the research three central research questions are presented. Within each group of analyses related to each research question, first the results from the pilot survey data analyses are presented, followed by results from the cognitive interview data analyses, except in the case of research question 2 which was not addressed using data produced from those first two data collections. Then, revisions to the First Destination Fit (FDF) scale related to the results of those analyses are presented and discussed. To end each set of analyses related to each research question, the final survey data analyses are presented. To conclude the chapter, additional analyses that could be of interest to readers are presented, such as additional findings related to the reliability and validity of the FDF scale in both the pilot and final survey samples, additional inductive themes discovered in the cognitive interviews, as well as explanations of additional revisions that were made to the FDF scale between the pilot and final data collection efforts.

## Preliminary Analyses

### *Missing Data and Frequency Statistics*

For the pilot survey, there was very little missing data across the FDF scale items. Table 6 displays the frequency statistics, including missing values, for the pilot FDF scale items. There were only 8 items with any cases of missing data, and each only had one instance of missing data. These items with missing data were V3, P1, Ex5, S1, S2, S3, S4, and S5. Four items exhibited restricted range such that no respondents chose the lowest and/or second lowest answer options. These items were I1, V5, Ed3, and Ed4. Table 7 displays the frequency statistics, including missing data, for the 4 validation items. All validation items had at least one instance of missing data, except for the turnover item, and no item had more than 3 instances of missing data. Overall, 6 (8.8%) of the total cases contained missing values across these variables. A

missing completely at random (MCAR) test was conducted on the FDF scale variables and the data was found to be MCAR ($\chi^2 = 130, df = 140, p = 0.718$). Since the incidence of missing data was so small in this sample, and the data were MCAR, listwise deletion was used to delete the 6 cases containing missing data.

Frequency statistics for the FDF scale items (Table 8) and for the validation items (Table 9) were recalculated. No additional items exhibited restricted range after the deletion. Before and after case deletion, most items had bell-shaped, but negatively skewed, distributions. One item (G1) had a bimodal distribution such that the highest proportions of participants selected response options 3 and 5. Five items (I2, I3, I5, N3, and Ed2) had distributions such that a higher proportion of respondents selected response option 1 (i.e., very bad match) than the proportion of respondents that selected response option 2 (i.e., more of a bad match than a good match). This was an unexpected response pattern that created small tails at the end of the response distributions for those items. These items had this type of distribution before and after case deletion. All this to say, casewise deletion appeared to have little impact on the distributions and statistical properties of these survey items.

Table 6

*Frequency Statistics for Pilot FDF Scale Items, All Cases*

| Item Name | 1 | 2 | 3 | 4 | 5 | Missing |
|---|---|---|---|---|---|---|
| G1 | 4 | 8 | 19 | 16 | 21 | 0 |
| G2 | 5 | 10 | 17 | 21 | 15 | 0 |
| G3 | 3 | 4 | 13 | 30 | 18 | 0 |
| G4 | 3 | 9 | 12 | 26 | 18 | 0 |
| I1 | 0 | 9 | 10 | 30 | 19 | 0 |
| I2 | 7 | 5 | 18 | 21 | 17 | 0 |
| I3 | 6 | 4 | 9 | 28 | 21 | 0 |
| I4 | 4 | 7 | 13 | 27 | 17 | 0 |
| I5 | 5 | 3 | 12 | 23 | 25 | 0 |
| N1 | 1 | 9 | 12 | 29 | 17 | 0 |
| N2 | 4 | 6 | 17 | 26 | 15 | 0 |
| N3 | 5 | 4 | 22 | 24 | 13 | 0 |
| N4 | 2 | 9 | 18 | 24 | 15 | 0 |
| V1 | 2 | 4 | 12 | 33 | 17 | 0 |
| V2 | 3 | 6 | 17 | 26 | 16 | 0 |
| V3 | 2 | 2 | 19 | 27 | 17 | 1 |
| V4 | 5 | 6 | 14 | 24 | 19 | 0 |
| V5 | 0 | 6 | 11 | 28 | 23 | 0 |
| P1 | 3 | 11 | 17 | 25 | 11 | 1 |
| P2 | 4 | 8 | 18 | 23 | 15 | 0 |
| P3 | 4 | 11 | 16 | 26 | 11 | 0 |
| P4 | 6 | 9 | 18 | 24 | 11 | 0 |
| Ex1 | 3 | 10 | 17 | 27 | 11 | 0 |
| Ex2 | 2 | 7 | 19 | 25 | 15 | 0 |
| Ex3 | 1 | 7 | 20 | 25 | 15 | 0 |
| Ex4 | 2 | 7 | 15 | 33 | 11 | 0 |
| Ex5 | 3 | 3 | 14 | 28 | 19 | 1 |
| S1 | 1 | 3 | 11 | 28 | 24 | 1 |
| S2 | 2 | 2 | 16 | 21 | 26 | 1 |
| S3 | 1 | 9 | 15 | 27 | 15 | 1 |
| S4 | 1 | 8 | 13 | 27 | 18 | 1 |
| S5 | 2 | 7 | 15 | 24 | 19 | 1 |
| Ed1 | 5 | 8 | 16 | 21 | 18 | 0 |
| Ed2 | 4 | 3 | 24 | 21 | 16 | 0 |
| Ed3 | 0 | 0 | 18 | 32 | 18 | 0 |
| Ed4 | 0 | 2 | 12 | 29 | 25 | 0 |
| Ed5 | 2 | 6 | 16 | 31 | 13 | 0 |

Table 7

*Frequency Statistics for Pilot Validation Items, All Cases*

| | 1 | 2 | 3 | 4 | 5 | Missing |
|---|---|---|---|---|---|---|
| P-O Fit | | | | | | |
| PO1 | 1 | 6 | 21 | 18 | 20 | 2 |
| PO2 | 1 | 3 | 23 | 21 | 17 | 3 |
| PO3 | 1 | 6 | 18 | 20 | 21 | 2 |
| Job Satisfaction | 4 | 4 | 4 | 46 | 9 | 1 |
| | No (0) | Yes (1) | | | | |
| Turnover | 54 | 14 | | | | 0 |

Table 8

*Frequency Statistics for Pilot FDF Scale Items, Complete Cases Only*

| **Item Name** | **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|---|
| G1 | 4 | 6 | 19 | 14 | 19 |
| G2 | 5 | 8 | 17 | 18 | 14 |
| G3 | 3 | 4 | 12 | 28 | 15 |
| G4 | 3 | 9 | 11 | 22 | 17 |
| I1 | 0 | 9 | 10 | 25 | 18 |
| I2 | 7 | 5 | 17 | 18 | 15 |
| I3 | 6 | 4 | 9 | 24 | 19 |
| I4 | 4 | 7 | 12 | 24 | 15 |
| I5 | 5 | 3 | 11 | 19 | 24 |
| N1 | 1 | 8 | 11 | 26 | 16 |
| N2 | 4 | 4 | 17 | 24 | 13 |
| N3 | 5 | 4 | 19 | 22 | 12 |
| N4 | 2 | 7 | 18 | 20 | 15 |
| V1 | 2 | 3 | 12 | 30 | 15 |
| V2 | 3 | 6 | 15 | 24 | 14 |
| V3 | 2 | 2 | 18 | 25 | 15 |
| V4 | 5 | 6 | 13 | 22 | 16 |
| V5 | 0 | 6 | 11 | 25 | 20 |
| P1 | 3 | 10 | 16 | 22 | 11 |
| P2 | 4 | 8 | 16 | 19 | 15 |
| P3 | 4 | 10 | 14 | 25 | 9 |
| P4 | 6 | 7 | 18 | 20 | 11 |
| Ex1 | 3 | 10 | 15 | 25 | 9 |
| Ex2 | 2 | 7 | 19 | 22 | 12 |
| Ex3 | 1 | 7 | 18 | 23 | 13 |
| Ex4 | 2 | 7 | 14 | 30 | 9 |
| Ex5 | 3 | 3 | 14 | 26 | 16 |
| S1 | 1 | 3 | 10 | 26 | 22 |
| S2 | 2 | 2 | 14 | 19 | 25 |

*Frequency Statistics for Pilot FDF Scale Items, Complete Cases Only*

| | | | | | |
|---|---|---|---|---|---|
| S3 | 1 | 9 | 14 | 25 | 13 |
| S4 | 1 | 8 | 13 | 23 | 17 |
| S5 | 2 | 7 | 14 | 21 | 18 |
| Ed1 | 5 | 8 | 14 | 18 | 17 |
| Ed2 | 4 | 3 | 21 | 19 | 15 |
| Ed3 | 0 | 0 | 16 | 30 | 16 |
| Ed4 | 0 | 2 | 11 | 28 | 21 |
| Ed5 | 2 | 6 | 15 | 27 | 12 |

Table 9

*Frequency Statistics for Pilot Validation Items, Complete Cases Only*

| | | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| P-O Fit | | | | | | |
| | PO1 | 1 | 5 | 20 | 18 | 18 |
| | PO2 | 1 | 3 | 22 | 21 | 15 |
| | PO3 | 1 | 5 | 18 | 19 | 19 |
| Job Satisfaction | | 4 | 4 | 3 | 43 | 8 |
| | | No (0) | Yes (1) | | | |
| Turnover | | 50 | 12 | | | |

For the final survey, missing data were more substantial than in the pilot sample. Table 10 displays the frequency statistics, including missing values, for the revised FDF scale items. Each item had between 22 and 37 instances of missing values. Unlike in the pilot survey data, no revised FDF item exhibited a restricted range. Table 11 displays the frequency statistics, including missing values, for the final validation items. Missing cases for these items ranged between 12 and 36, with the intent to quit item having the lowest amount of missing data.

Across these variables, there were 8 patterns of missing data. There were 139 complete cases, leaving 40 cases that contained missing data (22%). Of those 40 cases, 12 participants did not answer any of the FDF scale items nor did they answer the validation questions. An additional 10 participants only answered the intent to quit item across all of the variables. This question was asked earlier on in the survey than all of the others. This finding could be evidence

of participant attrition. Likewise, 13 additional participants answered the intent to quit question, and all of the task fit questions, and then did not answer any of the field fit questions, nor did they answer the other validation questions. Since the intent to quit question and task field questions were asked before the field fit questions and other validation questions, this missing data pattern could also be explained by participant attrition. One participant chose not to answer any of the Person-Organization (P-O) fit items, nor the job satisfaction item, which could also be explained by attrition. The remaining four missing data patterns were unique to four respective participants, and the response patterns did not suggest that there was attrition. One participant chose not to answer item F16, and another chose not to answer item F3. One participant chose not to answer any of the field fit items, but did answer all of the other items to be used throughout the remaining analyses. Little's MCAR test was conducted on all of the variables that were planned to be used for the SEM models, and the test was significant ($\chi^2 = 233, df = 196, p = 0.036$), suggesting that the missing data was not MCAR. Because missing data was much more prevalent in the final data analysis compared to the pilot, and because the data were not MCAR, there was not enough evidence to support simply removing all cases with missing data using listwise deletion. Therefore, for subsequent analyses, Full Information Maximum Likelihood estimation was used under the assumption that the missing data, although not MCAR, was still missing at random (MAR). However, even using this method, the 12 (7%) participants that did not provide data for any variables used in the final SEM model had to be removed, resulting in a total sample size of 167 for all subsequent analyses using the final survey data.

Table 10

*Frequency Statistics for Final FDF Scale Items*

| | 1 | 2 | 3 | 4 | 5 | Missing |
|---|---|---|---|---|---|---|
| T1 | 6 | 8 | 33 | 54 | 56 | 22 |
| T2 | 2 | 6 | 20 | 59 | 70 | 22 |
| T3 | 5 | 8 | 24 | 56 | 64 | 22 |
| T4 | 4 | 5 | 34 | 77 | 37 | 22 |
| T5 | 4 | 5 | 32 | 71 | 44 | 23 |
| T6 | 4 | 18 | 39 | 59 | 36 | 23 |
| T7 | 5 | 11 | 25 | 56 | 60 | 22 |
| T8 | 8 | 24 | 35 | 54 | 36 | 22 |
| T9 | 11 | 29 | 38 | 48 | 31 | 22 |
| T10 | 6 | 21 | 37 | 55 | 38 | 22 |
| T11 | 8 | 8 | 33 | 58 | 50 | 22 |
| T12 | 4 | 2 | 24 | 58 | 68 | 23 |
| T13 | 5 | 11 | 37 | 52 | 52 | 22 |
| T14 | 6 | 13 | 32 | 58 | 48 | 22 |
| T15 | 10 | 18 | 39 | 47 | 43 | 22 |
| T16 | 15 | 24 | 37 | 38 | 43 | 22 |
| T17 | 12 | 10 | 28 | 49 | 58 | 22 |
| F1 | 6 | 7 | 16 | 50 | 64 | 36 |
| F2 | 3 | 6 | 19 | 49 | 66 | 36 |
| F3 | 3 | 12 | 18 | 39 | 70 | 37 |
| F4 | 3 | 10 | 37 | 56 | 37 | 36 |
| F5 | 2 | 10 | 43 | 53 | 35 | 36 |
| F6 | 4 | 21 | 32 | 53 | 33 | 36 |
| F7 | 4 | 4 | 21 | 44 | 70 | 36 |
| F8 | 7 | 12 | 19 | 43 | 62 | 36 |
| F9 | 7 | 10 | 30 | 36 | 60 | 36 |
| F10 | 5 | 4 | 30 | 46 | 58 | 36 |
| F11 | 5 | 5 | 21 | 40 | 72 | 36 |
| F12 | 3 | 2 | 21 | 42 | 75 | 36 |
| F13 | 3 | 4 | 22 | 46 | 68 | 36 |
| F14 | 4 | 4 | 25 | 42 | 68 | 36 |
| F15 | 4 | 13 | 26 | 35 | 65 | 36 |
| F16 | 9 | 12 | 30 | 32 | 59 | 37 |
| F17 | 8 | 11 | 24 | 35 | 65 | 36 |

Table 11

*Frequency Statistics for Final Validation Items, All Cases*

| | 1 | 2 | 3 | 4 | 5 | Missing |
|---|---|---|---|---|---|---|
| P-O Fit | | | | | | |
| PO1 | 5 | 6 | 11 | 60 | 61 | 36 |
| PO2 | 5 | 2 | 13 | 66 | 57 | 36 |
| PO3 | 6 | 3 | 11 | 62 | 61 | 36 |
| Job Satisfaction | 5 | 9 | 13 | 59 | 57 | 36 |
| | No (0) | Yes (1) | | | | |
| Intent to Quit | 110 | 57 | | | | 12 |

***Descriptive Statistics***

Descriptive statistics for the pilot FDF scale items are shown in Table 12. Mean ratings for each item varied between 3.37 (P4) and 4.10 (Ed4). Median ratings had a similar range, between 3.5 and 4. Standard errors for each item mean ranged between 0.09 and 0.16. For the validation items in the pilot data (Table 13), the means for the 5-point items ranged between 3.74 and 3.81, with standard errors between 0.12 and 0.13. The turnover item had a mean of 0.19, and a standard error of 0.05.

Table 12

*Descriptive Statistics for FDF Pilot Scale Items*

| Item Name | N Valid | Mean | Median | S.D. | S.E. | Min. | Max |
|---|---|---|---|---|---|---|---|
| G1 | 62 | 3.61 | 4.0 | 1.21 | 0.15 | 1 | 5 |
| G2 | 62 | 3.45 | 4.0 | 1.21 | 0.15 | 1 | 5 |
| G3 | 62 | 3.77 | 4.0 | 1.05 | 0.13 | 1 | 5 |
| G4 | 62 | 3.66 | 4.0 | 1.17 | 0.15 | 1 | 5 |
| I1 | 62 | 3.84 | 4.0 | 1.01 | 0.13 | 2 | 5 |
| I2 | 62 | 3.47 | 4.0 | 1.26 | 0.16 | 1 | 5 |
| I3 | 62 | 3.74 | 4.0 | 1.24 | 0.16 | 1 | 5 |
| I4 | 62 | 3.63 | 4.0 | 1.16 | 0.15 | 1 | 5 |
| I5 | 62 | 3.87 | 4.0 | 1.22 | 0.16 | 1 | 5 |
| N1 | 62 | 3.77 | 4.0 | 1.03 | 0.13 | 1 | 5 |
| N2 | 62 | 3.61 | 4.0 | 1.09 | 0.14 | 1 | 5 |
| N3 | 62 | 3.52 | 4.0 | 1.13 | 0.14 | 1 | 5 |
| N4 | 62 | 3.63 | 4.0 | 1.07 | 0.14 | 1 | 5 |
| V1 | 62 | 3.85 | 4.0 | 0.96 | 0.12 | 1 | 5 |
| V2 | 62 | 3.65 | 4.0 | 1.09 | 0.14 | 1 | 5 |
| V3 | 62 | 3.79 | 4.0 | 0.96 | 0.12 | 1 | 5 |
| V4 | 62 | 3.61 | 4.0 | 1.21 | 0.15 | 1 | 5 |
| V5 | 62 | 3.95 | 4.0 | 0.95 | 0.12 | 2 | 5 |
| P1 | 62 | 3.45 | 4.0 | 1.11 | 0.14 | 1 | 5 |
| P2 | 62 | 3.53 | 4.0 | 1.18 | 0.15 | 1 | 5 |
| P3 | 62 | 3.40 | 4.0 | 1.12 | 0.14 | 1 | 5 |
| P4 | 62 | 3.37 | 3.5 | 1.19 | 0.15 | 1 | 5 |
| Ex1 | 62 | 3.44 | 4.0 | 1.08 | 0.14 | 1 | 5 |
| Ex2 | 62 | 3.56 | 4.0 | 1.03 | 0.13 | 1 | 5 |
| Ex3 | 62 | 3.65 | 4.0 | 0.99 | 0.13 | 1 | 5 |
| Ex4 | 62 | 3.60 | 4.0 | 0.98 | 0.12 | 1 | 5 |
| Ex5 | 62 | 3.79 | 4.0 | 1.04 | 0.13 | 1 | 5 |
| S1 | 62 | 4.05 | 4.0 | 0.93 | 0.12 | 1 | 5 |
| S2 | 62 | 4.02 | 4.0 | 1.03 | 0.13 | 1 | 5 |
| S3 | 62 | 3.65 | 4.0 | 1.03 | 0.13 | 1 | 5 |
| S4 | 62 | 3.76 | 4.0 | 1.05 | 0.13 | 1 | 5 |
| S5 | 62 | 3.74 | 4.0 | 1.10 | 0.14 | 1 | 5 |
| Ed1 | 62 | 3.55 | 4.0 | 1.25 | 0.16 | 1 | 5 |
| Ed2 | 62 | 3.61 | 4.0 | 1.11 | 0.14 | 1 | 5 |
| Ed3 | 62 | 4.00 | 4.0 | 0.72 | 0.09 | 3 | 5 |
| Ed4 | 62 | 4.10 | 4.0 | 0.80 | 0.10 | 2 | 5 |
| Ed5 | 62 | 3.66 | 4.0 | 1.01 | 0.13 | 1 | 5 |

Table 13

*Descriptive Statistics for Pilot Validation Items*

| Item Name | N Valid | Mean | Median | S.D. | S.E. | Min. | Max |
|---|---|---|---|---|---|---|---|
| PO1 | 62 | 3.76 | 4 | 1.02 | 0.13 | 1 | 5 |
| PO2 | 62 | 3.74 | 4 | 0.94 | 0.12 | 1 | 5 |
| PO3 | 62 | 3.81 | 4 | 1.02 | 0.13 | 1 | 5 |
| JS | 62 | 3.76 | 4 | 0.99 | 0.13 | 1 | 5 |
| Turnover | 62 | 0.19 | 0 | 0.40 | 0.05 | 0 | 1 |

For the final FDF scale items, descriptive statistics are displayed in Table 14. Mean ratings for the task items varied between 3.37 (T9) and 4.20 (T2). The mean ratings for the field items varied between 3.63 (F6) and 4.27 (F12). Standard errors were also smaller for the final FDF items compared to the pilot FDF scale items, ranging between 0.07 and 0.10 for the final data. Descriptive statistics for the validation items (Table 15) were slightly higher compared to the pilot. The 5-point scale item means ranged between 4.04 and 4.17, and standard errors ranged between 0.15 and 0.16. The intent to quit item had a mean of 0.34, and a standard error of 0.04.

Table 14

*Descriptive Statistics for Final FDF Scale Items*

| Item Name | N Valid | Mean | S.D. | S.E. | Min. | Max |
|---|---|---|---|---|---|---|
| T1 | 167 | 3.92 | 1.05 | 0.08 | 1 | 5 |
| T2 | 167 | 4.20 | 0.89 | 0.07 | 1 | 5 |
| T3 | 167 | 4.05 | 1.02 | 0.08 | 1 | 5 |
| T4 | 167 | 3.88 | 0.89 | 0.07 | 1 | 5 |
| T5 | 167 | 3.92 | 0.93 | 0.07 | 1 | 5 |
| T6 | 167 | 3.66 | 1.04 | 0.08 | 1 | 5 |
| T7 | 167 | 3.98 | 1.05 | 0.08 | 1 | 5 |
| T8 | 167 | 3.54 | 1.15 | 0.09 | 1 | 5 |
| T9 | 167 | 3.37 | 1.19 | 0.10 | 1 | 5 |
| T10 | 167 | 3.62 | 1.10 | 0.09 | 1 | 5 |
| T11 | 167 | 3.85 | 1.08 | 0.09 | 1 | 5 |
| T12 | 167 | 4.17 | 0.92 | 0.07 | 1 | 5 |
| T13 | 167 | 3.85 | 1.06 | 0.08 | 1 | 5 |
| T14 | 167 | 3.82 | 1.07 | 0.09 | 1 | 5 |
| T15 | 167 | 3.60 | 1.18 | 0.09 | 1 | 5 |
| T16 | 167 | 3.43 | 1.30 | 0.10 | 1 | 5 |
| T17 | 167 | 3.82 | 1.21 | 0.10 | 1 | 5 |
| F1 | 167 | 4.09 | 1.06 | 0.09 | 1 | 5 |
| F2 | 167 | 4.15 | 0.95 | 0.08 | 1 | 5 |
| F3 | 167 | 4.11 | 1.06 | 0.09 | 1 | 5 |
| F4 | 167 | 3.79 | 0.97 | 0.08 | 1 | 5 |
| F5 | 167 | 3.75 | 0.94 | 0.08 | 1 | 5 |
| F6 | 167 | 3.63 | 1.07 | 0.09 | 1 | 5 |
| F7 | 167 | 4.18 | 0.97 | 0.08 | 1 | 5 |
| F8 | 167 | 3.96 | 1.16 | 0.09 | 1 | 5 |
| F9 | 167 | 3.91 | 1.16 | 0.09 | 1 | 5 |
| F10 | 167 | 4.00 | 1.02 | 0.08 | 1 | 5 |
| F11 | 167 | 4.16 | 1.03 | 0.08 | 1 | 5 |
| F12 | 167 | 4.27 | 0.91 | 0.08 | 1 | 5 |
| F13 | 167 | 4.17 | 0.94 | 0.08 | 1 | 5 |
| F14 | 167 | 4.14 | 1.00 | 0.08 | 1 | 5 |
| F15 | 167 | 3.98 | 1.12 | 0.09 | 1 | 5 |
| F16 | 167 | 3.83 | 1.22 | 0.10 | 1 | 5 |
| F17 | 167 | 3.94 | 1.19 | 0.10 | 1 | 5 |

Table 15

*Descriptive Statistics for Final Validation Items*

| Item Name | N Valid | Mean | S.D. | S.E. | Min. | Max |
|---|---|---|---|---|---|---|
| PO1 | 167 | 4.14 | 0.98 | 0.16 | 1 | 5 |
| PO2 | 167 | 4.16 | 0.90 | 0.15 | 1 | 5 |
| PO3 | 167 | 4.17 | 0.96 | 0.16 | 1 | 5 |
| JS | 167 | 4.04 | 1.03 | 0.15 | 1 | 5 |
| IQ | 167 | 0.34 | 0.47 | 0.04 | 0 | 1 |

**Research Question 1: Dimensionality**

***Pilot Survey Data***

Inter-item polychoric correlations were calculated between all FDF pilot scale items (Appendix E). The majority (82.7%) of these correlations were greater or equal to 0.4. Items Ed3 and Ed4 had the highest number of inter-item correlations that were below 0.4, which was expected because restricted range attenuates correlations. The average inter-item correlations between groups of items designed to capture the same element of FDF ranged from 0.49 to 0.78 (Table 16). However, inter-item correlations of items across element groups were also high. For example, the FDF items designed to measure the fit between participants' goals and their first destination position had an average inter-item correlation of 0.61. However, those goal items also had the same average inter-item correlation with the interests items, the values items, and the preferences items. The average inter-item correlation across all FDF items was 0.53. Given these findings, the dimensionality of FDF was unclear from the correlations alone.

Table 16

*Average Inter-item Correlations between FDF Pilot Items, by FDF Element Group*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| 1. Goals | 0.61 | | | | | | | |
| 2. Interests | 0.61 | 0.72 | | | | | | |
| 3. Needs | 0.51 | 0.50 | 0.72 | | | | | |
| 4. Values | 0.60 | 0.59 | 0.51 | 0.66 | | | | |
| 5. Preferences | 0.61 | 0.61 | 0.70 | 0.57 | 0.78 | | | |
| 6. Experiences | 0.45 | 0.39 | 0.51 | 0.48 | 0.51 | 0.62 | | |
| 7. Skills | 0.60 | 0.59 | 0.58 | 0.60 | 0.62 | 0.49 | 0.63 | |
| 8. Education | 0.42 | 0.42 | 0.47 | 0.46 | 0.47 | 0.46 | 0.41 | 0.49 |

The results of a parallel analysis suggested that the FDF scale items measured up to 2 factors. However, a scree plot suggested that there was only one factor measured by the FDF items. The Kaiser rule suggested that there were up to 8 factors as the first 8 eigenvalues were greater than 1. However, only the first two eigenvalues were greater than 2, and the first eigenvalue was 7.9 times as large as the second, whereas the second was only 1.4 times as large as the third. Additionally, the proportion of the total variance explained by each of the first two factors was 25% and 22%, respectively, whereas the third factor explained only 17% of the total variance. Extracting a 3-factor solution using all of the FDF items explained 64% of the total variance among the items, whereas extracting a 2-factor solution explained 60% of the total variance, and a 1-factor solution explained 54% of the total variance.

The parallel analysis was then repeated, removing items Ed3 and Ed4 due to their atypical descriptive and correlational statistics relative to the other FDF pilot items. The results were largely consistent. A parallel analysis suggested that 2 factors should be extracted. The scree plot suggested that there was only one factor. The Kaiser rule suggested that there could be up to 6 factors. However, once again, only the first two eigenvalues were greater than 2, and the first eigenvalue was 7.9 times as large as the second, whereas the second was only 1.5 times as

large as the third. The variance explained by the first three factors was 26%, 23%, and 18%, respectively. The total variance among the FDF items explained by the 3-factor solution was 67%, whereas the 2-factor solution explained 62% of the total variance, and the 1-factor solution explained 56% of the total variance.

The parallel analysis was repeated a third time, this time removing all items that exhibited restricted range (I1, V5, Ed3, and Ed4). The parallel analysis suggested, once again, that 2 factors should be extracted. The scree test suggested that there was only one factor. The Kaiser rule suggested that there could be up to 5 factors. However, only the first two eigenvalues were greater than 2, and the first eigenvalue was 8.0 times as large as the second, whereas the second was only 1.6 times as large as the third. The variance explained by each of the three factors was 25%, 23%, and 19%, respectively. The total variance among FDF items explained by the 3-factor solution was 67%, whereas the 2-factor solution explained 63% of the total variance, and the 1-factor solution explained 56% of the total variance.

Factor loadings are presented in Table 17 for the one-factor and two-factor models, excluding items I1, V5, Ed3, and Ed4, and using Promax rotation methods for the two-factor solution. For the 1-factor solution, all items loaded above 0.581. Only two items loaded below 0.6 (Ex1 and Ex3). In the 2-factor solution, after factor rotation, 20 of the 33 items (61%) showed double-factor loadings greater than |0.2|. Additionally, 7 items (21%) did not have loadings of 0.5 or higher on either of the 2 extracted factors. For these reasons, certain items did not clearly load on one of the two factors (i.e., G3, N3, P1, S1, S2, V2, and V3). Further, qualitatively, there was no interpretable pattern that could be used to explain why the remaining items did clearly load on each of the two factors. The items were not divided in the N-S and D-A dimensions found in previous research, and were not divided by FDF element, either.

Additionally, there were no patterns found in the sentence structure or grammar of the items that loaded clearly on each of the two factors. Overall, these results provided evidence that the pilot scale was only detecting one, global latent dimension of FDF.

Table 17

*Pattern Matrix Factor Loadings for Two-factor and One-factor FDF Pilot Scale Models*

| Two-Factor Model | | | One-Factor Model | |
|---|---|---|---|---|
| Items | Factor 1 | Factor 2 | Items | Factor 1 |
| I2 | 1.008 | | P1 | 0.894 |
| G1 | 0.979 | | P4 | 0.835 |
| G2 | 0.979 | -0.201 | N3 | 0.825 |
| Ed1 | 0.927 | | N2 | 0.820 |
| I4 | 0.916 | | V2 | 0.818 |
| I3 | 0.846 | | I3 | 0.809 |
| Ex4 | 0.839 | | P3 | 0.808 |
| I5 | 0.810 | | S5 | 0.807 |
| V4 | 0.768 | | V1 | 0.806 |
| P2 | 0.743 | | V4 | 0.782 |
| Ed2 | 0.737 | | P2 | 0.781 |
| Ex2 | 0.727 | | G3 | 0.780 |
| N1 | 0.683 | | I2 | 0.778 |
| S3 | 0.610 | 0.205 | N4 | 0.775 |
| S5 | 0.610 | 0.248 | Ex4 | 0.773 |
| G4 | 0.592 | | G1 | 0.771 |
| P3 | 0.580 | 0.273 | Ed1 | 0.771 |
| S4 | 0.503 | 0.287 | S2 | 0.769 |
| P1 | 0.491 | 0.462 | S3 | 0.767 |
| S1 | 0.459 | 0.320 | Ed5 | 0.750 |
| N3 | 0.452 | 0.428 | S4 | 0.744 |
| V3 | 0.441 | 0.297 | S1 | 0.731 |
| S2 | 0.420 | 0.401 | G2 | 0.730 |
| Ex1 | -0.338 | 0.978 | G4 | 0.707 |
| Ex5 | -0.259 | 0.967 | I4 | 0.697 |
| Ex3 | -0.214 | 0.856 | Ex2 | 0.696 |
| N2 | 0.225 | 0.649 | V3 | 0.693 |
| V1 | 0.250 | 0.616 | I5 | 0.667 |
| P4 | 0.300 | 0.589 | N1 | 0.649 |
| N4 | 0.249 | 0.572 | Ed2 | 0.645 |
| Ed5 | 0.241 | 0.572 | Ex5 | 0.644 |
| V2 | 0.392 | 0.478 | Ex3 | 0.588 |
| G3 | 0.410 | 0.427 | Ex1 | 0.581 |

*Note*. Factor loadings below |0.200| are suppressed

### *Cognitive Interviews*

During the cognitive interviews, participants mentioned multiple aspects of their fit in response to the FDF scale items. Some aspects were indicative of construct irrelevant variance. One such aspect was P-O fit. P-O fit was mentioned 45 times across 21 of the 37 items. For example, in response to item Ex3, Participant 5 mostly described their fit with their employer rather than their fit with their specific career-related position that their employer was providing:

> Your personal history. I would say it's more of a good match than a bad match. I always told myself that I—I thought that when I was in college that I wanted to work for a non-profit, because I really wanted to work for a company like whose mission I believed in, and a company that I can really stand behind like what they do and who they are. And while [Name of Employing Company] isn't a non-profit, I can very much stand behind who they are as a brand and advocate for what they do. I told this to everybody how much I love working there, and how much they care about their employees, I think it's really like spectacular. So I think that goes well with my personal history.

Participant 10 also discussed their fit with their company when responding to item V3 rather than talking about the specifics of their position within that company:

> Your personal beliefs. Definitely a very good match. Again, I find that question kind of similar to values, so—but yeah, I guess as far as like my personal beliefs around equity and accessible resources, they also align with the company's message around equity.

The FDF items designed to represent the theoretical FDF element of needs were particularly laden with construct irrelevant variance. For example, participants mentioned pay or other logistical elements of their job 20 times across the needs items, as well as other construct-

irrelevant factors such as P-O fit and P-E fit. For example, Participant 4 said this in response to item N1:

> Number one, your basic needs for a position after college, a very good match. My basic needs are I need to have a commute that is not crazy, and I have a 35-minute commute and that's totally fine for me. I need to have a schedule that allows me to have a good life-work balance. And I get three days off, and that's really awesome. The pay is what I was looking for, so again, that's a basic need and yeah, so a very good match on all fronts. Like, talking basic fundamental needs.

Similarly, Participant 82 responded to item N2 saying:

> The criteria you had—the criteria I had for a position after college. The criteria I had? I didn't have very specific criteria to being with, it was within my desired salary range, [unintelligible], it was within an ideal location. It honesty was not, like going back to my experience of selecting the position I came about to, it was not the position at the facility that I originally expected. I had been interning at the neighboring hospital leading up to this, so that was very unexpected and initially undesired, but I would say in retrospect yes, it certainly satisfied my criteria.

Illustrating how participants also incorporated elements of P-O and P-E fit in their responses to the needs items, Participant 35 said this in response to item N3:

> And then the standards that I set for a position. I guess like company standards, my position has been a very good match with the standards that I set for a position after college. You know the company itself has you know been so welcoming and friendly to me and I would say like the company's standards are set you know very high, so it's definitely been like a very good match and surprising how they treat you know everyone

> on the ladder from interns to higher-ups, so it's been definitely like a pretty good match in that sense.

While both P-O fit and P-E fit, as well as elements of payment and other work logistics, are conceptualized as separate constructs from P-J fit rather than another dimension of P-J fit, other aspects of fit arose in participants' responses that could be conceptualized as dimensions of P-J fit. Importantly, these dimensions were not the N-S and D-A dimensions that were discussed in previous research. Instead, one of these dimensions dealt with the specific tasks that participants were performing in their positions. Across interviews, the fit between the participant and the tasks related to their position was mentioned 183 times, and all 13 participants mentioned the tasks related to their positions at least once. For example, Participant 1, in response to item S3, discussed how the communication and relationship-building tasks required for their position were a good match with their natural abilities:

> Your natural or innate abilities. I'd say more of a good match than a bad match. I don't know how to put this—I'm not trying to brag and I don't really like talking about myself like this, but I think I'm naturally good at talking with other people. And that it's easy for me to connect with other people, as well as be in a position of service in that I'm willing to give myself up for another person, whether it's in a professional sense or a friendship sense or relationship sense, so I think all of those innate or natural abilities kind of came out for the better in this specific position.

Similarly, Participant 81, in response to item Ed5, described how their education around using the software program R helped them with work tasks related to learning and using another software language, SQL:

> And one of your majors, minors, or concentrations. I would say, honestly, probably my statistics minor has helped me the most so far, because I did a lot of work with R in like my statistics classes and R and SQL are different, but there's some similarities and kind of learning about data frames and how they kind of interact with one another has helped me a good amount. Yeah, so that's what I'd say for those.

Participant 5, in response to item I3, described how the tasks associated with their position were somewhat not aligned with their passions:

> The type of work you are passionate about. I would say that's sort of a good match, sort of a bad match. I'm not very passionate about like the technical aspects of my job, and I think part of that is because I don't know what I'm doing very well in that sense of my job, so I think you know that that will come with time, and being—having a better understanding of what I'm doing, especially when I'm like running queries and being able to do that in a way that isn't stressful I think will lend me to feeling more passionate about that aspect of my job and you know less stressed about it.

Participants 7 and 9, in response to items Ex2 and Ex1, respectively, described how the tasks associated with their position somewhat aligned with the tasks that they performed in previous work-related experiences. Participant 9 said:

> To what extent was your postgraduate position—so for this one I'm thinking, more of a good match then a bad match because, while I've said I've been—I've had internships that I've been exposed to patient care, I've never done like insurance verification and then kind of like the nitty gritty like faxing them and waiting for authorizations. So more of a good match than a bad match.

Participant 7 said:

> The type of work that you feel experienced doing. Well, I'd say more of a good match than a bad match. The internship is definitely things that I've done before, because I did it—I did most of it in my internships, because it is a lot of social media stuff, so I have worked with Instagram, Facebook, Pinterest, Google before, so I do feel experienced using those platforms. But there are some things with—especially with making ads specifically that I hadn't done before, so it's still, you know, a couple things that I don't know.

The second aspect of fit that was highly mentioned across participants' responses dealt with the general field in which participants' positions were situated, and how well-aligned they were with that field. This was mentioned 167 times across participants' responses, and each of the 13 participants mentioned their fit with their field at least once. For example, participant 1 described, in response to item G1, that the field they were working within for their first destination was a very bad match with the field they had a goal of working within:

> For the first one, your long-term career-related goals, I would probably say a very bad match. You know, I don't really plan on working in the restaurant industry, or becoming a manager of a restaurant, or owning a restaurant, so I don't think a server role really directly correlates to a position that I'm kind of looking at, which is more of kind of like—well, I haven't decided I have a couple paths that I might pursue later on in my life, but they don't really match up with those long-term—or server at a restaurant doesn't really match up with any of them really. Probably the only thing that's close to it is maybe me pursing like being the head of a service organization, but even then, a restaurant is different than service.

Conversely, Participant 35 responded to item G2 by describing how the field of their first destination position was a good match with the field that they had a new goal of working within:

> Your long-term future goals in general. Yeah sort of a good—yeah, I would say—yeah, I mean honestly I don't have—I would say more of a good match than a bad match for like my postgraduate position, more of a good match than a bad match for my long-term future goals in general. I didn't think that I would like PR, and you know journalism and news coverage and all of this, but I do really like it now so I didn't expect my career path to kind of take this direction, but I am definitely open to the opportunities that come after maybe this internship because my mind wasn't open to it before.

Participant 10 responded to item Ed5 and described how their previous education was somewhat of a good match with the field of their first destination position:

> And the last one, one or more of your majors, minors, or concentrations. A very good match actually. There is a larger conversation—well, firstly, I would say I focused on my major's in psychology my focus was in social psychology and race equity, so in that way, it's a really really good match. The minor that I took in women, gender studies, and sexuality also gives me the ability to be a part of larger conversations like because of the intersections of identity when we talk about race equity, so they are connected, so yeah I think both my major and my minor, it is a very good match.

Participant 7, in response to item V4, discussed how the field associated with their first destination position was not a good match with what they found meaningful and fulfilling:

> …in general, I would say you know meaningful and fulfilling would be something that I you know want to do every hour of every day, and it makes me feel like a better person because I do it. And I would say that marketing I don't really feel like a better person that

> I'm doing it, I don't feel like I'm changing the world in any way. So I really wouldn't find it that meaningful.

Participant 73 mentioned how the field associated with their first destination was not well-aligned, which is why they reported that it was a very bad match in response to item P3:

> To what extent was your postgraduate position a match with your top choice of a position after college? Yeah I would say that also was a very bad match because—yeah I want to say it's a very bad match because my top choice would have been working at a health clinic or something more definitively like close to my major. Like yeah it was communications but—and it was a little college-related but it wasn't actually like in the healthcare field, which is what my top choice would be.

As illustrated in the quotes thus far, participants at times exclusively discussed either their fit of their position's tasks with their first destination position, or their fit with the field of their position in response to an FDF item. However, there were also several instances where for a single FDF item, participants discussed both their fit with their position's field, and their fit with the tasks they were performing for their position. For example, Participant 6, in response to Item I2, described how both the tasks that they performed in their position as well as the field that they were working in were both very well-aligned with what excited them:

> So then to what extent is your postgraduation a match with the type of work that excites you. I'd say a very good match again. I mean I'm very excited every day to go to work, even the days where I know I'm gonna be in a classroom with that one kid that gives me a hard time, I try to cheer myself—because I always think, you know what, I'm gonna start with that kid, I'm gonna start by saying, "hey, how are you, what's going on? Anything you want to share?" And then I feel like just changing that one thing that could

> make me nervous about that day can put me right back in that excitement that I have for the field I'm in because I—I've always wanted to work in elementary schools, I've seen other people do it. I've picked up like family members who I've just seen how they teach and I'm just like one day I'll be them. So it's nice having my badge, having a role in it, calling the shots in something. It's definitely a very exciting job.

Similarly, Participant 82, in response to Item I3, discussed how both the field of their position and the tasks associated with their position were well-aligned:

> The type of work that you are passionate about. I would say it was more of a good match than a bad match. What I had learned by the time I had graduated about the type of work that I was passionate about was something that was medically related, could challenge and develop my understanding, and required a degree of acuity of mindset and what 's the other word I'm looking for, oh fast-paced, something that requires you to be on my feet and moving about. So to that extent, I would say it was more of a good match than a bad match. As to whether or not it was a very good match, it may have been, but perhaps I don't have the broadest perspective to be able to effectively answer that.

However, some participants only described either alignment with either the tasks, or the field, of their first destination position. For example, in response to Item N2, Participant 73 explained how their position was a good fit with the tasks they were performing, but a bad fit because it did not align with the field that they were interested in:

> Ok. To what extent was your postgraduate position a match with the criteria that you had for a position after college? I would say sort of a good match, and sort of a bad match. It was good because it allowed me interpersonal communication with a broad spectrum of people in a broad spectrum of platforms and it allowed me to feel fulfilled when I went to

> bed every night I guess like I enjoyed my job. I would say it was a bad match because it wasn't health focused, it didn't feel challenging to me I guess.

Conversely, Participant 4, in response to item I2, discussed how the tasks of their first destination position were not as well-aligned with what is exciting to them, but the field of their position was well-aligned with what excites them:

> The type of work that excites you. I would say sort of a good match and sort of a bad match. So, with my position, there are, like I said, a bunch of different assays that we run, and some of them are—well a majority of them are very repetitive, I mean it's the same thing over and over and over again. You have strict guidelines, and you follow those guidelines, you follow the standard operating procedure, and you just keep churning out results. So I wouldn't necessarily say it fully excites me, but there are other portions of it that are a little bit more focused on the microbiology of it. Like we have a lab where they identify any microbes that we may recover, and that's very exciting to me. I haven't trained in that yet, but would like to. So, some yes, and some no.

When participants were describing their fit with both the field and their fit with the tasks related to their first destination position, different combinations of results arose. Some participants felt that they fit well with both the tasks and the field of their positions, while others felt that they fit well with either the tasks of their position or the field of their position, and not both. This provides evidence that task fit and field fit are two different, but important, dimensions of FDF that should be considered to validly reflect the construct.

Two of the items in the pilot study did mention task-fit and field-fit specifically: item I4 and item I5. Participants' responses to item I4 were more targeted on the tasks related to their position compared to other items that did not explicitly ask about the tasks that they performed,

and participants' responses to item I5 were much more targeted on the field that their position was situated in. For example, Participant 35 focused only on the positive fit of the tasks of their position in response to the item:

> My postgraduate position is definitely a very good match with the types of work-related tasks that I enjoy doing. I you know I get to—I love my position because I have different tasks every single day. I have like the administrative side, I have the research side, and I also have you know the PR work in there, too. So kind of addressing creative outlets and I kind of love being on the administrative side like the interview scheduling I very much look froward to and like even just like the emails and everything I feel so professional so it's definitely a very good match for the types of work-related tasks that I enjoy doing.

Similarly, Participant 41 also reported positive alignment with their work-related tasks in response to item I4, and only focused on that type of alignment in response to the item:

> The types of work-related tasks that you enjoy doing. I would say for this one a very good match because I do want to—I knew I always wanted to use my writing skills, I'm more of like a words person than a numbers person, but it still could maybe have some aspects of business or I always also wanted to learn new things on the job, so I think this is like a perfect career where I could learn new things based on what kinds of clients I have.

Participant 1 did not report as good of an alignment with their work-related tasks in response to item I4, but still only focused on that type of alignment in their response:

> Match with the types of work-related tasks that you enjoy doing. This is like a mixed-bag. I don't know. I guess I'll say for this one more of a good match than a bad match just because I had a lot of fun like working at the restaurant. It's not like—it's tough for

> me to say, because it's not like the work-related tasks that I imagined myself doing, nor like what I enjoy doing maybe on a professional-level of like career-path, but like in terms of doing like work-related asks in general, I love trying new dishes or serving food to people, or you know, helping them have a better experience, you know? That was fun to me.

Participant 5 had similar feelings of a mediocre alignment with their work-related tasks:

> The type of work-related tasks that you enjoy doing. I would say in the middle there too, sort of a good match, and sort of a bad match. I enjoy like the problem-solving and like the attention to detail aspects of my role, but I'm still getting there on the technical role, I don't quite enjoy it yet because I don't fully understand it yet. We're getting there.

In the same way that participants' responses were more targeted toward task-fit in response to item I4, participants' responses were more targeted toward field-fit in response to item I5. Participant 6 reported a very good match with the field of their position:

> And then to what extent was your post-graduate position a match with the field or industries in which you are interested in working. I'd say a very good match again. I am interested in working with children, teaching mostly, but also with considering special ed, I like my behavior therapist job because it gives me that chance to see what it's like to be with children with special needs, and when I do go back for my Master's, I'm either gonna have to pick between working with special needs and just getting a Master's in special education, or getting a standard elementary education Master's.

Conversely, Participant 73 reported a very bad match with the field of their position by saying, "… it's a very bad match because I'm interested in working in the healthcare field, and it was not the healthcare field." Most participants reported that the alignment of the field of their position

was somewhere in between a very good match and a very bad match. For example, Participant 4 said this:

> The fields or industries in which you are interested in working. I'm gonna say sort of a good match and sort of a bad match. I had to—I feel like I'm still reconciling the fact that I work for big pharma, which obviously has a lot of negative connotations with it—that come with it, so the reason I'd say it's a good match is because I know that the medication that we're making really does help a lot of people with some really gnarly illnesses, so I would say that's really nice. I wouldn't necessarily say that I'm super passionate about, you know, medicine and the medical field and all of that stuff. I am a little bit, but not super. But I like that it's at least going towards a good cause and somebody is benefitting from this. On the flip side of that, of course, you know there are obviously the negative things that come with working for a huge pharmaceutical company and working in this industry. There's obviously you know—there can be corruption of course at the—at very high levels, so that's something that I would say is probably less of—is probably more of a bad match for me. Kind of doesn't fully align with my morals. But, I am interested in science, and this is a scientific field at the end of the day. That is the big umbrella that it is under. So, yeah. Sort of good, sort of bad.

Similarly, Participant 7 said the following about the field of their position in response to item I5:

> The fields or industries in which you are interested in working. Probably sort of a good match and sort of a bad match, like I've said, it's start-ups, which is interesting, but the fitness industry is not necessarily something that I wanted to go into. So you know exercise and fitness and wellness isn't what I thought I wanted to be doing, it's not

> necessarily a huge interest, but you know I do like the start-up and entrepreneurial aspect of it.

Lastly, Participant 35 described how they were surprised about how well the fit of the field of their position was because it was not what they expected:

> …my postgraduate position is more of a good match than a bad match with the field or industries that I'm interested in working in. Yeah. As I've said, you know I was expecting to go into political science or some type of international maybe even French industry, so it's been surprisingly good to be in a different kind of industry with PR. So, yeah, more of a good match than a bad match.

***Pilot Scale Revisions***

The analysis of the pilot survey data suggested that the pilot FDF scale was only assessing a single dimension of FDF. However, the analysis of the cognitive interviews made by the interviewees suggested that there were actually two important dimensions of FDF that were being conflated in the pilot survey scale: a task-fit dimension and a field-fit dimension. Participants provided clearer, more targeted responses to items I4 and I5, which were the only items that mentioned task-fit and field-fit specifically, compared to their responses to the other items in the set where they at times mentioned task-fit, field fit, and other related constructs (e.g., P-O fit). Therefore, to revise the pilot scale, two FDF subscales were created that clearly and explicitly mentioned task-fit and field-fit to focus participants on each dimension separately and uniquely as they responded. One subscale had the following item stem:

> For this section of the survey, please **only focus on the <u>work-related tasks</u> that are associated with your position**. These are the tasks that you carry out in order to accomplish the work that is associated with your position. Examples of these tasks are:

> attending meetings, coding or programming, making deliveries, organizing, presenting, researching, studying, teaching, training, writing, etc. To what extent are the **work-related tasks** associated with your position a match with the types of tasks that...

The second version of the subscale had the following item stem:

> For this section of the survey, please **only focus on the general <u>field or industry</u> that is associated with your position**. Examples of fields or industries include: Healthcare, Marketing, Education, Law, Business, etc. Note: If you are a **graduate or professional student or academic fellow**, think about the academic discipline or field associated with your studies and/or research when answering these questions. To what extent is the **field or industry** associated with your position a match with the fields/industries that...

These two versions of the FDF scale were designed to be parallel to one another since there was no pattern from the cognitive interviews that certain elements of fit only applied to task-fit whereas other elements of fit only applied to field-fit. Table 18 displays the alignment of each FDF element with the pilot scale and the revised scale. Both subscales still contained items that represented 7 out of the 8 conceptual elements of FDF. The only element that was not represented in the final subscales compared to the pilot scale was the needs element. This decision was made because of the high amount of construct irrelevant responses that were found within participants' explanations of their responses to those items during the cognitive interviews.

Table 18

*Alignment Between Pilot Scale Items, FDF Elements, and Final Scale Items*

| | | Final FDF Scale Items | |
|---|---|---|---|
| **Pilot FDF Scale Items** | **FDF Element** | **Task-Fit** | **Field-Fit** |
| Ed1: What you've studied during college | Education | T1: You want to learn more about | F1: You want to learn more about |
| Ed2: What you've learned prior to college | | T4: You know how to do | F4: You know about |
| Ed3: What you've learned outside of the classroom | | | |
| Ed4: What you've learned on your own | | | |
| Ed5: One or more of your majors, minors, or concentrations | | | |
| S1: The skills you have acquired | Skills | T2: Will improve skills that are important to you | F2: Will improve skills that are important to you |
| S2: The skills that you hope to improve | | T5: You feel skilled in | F5: You feel skilled working within |
| S3: Your natural or innate abilities | | | |
| S4: The things that you are good at | | | |
| S5: The things that you are the best at doing | | | |
| Ex1: Your previous career-related experience(s) | Experiences | T3: You want to gain more experience doing | F3: You want to gain more experience working within |
| Ex2: The type of work that you feel experienced doing | | T6: You feel experienced doing | F6: You feel experienced working within |
| Ex3: Your personal history | | | |
| Ex4: The experiences that have prepared you for the workplace | | | |
| Ex5: The experiences that you would list on your resume | | | |
| G1: Your long-term career-related goals | Goals | T7: You want to do, at least in the short-term | F7: You want to work within, at least in the short-term |

*Alignment Between Pilot Scale Items, FDF Elements, and Final Scale Items*

| | | | |
|---|---|---|---|
| G2: Your long-term future goals in general | | T16: You want to continue doing in the future | F16: You want to continue working within in the future |
| G3: Your short-term career-related objectives | | T17: Are relevant to your long-term goals | F17: Are relevant to your long-term goals |
| G4: Your short-term objectives for your future in general | | | |
| P1: Your preferences for a position after college | Preferences | T8: You prefer to be doing | F8: You prefer to be working within |
| P2: The type of position that you wanted after college | | T9: Are the "top choices" of tasks that you want to be doing | F9: Are your "top choices" of fields/industries that you want to work within |
| P3: Your top choice of a position after college | | | |
| P4: What you expected to secure for a plan after college | | | |
| I1: The type of work that engages you | Interests | T10: You enjoy | F10: You enjoy working within |
| I2: The type of work that excites you | | T11: Interest you | F11: Interest you |
| I3: The type of work that you are passionate about | | T13: Engage you | F13: Engage you |
| I4: The types of work-related tasks that you enjoy doing | | T15: You are passionate about | F15: You are passionate about working within |
| I5: The fields or industries in which you are interested in working | | | |
| N1: Your basic needs for a position after college | Needs | N/A | N/A |
| N2: The criteria that you had for a position after college | | | |
| N3: The standards that you set for a position after college | | | |
| N4: The essential requirements that you had for a position after college | | | |

*Alignment Between Pilot Scale Items, FDF Elements, and Final Scale Items*

| | | | |
|---|---|---|---|
| V1: Your personal values | Values | T12: You believe are valuable | F12: You believe are valuable to work within |
| V2: What you valued in a position after college | | T14: You believe are meaningful or fulfilling | F14: You believe are meaningful or fulfilling to work within |
| V3: Your personal beliefs | | | |
| V4: The type of work that you find meaningful or fulfilling | | | |
| V5: The type of work that you believe is important | | | |

***Final Survey Data***

Inter-item correlations were calculated for the revised FDF scale items (Appendix F). The majority of correlations between the task fit items (75.0%), and the majority of correlations between the field fit items (80.9%) were above 0.4. In the task-fit subscale, all correlations below 0.4 were concentrated across three items: T4, T5, and T6. In the field-fit subscale, all correlations below 0.4 were also concentrated across three parallel items: F4, F5, and F6. In both subscales, these items correlated highly with one another ($r \geq 0.7$), but not highly with the other items in the subscale. Qualitatively, these three items had two common themes. The first was that they all aligned to the D-A dimension of fit described in previous literature, as all three asked participants about their education, skills, and experiences. However, there were three additional task-fit items that did not highly correlate with these three items, but still asked participants about their education, skills, and experiences: T1, T2, and T3. The same was true of items F1, F2, and F3 for the field-fit items.

The second theme that these three items had in common was that they were the only items worded in such a way that they asked participants to reflect on the alignment of their past experiences with their current first destination position, as opposed to the other items, which focused on the alignment of participants' current needs with their first destination position. Comparing items T1 with T4, although both asked about participants' educational alignment with their position, item T1 focused on what participants currently hope to learn in their position, whereas item T4 focused on what they have already learned as it relates to their first destination position. The same pattern was true for items T2 and T5, T3 and T6, F1 and F4, F2 and F5, and F3 and F6.

Given this finding, it was determined that the CFA model should be specified to contain four latent constructs, rather than two as originally planned based on the analysis of the pilot data and cognitive interviews (Figure 1). The first latent factor was a Needs-Task (N-T) factor in which all task-fit items loaded freely onto, except for items T4, T5, and T6. Then, there was a Needs-Field (N-F) factor in which all field-fit items loaded freely onto, except for items F4, F5, and F6. Items T4, T5, and T6 were specified to load freely on a Previous-Experience-Task (P-E-T) factor, and items F4, F5, and F6 were specified to load freely on a fourth Previous-Experience-Field (P-E-F) factor. The factors were all specified to be correlated with one another, and error variances between parallel items (e.g., T1 and F1) were specified to correlate with one another. Factor variances were fixed to 1 in order to identify the model, and each item's error variance was freely estimated. The power for detecting a RMSEA value of 0.05 for this model given the sample size and an alpha value of 0.05 was ≥ 0.999.

The goodness of fit test was statistically significant ($\chi^2 = 1095.508, df = 504, p < 0.001$) indicating that the model did not have perfect fit. CFI statistic for the model was 0.877, which was slightly below the standard of 0.92. The RMSEA value was 0.095, which was statistically significantly different than 0.05 ($p < 0.001$) and was slightly higher than the commonly accepted value of 0.08. The SRMR value was 0.06, which was lower than the commonly accepted value of 0.09. Last, the AIC for the model was 10006.463 and the sample-size adjusted BIC value was 9992.819.

Standardized factor loadings for all items with their respective constructs were all above 0.7, except for one item associated with the N-T factor: T12 (0.678). All factor loadings were statistically significant. Additionally, correlations between the four factors were statistically significant and moderately to highly positive, with the highest being between the N-T and N-F

factors (r = 0.772). Not all of the correlated error terms that were specified were statistically significant, including the correlated errors between T1 and F1, T4 and F4, T5 and F5, T8 and F8, and T9 and F9. However, no qualitative patterns were discovered when examining these items to determine why certain expected correlated errors were significant, and others were not.

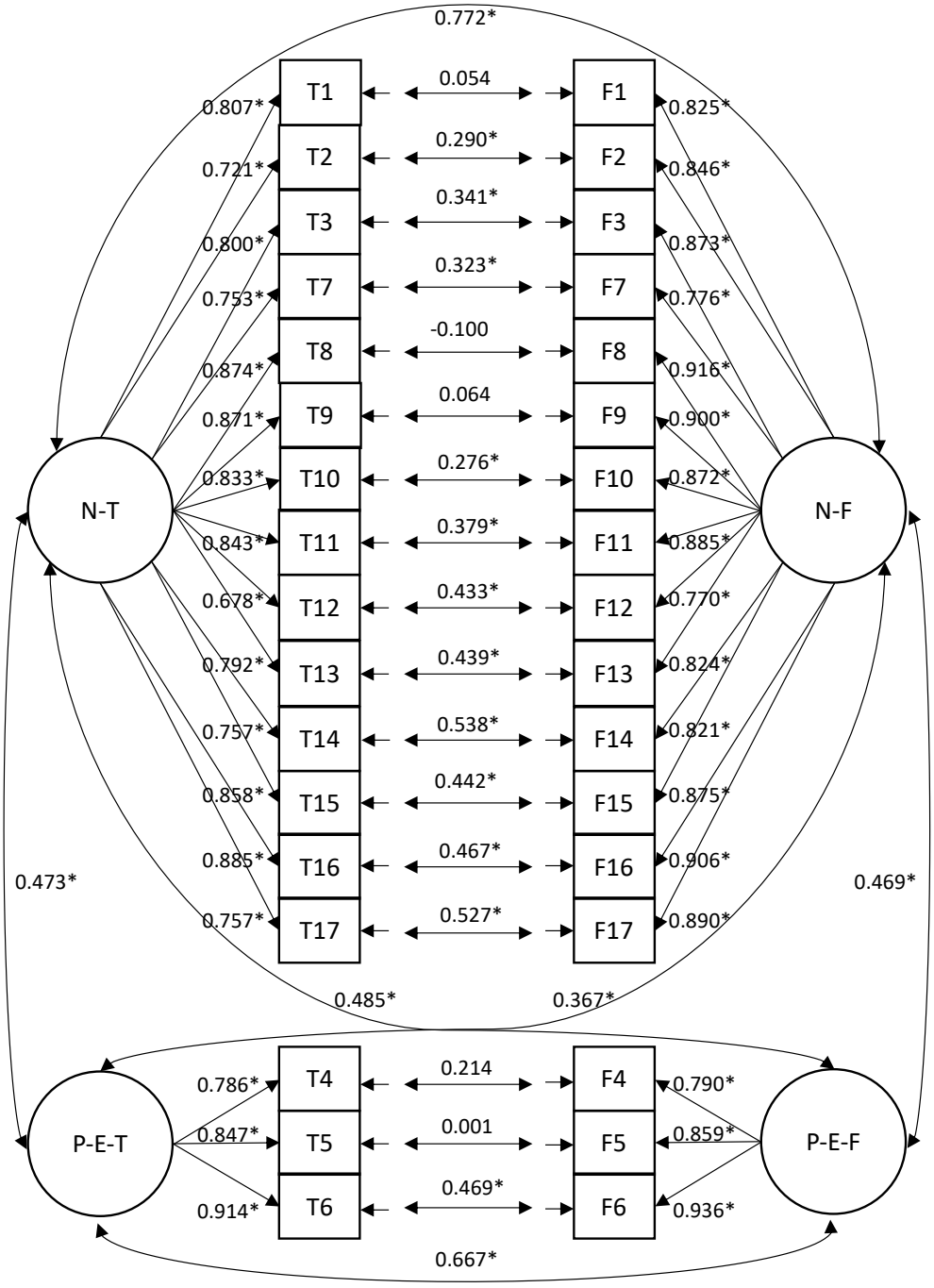
Standardized residuals were calculated for this model as well, and two were found to be statistically significantly misfitting. The first was the standardized residual between T2 and T3 (2.763), and the second was the standardized residual between T17 and F2. Neither of these pairs of items were judged to have significant qualitative relationships with one another, so the model was not revised to correlate each pair's error terms.

Modification indices were also calculated for this model. There were 116 (18.0%) modification indices that were statistically significant. Of those, 99 (85.3%) were modification indices associated with constrained correlated error terms, and the remaining 17 (14.7%) were associated with constrained factor loadings. The largest modification index (37.74) was between items F8 and F9. Both of these items were designed to measure preference fit. The modification index between parallel items T8 and T9 was also significant (24.88). However, the model was not re-specified to incorporate correlated errors between items designed to assess the same FDF element because some had significant modification indices while others did not. For example, items F7, F16, and F17 were all designed to measure goal fit. The modification index between items F16 and F17 was significant (8.60), but none of the remaining modification indices between items F7, F16, and F17 were significant. Of the significant modification indices for the constrained factor loadings (Table 19), many were between task items with field constructs, or vice-versa, which did not make sense qualitatively. Other significant modification indices suggested that the N-T items could be double-loading onto the P-E-T factor, some P-E-F items

could be double-loading onto the N-F, and some P-E-T items could be double-loading onto the N-T factor. This could be caused by the items being designed for a two-dimensional factor structure, then imposing a four-dimensional factor structure. Overall, these results taken together provide partial evidence for a four-dimensional understanding of FDF, but that additional item revisions should be considered in future psychometric research on the scale to attempt to improve overall model fit.

**Figure 1**

*Final CFA Model for FDF scale*




*Note.* Latent and observed variables are standardized. Residual variances are not shown, but are freely estimated. Variances for latent factors are fixed to 1 for model identification. *p < 0.05.

Table 19

*Significant Modification Indices for Overall FDF CFA Model*

| Latent Variable | Observed Variable | Modification Index | Expected Parameter Change |
|---|---|---|---|
| N-F | T17 | 14.896 | 0.391 |
| P-E-T | T3 | 12.064 | -0.197 |
| N-F | T7 | 8.564 | -0.277 |
| P-E-F | T7 | 7.511 | -0.186 |
| N-F | F6 | 7.510 | -0.155 |
| N-F | F4 | 7.482 | 0.166 |
| P-E-T | T10 | 6.331 | 0.145 |
| P-E-T | F5 | 5.608 | -0.170 |
| N-T | T5 | 5.433 | 0.110 |
| P-E-F | T6 | 4.825 | 0.169 |
| N-T | F13 | 4.667 | 0.151 |
| N-T | F10 | 4.630 | 0.150 |
| N-F | T11 | 4.498 | 0.167 |
| P-E-F | T13 | 4.237 | 0.121 |
| N-T | F6 | 4.093 | -0.117 |
| N-T | F16 | 4.014 | -0.142 |
| N-F | T3 | 3.953 | 0.165 |

*Note*. Only significant modification indices for relationships between observed variables and latent variables are shown. There were additional significant modification indices related to correlated error terms that are not displayed.

**Research Question 2: Factorial Invariance**

Unfortunately, due to sample size constraints in terms of the number of participants with a non-employment type first destination position (n = 56), robust standard error estimates could not be computed for the multi-group CFA models. A power analysis was conducted separately for each group of participants. For participants with an employment first destination, the power to detect a RMSEA of 0.05 with an alpha level of 0.05 was 0.995. However, for participants with a non-employment first destination, the power to detect a RMSEA of 0.05 with an alpha level of 0.05 was 0.666.

First, a separate group analysis was conducted. The sample was split into two groups based on whether participants had an employment type first destination position or a non-employment type first destination position. Then, the overall CFA model established in research question 1 (Figure 1) was applied separately on the data for each sample. A summary of the overall model fit statistics for each sample are displayed in Table 20. As shown, the model estimated using graduates who secured employment destinations had a much better overall model fit in terms of the CFI, RMSEA, and SRMR statistics compared to the model estimated using graduates who secured all other types of destination positions.

Table 20

*Separate Group CFA Models for Graduates with Employment Destinations versus All Others*

| Group | Exact fit test | CFI | RMSEA | SRMR | AIC | BIC |
|---|---|---|---|---|---|---|
| Employment | 1201.445 (504)* | 0.842 | 0.112* | 0.072 | 7279.386 | 7223.053 |
| Non-Employment | 1531.278 (504)* | 0.562 | 0.210* | 0.115 | 2728.739 | 2565.383 |

*Note.* The BIC reported is sample-size adjusted BIC. * $p < 0.05$.

Next, a multigroup analysis was conducted to test whether or not the CFA model for the FDF scale items had configural invariance. The goodness of fit test for this model was statistically significant ($\chi^2 = 2732.723, \mathrm{df} = 1008, \mathrm{p} \leq 0.001$). Additionally, the CFI of the model was 0.745, and the SRMR was 0.085. The RMSEA was 0.148, which was statistically significantly different than 0.05 ($p \leq 0.001$). The AIC statistic was 10008.125 and the BIC statistic was 9980.838. Overall, the results did not support that the FDF scale had configural invariance across these two first destination type groups, and the model had a better fit for the employment type destinations compared to the non-employment type destinations.

Additional analyses were conducted to provide preliminary data regarding which FDF scale items might be causing problems in terms of their model fit for the non-employment type group based on factor loadings, modification indices, and standardized residuals. Due to the

issues related to configural invariance and sample size with the non-employment type group, these results should only be interpreted in an exploratory manner to inform future research aimed at revising the items of the FDF scale.

First, factor loadings for the separate CFA models by destination type were calculated to explore differences in the factor loading patterns for the two groups (Table 21). More items had loadings below 0.7 for the non-employment group compared to the employment group. Specifically, items T2, T3, and F1 had loadings below 0.7 for the non-employment group, even though they had loadings above 0.7 for the employment group. Item T12 had a loading below 0.7 for both groups. Items T3, F1, F9, F10, and F11 had differences above 0.1 between the employment and non-employment groups.

Next, modification indices and standardized residuals were calculated for the CFA model estimated using only graduates who secured non-employment destination positions to collect evidence about which FDF items might be loading on different constructs than specified. There were no standardized residuals greater than 2.57. However, there were modification indices for factor loadings that were greater than 3.84 (Table 22). One pattern was that more of the Needs items had significant modification indices compared to the Previous-Experience items. Also, parallel items T2 and F2 both had significant modification indices. Additionally, items T5 and T6 were designed with a two-dimensional model of FDF in mind, such that they would both load onto a task-fit dimension. However, a four-dimensional model of FDF was specified, splitting the single task-fit dimension into a N-T and P-E-T dimension. The modification indices suggest that items T5 and T6 could be double-loading onto the N-T dimension.

Table 21

*Standardized Factor Loadings for Separate CFA Models by First Destination Type*

| | N-T | | P-E-T | | N-F | | P-E-F | |
|---|---|---|---|---|---|---|---|---|
| | Emp. | Non-Emp. | Emp. | Non-Emp. | Emp. | Non-Emp. | Emp. | Non-Emp. |
| T1 | 0.816 | 0.740 | | | | | | |
| T2 | 0.719 | 0.680 | | | | | | |
| T3 | 0.820 | 0.650 | | | | | | |
| T7 | 0.741 | 0.796 | | | | | | |
| T8 | 0.874 | 0.821 | | | | | | |
| T9 | 0.863 | 0.877 | | | | | | |
| T10 | 0.838 | 0.828 | | | | | | |
| T11 | 0.846 | 0.773 | | | | | | |
| T12 | 0.666 | 0.650 | | | | | | |
| T13 | 0.769 | 0.853 | | | | | | |
| T14 | 0.725 | 0.807 | | | | | | |
| T15 | 0.843 | 0.886 | | | | | | |
| T16 | 0.874 | 0.881 | | | | | | |
| T17 | 0.744 | 0.771 | | | | | | |
| T4 | | | 0.871 | 0.922 | | | | |
| T5 | | | 0.934 | 0.859 | | | | |
| T6 | | | 0.876 | 0.884 | | | | |
| F1 | | | | | 0.878 | 0.662 | | |
| F2 | | | | | 0.868 | 0.784 | | |
| F3 | | | | | 0.889 | 0.831 | | |
| F7 | | | | | 0.773 | 0.838 | | |
| F8 | | | | | 0.925 | 0.856 | | |
| F9 | | | | | 0.920 | 0.770 | | |
| F10 | | | | | 0.888 | 0.741 | | |
| F11 | | | | | 0.894 | 0.768 | | |
| F12 | | | | | 0.754 | 0.845 | | |
| F13 | | | | | 0.806 | 0.842 | | |
| F14 | | | | | 0.799 | 0.861 | | |
| F15 | | | | | 0.877 | 0.798 | | |
| F16 | | | | | 0.897 | 0.896 | | |
| F17 | | | | | 0.912 | 0.795 | | |
| F4 | | | | | | | 0.784 | 0.850 |
| F5 | | | | | | | 0.914 | 0.909 |
| F6 | | | | | | | 0.884 | 0.878 |

Table 22

*Modification Indices for Graduates who Secured Non-employment First Destinations*

| Latent Variable | Observed Variable | Modification Index | Expected Parameter Change |
|---|---|---|---|
| N-F | T2 | 7.909 | 0.290 |
| N-T | T5 | 6.246 | 0.234 |
| N-T | F17 | 6.182 | -0.265 |
| N-T | F2 | 5.290 | 0.233 |
| N-F | T3 | 5.058 | 0.310 |
| N-F | T15 | 4.988 | -0.238 |
| N-T | T6 | 4.724 | -0.224 |
| N-F | T11 | 4.591 | 0.231 |
| P-E-F | T7 | 3.905 | -0.230 |

*Note*. Only significant modification indices for relationships between observed variables and latent variables are shown. There were additional significant modification indices related to correlated error terms that are not displayed.

**Research Question 3: Construct Validity**

***Pilot Survey Data***

Table 23 displays the polychoric correlations between each pilot FDF scale item with the validation items. All of the FDF pilot items correlated in the expected, positive direction with the three P-O fit scale items, although items Ex1 and Ed3 had near-zero correlations with one or more of those items. All of the FDF pilot items correlated in the expected, positive direction with the job satisfaction item as well. Some FDF items correlated in the expected, negative direction with the turnover item. However, three items had particularly positive correlations with the turnover item: Ex1, Ex3, and Ex5. Additionally, about half of the items had a near-zero correlation with the turnover item.

Table 23

*Polychoric Correlations between FDF Pilot Items and Validation Items.*

| | PO1 | PO2 | PO3 | JS | Turnover |
|---|---|---|---|---|---|
| G1 | 0.636 | 0.501 | 0.511 | 0.803 | -0.274 |
| G2 | 0.554 | 0.463 | 0.523 | 0.730 | -0.301 |
| G3 | 0.396 | 0.352 | 0.298 | 0.693 | -0.016 |
| G4 | 0.459 | 0.397 | 0.347 | 0.535 | 0.084 |
| I1 | 0.293 | 0.301 | 0.259 | 0.647 | -0.045 |
| I2 | 0.399 | 0.322 | 0.344 | 0.749 | -0.202 |
| I3 | 0.444 | 0.344 | 0.439 | 0.832 | -0.080 |
| I4 | 0.419 | 0.349 | 0.470 | 0.769 | -0.163 |
| I5 | 0.367 | 0.314 | 0.336 | 0.579 | -0.210 |
| N1 | 0.331 | 0.306 | 0.307 | 0.587 | 0.047 |
| N2 | 0.493 | 0.396 | 0.353 | 0.602 | -0.158 |
| N3 | 0.534 | 0.368 | 0.445 | 0.669 | -0.143 |
| N4 | 0.494 | 0.418 | 0.541 | 0.574 | -0.199 |
| V1 | 0.629 | 0.636 | 0.472 | 0.571 | 0.038 |
| V2 | 0.360 | 0.285 | 0.311 | 0.716 | -0.104 |
| V3 | 0.517 | 0.522 | 0.313 | 0.481 | -0.127 |
| V4 | 0.465 | 0.382 | 0.415 | 0.773 | -0.032 |
| V5 | 0.393 | 0.523 | 0.474 | 0.637 | 0.057 |
| P1 | 0.589 | 0.436 | 0.360 | 0.679 | -0.253 |
| P2 | 0.405 | 0.261 | 0.272 | 0.718 | -0.337 |
| P3 | 0.320 | 0.199 | 0.301 | 0.795 | -0.355 |
| P4 | 0.278 | 0.279 | 0.393 | 0.592 | -0.193 |
| Ex1 | 0.155 | 0.084 | 0.006 | 0.437 | 0.286 |
| Ex2 | 0.262 | 0.232 | 0.038 | 0.595 | 0.079 |
| Ex3 | 0.306 | 0.300 | 0.132 | 0.409 | 0.280 |
| Ex4 | 0.454 | 0.375 | 0.257 | 0.515 | -0.184 |
| Ex5 | 0.389 | 0.318 | 0.216 | 0.545 | 0.206 |
| S1 | 0.451 | 0.458 | 0.432 | 0.756 | -0.127 |
| S2 | 0.618 | 0.514 | 0.361 | 0.583 | -0.182 |
| S3 | 0.384 | 0.387 | 0.259 | 0.700 | -0.303 |
| S4 | 0.381 | 0.377 | 0.340 | 0.513 | -0.037 |
| S5 | 0.530 | 0.434 | 0.373 | 0.631 | -0.014 |
| Ed1 | 0.513 | 0.462 | 0.384 | 0.575 | -0.180 |
| Ed2 | 0.315 | 0.179 | 0.192 | 0.497 | -0.103 |
| Ed3 | 0.216 | 0.110 | 0.019 | 0.412 | 0.000 |
| Ed4 | 0.412 | 0.294 | 0.277 | 0.397 | 0.003 |
| Ed5 | 0.361 | 0.309 | 0.248 | 0.724 | -0.121 |

### *Pilot Scale Revisions*

The majority of the FDF pilot items correlated in the expected directions with four of the five validation items. However, the majority of the FDF pilot items did not correlate in the expected directions with the turnover item. This could either indicate that there was a problem with the FDF pilot scale items, or that there was a problem with the validation item. To gather more evidence on which of these explanations was more plausible, in the final survey, the turnover item was replaced with a question about participants' intent to quit their first destination position. Similar to turnover, intent to quit was expected to negatively correlate with FDF based on existing P-J Fit literature. The intent to quit item read, "Are you actively seeking a new career-related position at this time (e.g., searching, applying, interviewing, etc.)?" and the answer options were "Yes" and "No".

### *Final Survey Data*

Once again, due to sample size constraints and model convergence issues, robust standard error estimates could not be calculated for the following SEM models. Additionally, due to the results of the analyses related to research question 2, these SEM models were conducted separately for graduates with an employment type first destination and graduates with any non-employment type first destination. First, an SEM model was specified only using the validation constructs. The three P-O fit items were specified to measure a latent construct of P-O fit, with variance fixed to 1, and freely estimated residuals. The job satisfaction and intent to quit items were also included in the model as estimates of their respective constructs, with error variances fixed to 0 and factor loadings fixed to 1. All correlations between latent constructs were freely estimated.

The overall model fit statistics for this model are shown in Table 24, by first destination type group. As shown, the model had a high overall fit for both groups. The exact fit test for both groups was non-significant. The CFI value for both groups was greater than or equal to 0.977. The RMSEA values were both less than 0.112 and not statistically significantly different than 0.05. And the SRMR values were both below 0.033.

Table 24

*SEM Validation Model Fit Statistics, by First Destination Type Group*

| Group | Exact fit test | CFI | RMSEA | SRMR | AIC | BIC |
|---|---|---|---|---|---|---|
| Employment | 3.433 (4) | 1.000 | 0.000 | 0.014 | 863.909 | 907.967 |
| Non-Employment | 6.551 (4) | 0.977 | 0.112 | 0.033 | 438.391 | 469.301 |

*Note.* The BIC reported is sample-size adjusted BIC. * $p < 0.05$.

Next, the full SEM model was specified, including all validation constructs, as well as the four-dimensional FDF CFA model. All four dimensions of FDF were specified to freely covary with the three validation constructs. A power analysis was conducted for both of the first destination type groups. For the employment first destination type group, in order to detect a RMSEA of 0.05 with an alpha level of 0.05, the power for the model was 0.999. For the non-employment first destination type group, in order to detect a RMSEA of 0.05 with an alpha level of 0.05, the power for the model was 0.767.

Similar to the results of the CFA analysis, the full SEM model had higher model fit for the employment first destination type group compared to the non-employment first destination type group (Table 25). While the exact fit tests were significant for both groups, the CFI for the employment group was 0.839, compared to the CFI of the non-employment group which was 0.481. The RMSEA value for both groups was also significantly greater than 0.05, but for the employment group, the SRMR value was below 0.08, while for the non-employment group, the

SRMR value was 0.112. Because of the poor model fit for the non-employment group, the results of model estimates should be interpreted cautiously and in an exploratory manner.

Table 25

*Full SEM Model Fit Statistics, by First Destination Type Group*

| Group | Exact fit test | CFI | RMSEA | SRMR | AIC | BIC |
|---|---|---|---|---|---|---|
| Employment | 1472.402 (666)* | 0.839 | 0.102* | 0.071 | 8092.984 | 8030.656 |
| Non-Employment | 2239.445 (666)* | 0.481 | 0.215* | 0.112 | 3144.744 | 2959.957 |

*Note.* The BIC reported is sample-size adjusted BIC. * $p < 0.05$.

Correlation estimates between latent factors produced by the final SEM model are displayed in Table 26. For the employment group, almost all of the correlations between latent factors were statistically significant. Further, the FDF factors and the validation factors were correlated in the expected directions: positive correlations between the FDF factors with P-O fit and job satisfaction, and negative correlations between the FDF factors with intent to quit. However, there were three correlations that were not statistically significant. Two of the non-significant correlations were the correlations between P-E-T and intent to quit, and between P-E-F and intent to quit. One interpretation of this result is that previous experience fit is not as predictive of intent to quit as fit as current needs is for graduates with employment type destinations. The third non-significant correlation was between P-E-F and job satisfaction. This could suggest that, for graduates with employment destinations, previous experience in the field of their first destination does not relate to their satisfaction with their first destination position as strongly as their current needs for their position, nor as strongly as their previous experience with the tasks associated with their position.

For the non-employment group, several more correlations were found to be non-significant compared to the employment group. However, this could be due to poor model fit, and an underpowered analysis. Both previous experience dimensions did not correlate

significantly with job satisfaction. This could suggest that, for graduates with non-employment first destination types, previous experience fit does not relate to their satisfaction with their first destination position. The intent to quit variable did not have significant correlations with any FDF factor, nor any validation variable, for the non-employment group. This could signify that intent to quit is not as relevant for graduates with non-employment type destinations compared to graduates with employment-type destinations. All other correlations were statistically significant, and all significant correlations between the FDF factors, job satisfaction, and P-O fit were positive, as expected.

Table 26

*Correlations between Latent Factors, by First Destination Type Group*

| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| Employment | 1. P-E-F | 1.000 | | | | | | |
| | 2. P-E-T | 0.692* | 1.000 | | | | | |
| | 3. N-F | 0.439* | 0.314* | 1.000 | | | | |
| | 4. N-T | 0.487* | 0.448* | 0.760* | 1.000 | | | |
| | 5. P-O | 0.274* | 0.302* | 0.532* | 0.548* | 1.000 | | |
| | 6. JS | 0.206 | 0.310* | 0.547* | 0.611* | 0.651* | 1.000 | |
| | 7. IQ | -0.026 | 0.023 | -0.171* | -0.164* | -0.141* | -0.196* | 1.000 |
| Non-Employment | 1. P-E-F | 1.000 | | | | | | |
| | 2. P-E-T | 0.584* | 1.000 | | | | | |
| | 3. N-F | 0.621* | 0.523* | 1.000 | | | | |
| | 4. N-T | 0.480* | 0.539* | 0.729* | 1.000 | | | |
| | 5. P-O | 0.388* | 0.484* | 0.446* | 0.704* | 1.000 | | |
| | 6. JS | 0.299 | 0.300 | 0.436* | 0.751* | 0.768* | 1.000 | |
| | 7. IQ | -0.107 | -0.030 | -0.091 | -0.130 | -0.056 | -0.109 | 1.000 |

*Note*. *p < 0.05

**Supplementary Analyses**

***Pilot Survey Data***

For the pilot survey data, the overall Cronbach's alpha for the FDF scale, after removing items with restricted range, was 0.98. This is particularly high, but the value is certainly inflated by the number of items in the scale, which was 33 after removing all items with restricted range.

All items had an alpha-if-deleted value of 0.98. Corrected item-total correlations and item communalities are presented in Table 27. Corrected item-total correlations ranged between 0.590 and 0.878, with the lowest correlations being for items Ex1 and Ex3. Item communalities ranged between 0.338 and 0.800, with the lowest communalities being for items Ex1 and Ex3 as well.

Table 27

*FDF Pilot Scale Item-total Correlations and Communalities*

| | Corrected Item-Total Correlations | Communalities |
|---|---|---|
| G1 | 0.751 | 0.595 |
| G2 | 0.700 | 0.533 |
| G3 | 0.789 | 0.608 |
| G4 | 0.714 | 0.499 |
| I2 | 0.763 | 0.606 |
| I3 | 0.806 | 0.655 |
| I4 | 0.690 | 0.486 |
| I5 | 0.647 | 0.445 |
| N1 | 0.635 | 0.421 |
| N2 | 0.805 | 0.673 |
| N3 | 0.802 | 0.681 |
| N4 | 0.749 | 0.600 |
| V1 | 0.809 | 0.649 |
| V2 | 0.812 | 0.669 |
| V3 | 0.687 | 0.480 |
| V4 | 0.779 | 0.611 |
| P1 | 0.878 | 0.800 |
| P2 | 0.753 | 0.610 |
| P3 | 0.785 | 0.652 |
| P4 | 0.823 | 0.698 |
| Ex1 | 0.591 | 0.338 |
| Ex2 | 0.702 | 0.484 |
| Ex3 | 0.590 | 0.345 |
| Ex4 | 0.776 | 0.597 |
| Ex5 | 0.647 | 0.414 |
| S1 | 0.729 | 0.535 |
| S2 | 0.753 | 0.592 |
| S3 | 0.747 | 0.588 |
| S4 | 0.730 | 0.554 |
| S5 | 0.797 | 0.651 |
| Ed1 | 0.778 | 0.594 |
| Ed2 | 0.654 | 0.416 |
| Ed5 | 0.743 | 0.563 |

### *Cognitive Interviews*

**Item redundancy.** The most common issue related to the pilot FDF scale's validity that arose during the cognitive interviews was redundancy. Across the 13 participants, redundancy was mentioned 79 times. This was the most common code, and was anticipated in the deductive coding scheme. Every participant identified at least one FDF item that they believed to be redundant with one or more other items in the same FDF element group. Only 3 FDF items were not labeled as redundant with any other items (G1, Ed2, and S2). All of the other 34 items were labeled as redundant with at least one other item.

Some FDF items were more commonly mentioned as redundant compared to other items (Figure 2). The items that were most commonly mentioned as redundant were V3, V1, S4, and I2. Figure 3 shows a heatmap of the number of mentions that participants labeled a given pair of items as redundant with one another. As shown, all items were labeled as redundant with other items intended to measure the same element of FDF. However, this could have been a function of the design of the study where the slides displayed to the interviewees containing the FDF items only showed items that intended to measure one element of FDF. Items V1 and V3 were the most common two items that interviewees labeled as redundant, as they mentioned this 10 times during the course of their interviews. Items I1 and I2 were also labeled by interviewees as redundant 7 times, but also items I3 and I2 were labeled as redundant by interviewees 6 times. Similarly, item S3 was labeled as redundant with item S4 6 times, and item S4 was labeled as redundant with item S5 5 times. For the Needs and Preferences items, at least one participant labeled each pair of items as redundant. A final finding in terms of redundancy was that certain items were labeled as redundant with multiple other items, whereas others were either not labeled as redundant at all, or only labeled as redundant with one other item. For example, items

Ed3 and Ed4 were only labeled as redundant with one another. The same is true for items Ed1 and Ed5. However, Item I1 was labeled as redundant with each other Interest item by at least one participant, most commonly with I2, as explained previously.

**Figure 2**

*Mentions of Redundancy by FDF Pilot Item*

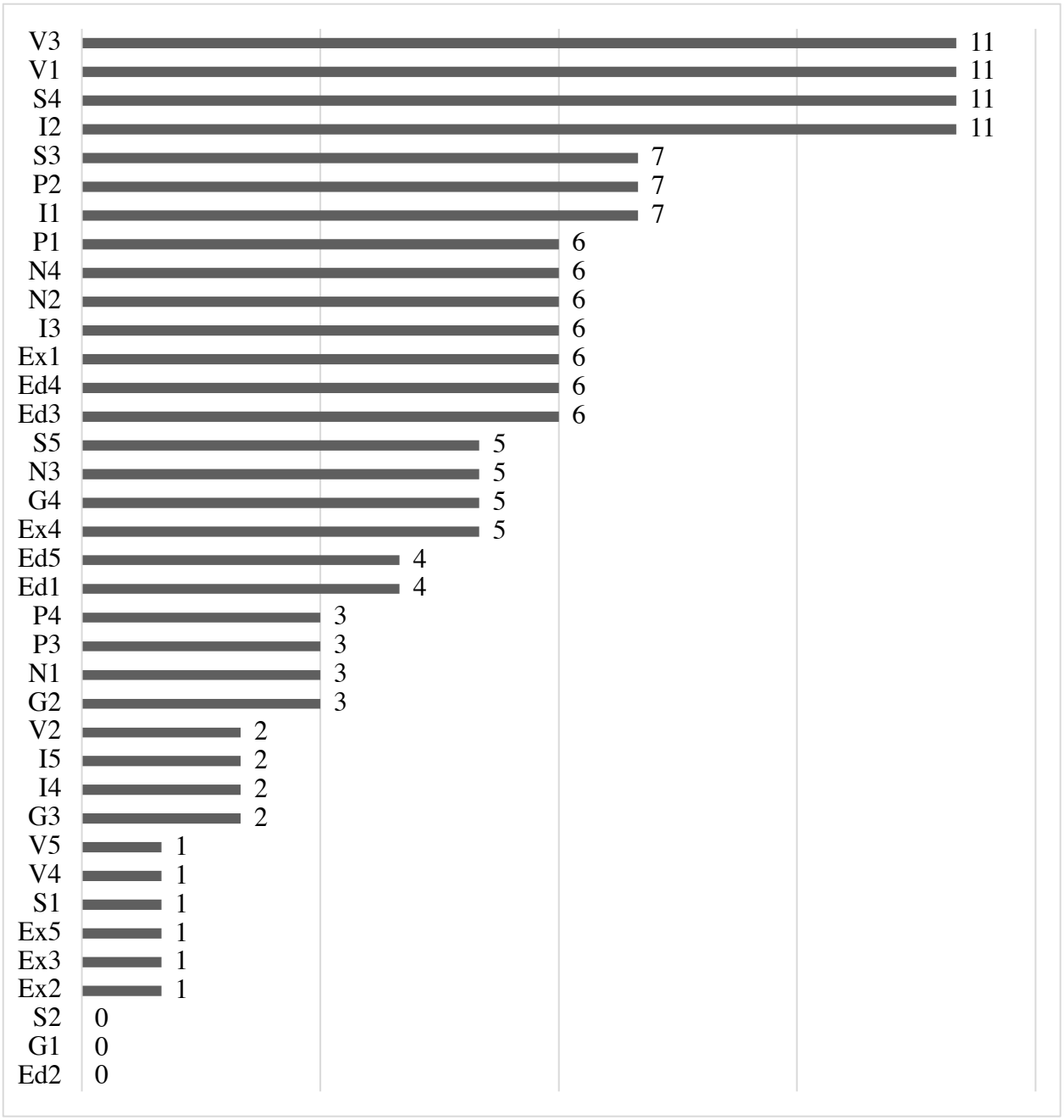
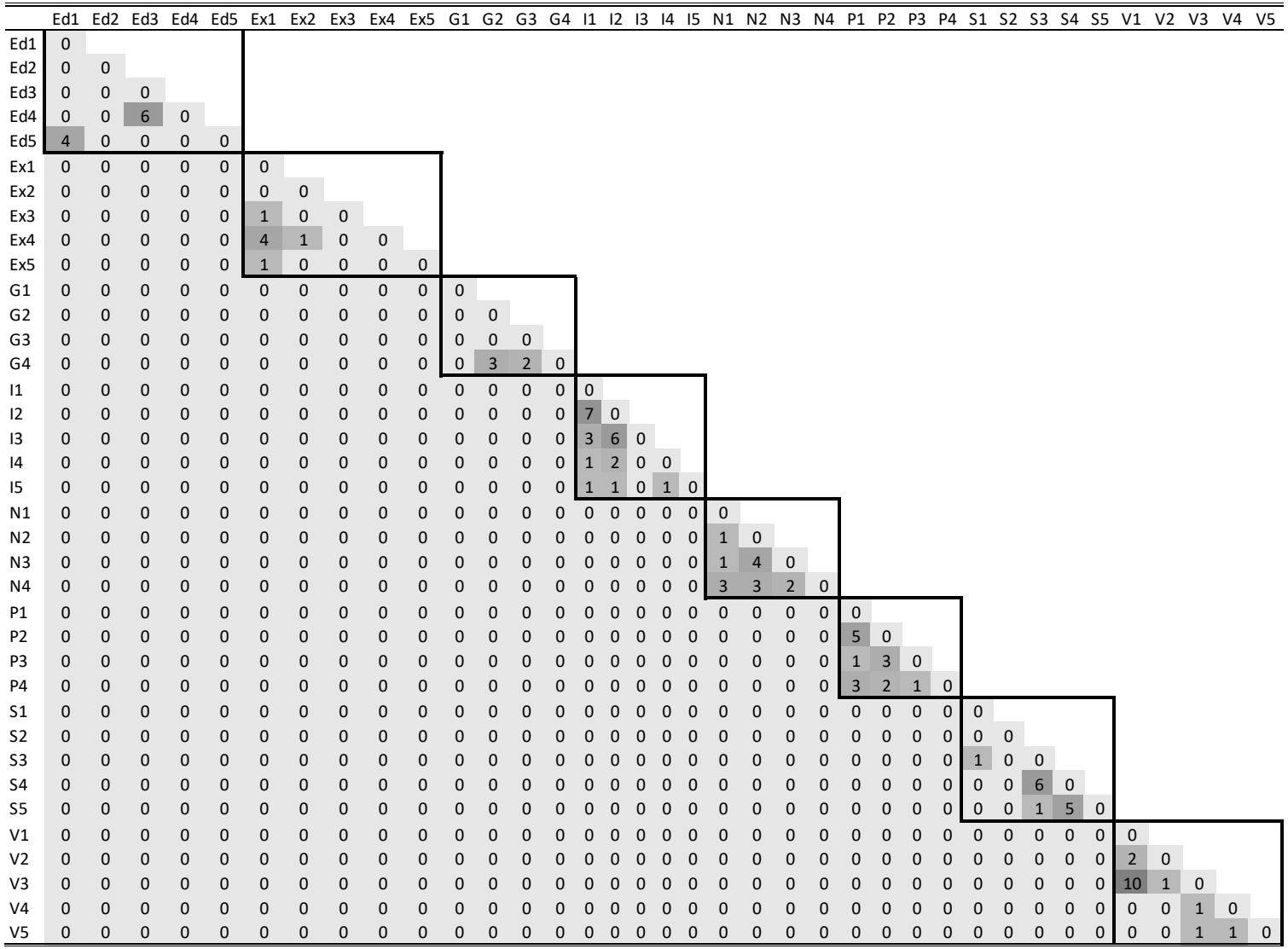


**Figure 3**

*Heatmap of Pairwise Redundancy Mentions During Cognitive Interviews*



**Additional pilot item issues.** Other codes used to flag problematic items were "Irrelevant", "Unclear", "Timing/Tense Issue", and "Difficult (non-specific)". There were 40 total mentions that certain items were unclear. Of the total 37 items, 24 were labeled as unclear. The number of mentions per item of it being unclear ranged from 0 to 8 mentions. Eleven of the 24 items that were labeled as unclear were only labeled as unclear by one participant. The most common item labeled as unclear was Ex3, with 8 mentions. Other items commonly mentioned as unclear were Ed2, P4, Ed3, N2, and V3.

Eight items were labeled as having a timing or tense issue. This code had 15 total mentions, ranging between 0 to 3 per item. The most common items with this type of issue were V4, G3, and N2. Four items were labeled as being irrelevant. This code had a total of 6 mentions, ranging between 0 and 2 per item. The items that participants labeled as irrelevant were Ex3, Ed4, Ed2, and Ed3. Finally, participants mentioned 3 items (G3, G4, and P3) as being difficult for a reason that they couldn't articulate. These items were each mentioned only once.

**Requested scale additions.** The additions that graduates recommended to the FDF scale were all coded inductively, and there was not consensus among participants regarding what, if anything, was missing from the current draft of the FDF scale. Three participants discussed how their first destination position might not fit well with their current skillset, but could be leading them to grow in ways that they find valuable. For example, Participant 5 said:

> Yeah. I would say you know one of the reasons that I think this is a really—gonna be a really good role for me is because it's challenging me in a way that really puts me out of my comfort zone in some of my abilities…It just kind of hits you head-on, and then the next time you're faced with it, you're sort of expected to understand at least the basics of what it is and how it works.

Participant 81 also discussed this and said:

> I think one thing that I picked up on as we've like went through the sections was that the questions were really asking you about your skills and not about your weaknesses, so maybe…like someone might have found a job that kind of adheres to their weaknesses, but that doesn't mean that they're doing bad at their job, it just means that those weaknesses are getting stronger.

Participant 81 also offered some suggested items that relate to fit to address what he saw as missing from the FDF scale, saying "Maybe one thing, so we have like the skills you have acquired, the skills that you hope to improve, what about like the skills that you hope to learn one day?" Participant 1 mentioned that they would like to see an item about how their first destination aligned with their hopes by saying, "Yeah, I'd say maybe like your—you could add something on like your hopes? Like, to what extent was your postgraduate position a match with your hopes for a postgraduate position?". Participant 41, when asked about additional items, mentioned that they would like to see an item about their extracurricular activities by saying, "Yes, like the extracurriculars, I kind of just dived into that on my own." Participant 7 suggested thinking about fit comparatively in terms of how well it seemed like their peers fit with their first destinations versus how well the graduate believed they fit with their first destination, "Maybe something about compared to what other students are doing right now…like compared to like your peers' goals and where they want to be and where they currently are."

### *Pilot Scale Revisions*

To address the issues with item clarity and redundancy discovered in the pilot FDF scale, each group of items were reviewed as a set in terms of both their quantitative and qualitative

data. For most items, the quantitative data was positive and suggested good fit, so this data was given slightly less weight analytically compared to the qualitative data.

For the goals items, the phrase “future goals in general” (G2 and G4) seemed to confuse cognitive interview participants, and both items had lower factor loadings, corrected item-total correlations, and communalities compared to items G1 and G3. Therefore, the phrase was removed in the final scale. Additionally, the phrase “short-term goals” (G4) seemed to confuse participants, so it was rephrased to read, “what you want to do, in the short-term at least.”

For the interest items, “engaged” and “excites” (I1 and I2) had a different meaning for some graduates, but not for others. “Engaged” was chosen between the two to include in the final scale because it had a lower amount of redundancy mentions overall.

For the values items, participants had difficulty discerning between their “values” and “beliefs” (V1 and V3). Item V3 was removed as it had a lower factor loading, lower corrected item-total correlation, and lower communality. Participants also identified redundancy between “important” and “meaningful and fulfilling” (V4 and V5). Item V5 was removed because there was less evidence of its validity since it had restricted range and was not included in the EFA model. Item V2 was removed because it no longer fit with the revised item stems related to task-fit and field-fit.

For the preference items, some participants explained that they did not know how to respond to item P4 because their expectations were very low for their first destination, but then their first destination position exceeded their expectations. Therefore, they did not know whether to answer that the position was a very good match with their expectations or a very bad match. For that reason, the item was removed. Participants also felt that item P2 was redundant with

item P1. Additionally, item P2 had the lowest factor loading, corrected-item-total correlation, and lowest communality of all of the preference items. Therefore, item P2 was removed.

For the skill items, graduates reported that S1 and S2 were the least redundant items of the set, so they were both retained. Participants expressed trouble with item S5 in that they did not know what they were best at yet, and how that differed from what they were good at (S4), and their natural or innate abilities (S3). Therefore, all three items were removed.

The education and experience items were qualitatively different from the other items in the scale because they were discovered through the cognitive interviews to be double-barreled. They were asking graduates not only how well they were aligned with their first destinations, but also were asking why they were aligned with their first destinations. For example, was it because of experiences that they had in high school, or college, or previous work experiences, etc.? Or, was it because of something they learned in high school, or college, or on their own, etc.? Both sets of items contained the most problematic items in terms of their quantitative statistics as well (i.e., Ed3, Ed4, Ex1, and Ex3). Therefore, these items were revised so that they were no longer asking specifically why graduates felt aligned or misaligned, but were rather only asking about the extent of graduates' alignment.

Last, six items were added based on participant comments during the cognitive interview regarding fit with how they wanted to grow in their education, skills, and experiences. These items were T1, T2, T3, F1, F2, and F3.

***Final Survey Data***

The communalities for the four-dimensional FDF model are reported in Table 28. The communality values ranged from 0.460 to 0.839, with item T12 having the lowest communality estimate. All communalities were above 0.5, except for item T12. The average variance

explained by each latent factor, as well as the construct reliability values for each latent factor, are reported in Table 29. The N-T variable had the lowest average variance explained value, and the P-E-F variable had the lowest construct reliability value. However, all average variance explained values were above the commonly accepted standard of 0.5, and all reliability values were above the commonly accepted standard of 0.7.

Table 28

*Communality Estimates for Final FDF Scale Items*

| FDF Item | Communality |
|---|---|
| T1 | 0.651 |
| T2 | 0.520 |
| T3 | 0.641 |
| T4 | 0.786 |
| T5 | 0.830 |
| T6 | 0.786 |
| T7 | 0.567 |
| T8 | 0.764 |
| T9 | 0.758 |
| T10 | 0.694 |
| T11 | 0.710 |
| T12 | 0.460 |
| T13 | 0.627 |
| T14 | 0.573 |
| T15 | 0.737 |
| T16 | 0.783 |
| T17 | 0.573 |
| F1 | 0.681 |
| F2 | 0.716 |
| F3 | 0.762 |
| F4 | 0.651 |
| F5 | 0.828 |
| F6 | 0.796 |
| F7 | 0.602 |
| F8 | 0.839 |
| F9 | 0.809 |
| F10 | 0.761 |
| F11 | 0.783 |
| F12 | 0.593 |
| F13 | 0.679 |
| F14 | 0.675 |
| F15 | 0.766 |
| F16 | 0.821 |
| F17 | 0.793 |

Table 29

*Average Variance Explained (AVE) and Construct Reliability for Final Latent FDF Factors*

| | Average Variance Explained | Construct Reliability |
|---|---|---|
| N-F | 0.744 | 0.974 |
| N-T | 0.661 | 0.962 |
| P-E-F | 0.759 | 0.902 |
| P-E-T | 0.800 | 0.924 |

## Chapter 5: Discussion

### Summary of Findings

The purpose of this study was to create a valid survey scale to explore the dimensionality of a previously new construct related to first destination quality: first destination fit (FDF). FDF was conceptualized as being a generalization of Person-Job (P-J) fit theory such that college graduates could be well-aligned or misaligned, with their first career-related position after graduation, just as employees could be well-aligned or misaligned with their employment position. Because this construct was conceptualized to be similar to P-J fit, it was expected to relate to similar constructs that P-J fit has been found to be related to, such as Person-Organization (P-O) fit, job satisfaction, turnover, and intent to quit.

Using items that had been rigorously designed, reviewed, and pilot tested, this study found evidence supporting a four-dimensional framework for FDF. Importantly, these dimensions were related, but not perfectly aligned, with the Needs-Supplies (N-S) and Demands-Abilities (D-A) dimensions of P-J fit discussed in previous research. These dimensions can be thought of in two groups. First, there are the needs-related dimensions of Needs-Task (N-T) and Needs-Field (N-F), which relate to what graduates want and prefer for their position, what they are interested in, what they find valuable, what they are passionate about, and what their goals are for their futures. This framework suggests that just because the tasks or the field of their first

destination are well-aligned or misaligned with their needs, it does not necessarily mean that both the tasks and the field of their first destination are well-aligned with their needs. Second, there are the previous-experience-related dimensions of Previous-Experience-Tasks (P-E-T) and Previous-Experience-Field (P-E-F), which relate to the work that graduates have already done, the education that they have received, and the skills that they have learned. As with the first two dimensions, just because the tasks or the field of their first destination are well-aligned or misaligned with their previous experiences, it does not necessarily mean that both the tasks and the field of their first destination are well-aligned with those experiences.

In response to the second research question, however, this conceptualization of FDF did not fit as well with the data from graduates that had non-employment-type destinations compared to graduates that had employment-type destinations. It was difficult to discern from the results of this analysis what the cause of the misfit was for graduates with a non-employment type destination, but there was evidence that certain items could be problematically affecting model fit for that group. These items were T2, T3, T5, T6, F1, F2, F9, F10, and F11. Another pattern discovered was that there appeared to be more issues with the Needs items than the Previous Experience items. These issues could have been caused by the unexpected presence of the Previous Experience constructs in the final FDF survey scale, which was designed with a two-dimensional understanding of FDF in mind opposed to the four-dimensional understanding that was clear from the empirical data. This could have caused certain items to double-load across the two task-related constructs, or double load across the two field-related constructs.

Last, in response to the third research question, FDF partially related to the same constructs that P-J fit related to. There were significant, positive associations between all four dimensions of FDF with P-O fit for the graduates with an employment type destination.

However, only the two needs-related dimensions of FDF were significantly, negatively related to the intent to quit construct for this group of graduates. This was an unexpected finding, but does not necessarily signify a problem with the validity of the FDF scale. It could be the case that fit between a graduate's first destination and their previous experiences is not as predictive of whether they will quit the position as the position's fit with the current needs. Another interesting finding related to the relationship between FDF and job satisfaction for graduates with an employment type destination was that the fit between a graduate's previous experience with the field of their first destination position did not significantly predict their job satisfaction. This could indicate that a graduate's previous experience with the field of their first position is not as important in terms of job satisfaction as their previous experience with the tasks associated with their position, and how well their position is meeting their current task- and fit-related needs.

**Implications**

This study has implications for research on FDF and for research on P-J fit. First, this study has found evidence that supports four-dimensional framework for FDF. Therefore, studies that desire to continue to develop and test assessments of FDF should at least consider these four dimensions moving forward, since graduates can be well-aligned or misaligned with their first destination positions on each of the four dimensions. This study also illustrates the importance of collecting both qualitative on quantitative data on this construct, particularly because the construct is newly conceptualized by this study. Had the cognitive interview data not been collected, the pilot analysis would have suggested that the items chosen for the FDF pilot scale captured only one dimension of FDF, and captured that dimension well. Not only did the cognitive interviews reveal that participants were actually thinking about multiple dimensions of

FDF, but also revealed other issues with the pilot scale, such as redundancy, construct underrepresentation, and other difficulties around item clarity.

This study has produced a rigorously developed and refined scale to assess recent graduates' FDF that higher education institutions (HEIs) can use to collect more comprehensive information on graduates' employment outcomes. In particular, descriptive data can be collected using this measure to provide HEIs about how well-fitting their recent graduates' first destinations are with their current needs and previous experiences. However, some caution is needed when comparing groups of students using this scale (American Educational Research Association et al., 2014, Standard 1.3). First, the CFA model did not have configural invariance for graduates who secured non-employment types of first destinations. Additionally, even for graduates who did secure employment types of first destinations, the overall model fit statistics for the CFA model were slightly below commonly accepted standards. Therefore, comparisons should not be made between graduates with employment destinations and those with non-employment destinations regarding their fit until the scale is further refined and tested. Further, there was not evidence that the scale is invariant based on other graduate characteristics, such as gender, race, English fluency, disability status, etc. That said, comparisons between different groups of students' first destinations should not be made.

Another caution that HEIs should heed when using this scale involves the general assessment of graduates with non-employment destinations. Evidence from this study suggests that graduates with non-employment destinations may not be interpreting the FDF scale items in the same way as graduates with employment destinations. HEIs should think critically when distributing the current version of this scale to graduates that secure non-employment destinations regarding what items will be relevant until further psychometric work is conducted.

They should also not use the same CFA model used in this study to generate scale scores for graduates with non-employment destinations because those scores would be misleading given the lack of fit of the measurement model with the data collected in this study.

At the beginning of this study, FDF was conceived to be most similar to P-J fit. However, based on the results, FDF is more similar to Person-Environment (P-E) fit in that it is a collection of different dimensions of fit that graduates might score high or low across, and those dimensions will not necessarily be perfectly correlated. For example, a graduate could fit well with the tasks that they perform in their position, but not with the field of their position, or vice versa. Additionally, a graduate could fit well with their position in terms of what they currently need, but the position might not fit well with what their previous work experience has been, including the skills that they have learned and the education they have received.

The major implication of this study for P-J fit research is that, in addition to providing evidence for the dimensionality of FDF, it raises questions about the dimensionality of P-J fit. The several studies on P-J fit located prior to the current study suggested that P-J fit was comprised of a N-S dimension and a D-A dimension. However, no research was found prior to this study that empirically investigated this dimensionality, especially with a mixed-methods design. While the N-S and D-A framework has been used across multiple studies, it would be beneficial for future research on P-J fit to follow similar methodologies as those carried out in this study to explore and confirm the dimensionality of the construct. Since the majority of the P-J fit research has been quantitative, and since there have not been many rigorous psychometric investigations of P-J fit scales, it could be that the understanding of the construct has been specified incorrectly and underrepresented by previous research, which could complicate the

findings of that research, especially as it relates to relationships between P-J fit and other variables of interest.

There are two findings in particular that P-J fit researchers should take particular note of from the current study. The first is that it could be possible for employees to have needs related to the experiences, education, and abilities that their employment position can provide to them, just like recent graduates in this study had needs related to those three attributes. Previous research on P-J fit only has included items related to experiences, education, and abilities within D-A subscales, but this study implies that its reasonable for N-S subscales to contain items related to these elements so long as their phrased in terms of the education, experiences, and abilities that employees want or need their position to supply them with.

Second, the FDF dimensions discovered in this study appear to be applicable dimensions to P-J fit. In fact, this study found that for graduates with employment positions, this four-dimensional framework fit reasonably well with their survey response data. Therefore, P-J fit scales should be evaluated for whether they incorporate elements of all four dimensions of fit that were discovered in this study, and potentially new scales should be developed with these four dimensions of fit in mind.

**Limitations**

Small sample sizes presented two limitations to the study. The first limitation related to small sample sizes is that the small sample size caused a lack of representativeness in all three of the recruited samples for the study. Ideally, there would be a list of all recent graduates who graduated within two years from every HEI in every English-speaking country to draw samples from. Without that, it would have been beneficial to use comprehensive demographic information on that population of graduates to apply sampling weights for non-representative

samples. However, neither could be located for this study. Even so, it was certain that there was sample underrepresentation within each sample drawn for this study because there were groups of graduates who were not recruited at all as participants. The pilot sample was the most diverse sample of the three, but was also the smallest. Two known areas where that sample lacked participant representation were that there were no participants who identified only as Native American or Alaskan Natives, and there were no participants who identified as only Native Hawaiian or other Pacific Islander. In terms of first destination types, there were also no participants who reported having a volunteer or academic fellowship first destination.

The cognitive interview sample was the least diverse sample of the three. This was especially apparent in terms of the race and ethnicity of the participants, all of whom identified as white, but two of whom also identified as Hispanic. All participants were also recruited from only the U.S., and further, only two regions of the U.S: the Northeast and the Midwest. In terms of first destination types, no participants were recruited that participated in volunteer work, an academic/research fellowship, or military service.

In the final survey sample, all participants were recruited from the same college in the northeastern U.S. Like the pilot sample, there were no participants who identified only as Native American or Alaskan Natives, and there were no participants who identified as only Native Hawaiian or other Pacific Islander. Overall, all three samples were not fully representative in terms of racial diversity, particularly the cognitive interviews. Further, graduates in the U.S. were overrepresented compared to English-speaking graduates from other countries. In some samples, graduates that secured volunteer and academic fellowship destinations were not represented.

The second limitation related to the study's small sample size was that the small sample size narrowed the possible statistical analyses that could be conducted validly on the quantitative

data. Even some of the analyses that were conducted, such as the EFA on the pilot survey data and the single-group SEM analyses on the graduates with a non-employment first destination type, were statistically underpowered. Also, for the multi-group CFA models and SEM models in the final data analysis, robust standard error estimates could not be used due to data constraints caused by sample size, which would have been a more appropriate method for CFA with ordinal variables. Additionally, in research question 2, the FDF scale was found to not have configural invariance by first destination type. Yet, the scale was still used explore relationships between FDF and other constructs for the non-employment type group. This analysis would have been stronger if more non-employment type participants were recruited so that a separate CFA model could be conducted with each group of participants. Therefore, results related to research question 3 should be interpreted in an exploratory manner, and should be replicated in future research on FDF, either with revised versions of the current scale, or entirely new scales altogether.

Last, there were limitations in this study concerning construct measurement. First, concerning the P-E-T and P-E-F dimensions of FDF that were discovered, the items that comprised the final version of the FDF scale were not intentionally designed to comprehensively represent these constructs. Had these constructs been discovered earlier on in the research, there would have been an opportunity to craft a new set of items that were expected to represent the construct fully, which would have improved the overall understanding of the construct and potentially also the fit of the CFA model. Additionally, job satisfaction is a complex construct that could have been measured using more than a single item, even though there was a precedent set for using a single item in previous research on P-J fit. Given the limitations of this study with sample size, it was beneficial to keep the survey instrument as short as possible to reduce

participant attrition; however, future studies that do not anticipate the same sample size barriers would do well to measure all latent constructs using multi-item measures that have been rigorously tested for their validity.

**Future Directions**

In terms of future directions for research on FDF, it would at least be beneficial to conduct cognitive interviews with recent graduates who secured first destination positions using the final FDF scale produced from this study. It would be beneficial to have this group of participants be as diverse as possible, representing different demographic groups from the target population of all recent graduates in English-speaking countries, and especially focus on recruiting participants who have non-employment types of first destinations. The same semi-structured interview protocol could be used as a foundation for this research. The purposes of this type of research would be to identify items that are problematic, particularly for graduates with non-employment types of first destinations, and to explore construct underrepresentation.

However, at most, it would be beneficial to recreate an item pool based on the four dimensions of FDF that were discovered in this study, and repeat the scale development process, including a review by content experts, followed by cognitive interviews with recent graduates and pilot testing. The rationale for this is that it is reasonable to believe that the items used in this study to measure P-E-T and P-E-F are likely not fully representative of those constructs because they were not intentionally designed with those constructs in mind.

After another revised FDF scale is created, it would be beneficial to continue collecting evidence on the psychometric validity of the scale. One next step, for example, could be to intentionally design items for each dimension of FDF that are expected to range in difficulty from low to high in order maximize the information collected by the assessment. Items

intentionally designed in this manner could then be evaluated using a multi-dimensional item-response theory (MIRT) model. These models have several statistical benefits compared to traditional CFA models, including but not limited to item characteristic estimates that are not group-dependent, ability estimates that are not test-dependent, and standard errors of measurement for each score rather than for the scale as a whole (Hambleton et al., 1991).

Another direction for future research as it relates to the psychometrics validity of an FDF scale is returning to questions of factorial invariance and/or differential item functioning. This includes primarily reexamining research question 2 of this study. With a sufficient sample size, this question could be explored for each first destination type group (i.e., graduates with internships, graduates who continue onto graduate school, etc.) rather than just a single, binary comparison of graduates who secured employment first destinations versus all others. However, this is not the only question of factorial invariance that is of importance. It will be imperative to explore whether there is measurement invariance across groups that have historically been marginalized by assessment efforts, such as women, people of color, English language learners and people with cognitive disabilities (American Educational Research Association et al., 2014, Standard 2.11; Standard 3.1; Standard 3.3; Standard 3.17). Since the scale is being developed in the U.S., but the target population is English-speaking graduates from any country, measurement invariance should also be examined by relevant geographical regions. Additionally, practitioners and researchers may be interested in comparing different groups of graduates on their FDF. For example, a HEI may want to explore whether their graduates are equitably securing first destination positions that are well-fitting based on graduates' gender, race, and other demographic outcomes of interest. Before these studies are conducted, it is important to ensure that the assessment is invariant across those different groups of graduates to ensure that the

scores of one or more groups are not being systematically and disproportionately affected by either certain items, or the entire assessment.

In terms of future research on P-J fit in general, this study prompts questions related to the dimensionality of that construct. Therefore, it would be beneficial to not only conduct a similar study to the present study on the dimensionality of P-J fit, but also then to explore some of the other psychometric studies that have been suggested in this chapter to produce stronger and more valid measures of the construct. If these studies result in a substantially different understanding of P-J fit, it would be beneficial to replicate previous research regarding associations between P-J fit and other variables to study whether past findings remain consistent.

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# Appendix A

## Initial Item Pool

**Item Stem**: To what extent is your career-related position aligned with…

**Goals**

- Your goals
- Your goals for your future
- Your future goals
- Your goals for your career
- Your career goals
- Your career-related goals
- Your long-term goals
- Your short-term goals
- Your long-term career goals
- Your short-term career goals
- Your long-term future goals
- Your short-term future goals
- Your long-term career-related goals
- Your short-term career-related goals
- Your long-term goals for your future
- Your short-term goals for your future
- Your long-term goals for your career
- Your short-term goals for your career
- Your plans
- Your plans for your future
- Your future plans
- Your plans for your career
- Your career plans
- Your career-related plans
- Your long-term plans
- Your short-term plans
- Your long-term career plans
- Your short-term career plans
- Your long-term future plans
- Your short-term future plans
- Your long-term career-related plans
- Your short-term career-related plans
- Your long-term plans for your future
- Your short-term plans for your future
- Your long-term plans for your career
- Your short-term plans for your career
- Your aspirations
- Your aspirations for your future
- Your future aspirations
- Your aspirations for your career
- Your career aspirations
- Your career-related aspirations
- Your long-term aspirations
- Your short-term aspirations
- Your long-term career aspirations
- Your short-term career aspirations
- Your long-term future aspirations
- Your short-term future aspirations
- Your long-term career-related aspirations
- Your short-term career-related aspirations
- Your long-term aspirations for your future
- Your short-term aspirations for your future
- Your long-term aspirations for your career
- Your short-term aspirations for your career
- Your dreams
- Your dreams for your future
- Your future dreams
- Your dreams for your career
- Your career dreams
- Your career-related dreams
- Your long-term dreams
- Your short-term dreams
- Your long-term career dreams
- Your short-term career dreams
- Your long-term future dreams
- Your short-term future dreams

- Your long-term career-related dreams
- Your short-term career-related dreams
- Your long-term dreams for your future
- Your short-term dreams for your future
- Your long-term dreams for your career
- Your short-term dreams for your career
- Your ambitions
- Your ambitions for your future
- Your future ambitions
- Your ambitions for your career
- Your career ambitions
- Your career-related ambitions
- Your long-term ambitions
- Your short-term ambitions
- Your long-term career ambitions
- Your short-term career ambitions
- Your long-term future ambitions
- Your short-term future ambitions
- Your long-term career-related ambitions
- Your short-term career-related ambitions
- Your long-term ambitions for your future
- Your short-term ambitions for your future
- Your long-term ambitions for your career
- Your short-term ambitions for your career
- Your objectives
- Your objectives for your future
- Your future objectives
- Your objectives for your career
- Your career objectives
- Your career-related objectives
- Your long-term objectives
- Your short-term objectives
- Your long-term career objectives
- Your short-term career objectives
- Your long-term future objectives
- Your short-term future objectives
- Your long-term career-related objectives
- Your short-term career-related objectives
- Your long-term objectives for your future
- Your short-term objectives for your future
- Your long-term objectives for your career
- Your short-term objectives for your career

**Interests**

- Your interests
- What interests you
- What is interesting to you
- What you find to be interesting
- What engages you
- What is engaging to you
- What you find to be engaging
- Your motivations
- What motivates you
- What is motivating to you
- What you find to be motivating
- What appeals to you
- What is appealing to you
- What you find to be appealing
- What you like
- What you like to do
- What you like doing
- What you enjoy
- What you enjoy doing
- What you find to be enjoyable
- What you love
- What you love to do
- What you love doing
- What fascinates you
- What is fascinating to you
- What you find to be fascinating
- Your fascinations

- Your passions
- What you are passionate about doing

**Needs**

- Your needs
- What you needed to secure
- What was necessary for you to secure
- What you needed for a plan after college
- What you needed to secure for a plan after college
- What was necessary for you to secure for a plan after college
- Your requirements
- What you required
- What you required for a plan after college
- Your criteria
- Your standards
- Your criteria for a post graduate plan
- The criteria that you had for a plan after college
- Your standards for a plan after college
- The standards that you had for a plan after college
- What you had to secure
- What you felt you had to secure
- What you had to secure for a plan after college
- What you felt you had to secure for a plan after college
- What was essential for you to secure
- What was essential for you to secure in a plan after college

**Values**

- Your values
- What you value
- What you valued in a plan after college
- Your beliefs
- Your convictions
- Your belief system
- What you believe
- Your worldview
- Your philosophy
- Your views
- Your conscience
- Your morals
- Your moral standards
- Your moral code
- Your ethics
- Your code of ethics
- Your ethical standards
- Your vocation
- Your calling
- Your purpose
- Your life's calling
- Your calling in life
- Your life's purpose
- Your purpose in life

**Preferences**

- Your preferences
- Your preferences for a plan after college
- What you preferred
- What you preferred to secure for a plan after college
- Your wants
- What you wanted
- What you wanted to secure for a plan after college
- What you wanted in a plan after college
- What you wanted to secure for a plan after college
- Your hopes
- Your hopes for a plan after college
- What you hoped to secure
- What you hoped to secure for a plan after college
- Your desires
- What you desired
- Your desires for a plan after college
- What you desired to secure for a plan after college
- Your wishes
- What you wished for a plan after college

- What you wished to secure for a plan after college

**Experiences**

- Your previous experience(s)
- Your previous job(s)
- Your previous work experience(s)
- Your previous career-related experience(s)
- Your previous career-advancing experience(s)
- Your background
- Your work background
- Your career background
- Your professional background
- Your resume
- The experiences listed on your resume
- The experiences you would list on your resume
- Your resume-building experiences
- Your work history
- Your professional history
- Your career history
- Your job history

**Skills**

- Your skills
- Your skillset
- Your professional skills
- Your career-related skills
- Your abilities
- Your aptitudes
- What you're able to do
- Your professional abilities
- Your professional aptitudes
- Your career-related abilities
- Your career-related aptitudes
- Your talents
- Your professional talents
- Your career-related talents
- Your proficiencies
- What you are proficient at doing
- The areas in which you are proficient
- Your strengths
- Your professional strengths
- Your career-related strengths
- What you are good at doing
- The things you are good at doing
- The types of things you are good at doing
- What you are best at doing
- With the things you are best at doing
- The types of things you are best at doing

**Education**

- Your studies
- What you've studied
- What you know
- Your knowledge
- Your intelligence
- What you understand
- Your understanding
- Your education
- Your educational background
- What you have been taught
- Your learning
- What you've learned

## Appendix B

### First Destination Fit Pilot Scale

**Question stem**: To what extent [is/was] your first destination position a match with…

**Answer Options**: A very bad match; More of a bad match than a good match; Sort of a good match and sort of a bad match; More of a good match than a bad match; A very good match

**Survey Items**:

G1: Your long-term career-related goals
G2: Your long-term future goals in general
G3: Your short-term career-related objectives
G4: Your short-term objectives for your future in general
I1: The type of work that engages you
I2: The type of work that excites you
I3: The type of work that you are passionate about
I4: The types of work-related tasks that you enjoy doing
I5: The fields or industries in which you are interested in working
N1: Your basic needs for a position after college
N2: The criteria that you had for a position after college
N3: The standards that you set for a position after college
N4: The essential requirements that you had for a position after college
V1: Your personal values
V2: What you valued in a position after college
V3: Your personal beliefs
V4: The type of work that you find meaningful or fulfilling
V5: The type of work that you believe is important
P1: Your preferences for a position after college
P2: The type of position that you wanted after college
P3: Your top choice of a position after college
P4: What you expected to secure for a plan after college
Ex1: Your previous career-related experience(s)
Ex2: The type of work that you feel experienced doing
Ex3: Your personal history
Ex4: The experiences that have prepared you for the workplace
Ex5: The experiences that you would list on your resume
S1: The skills you have acquired
S2: The skills that you hope to improve
S3: Your natural or innate abilities
S4: The things that you are good at
S5: The things that you are the best at doing
Ed1: What you've studied during college
Ed2: What you've learned prior to college
Ed3: What you've learned outside of the classroom
Ed4: What you've learned on your own
Ed5: One or more of your majors, minors, or concentrations

## Appendix C

### Interview Protocol for Recent Graduates with First Destinations

Hi, thanks for meeting with me today. The purpose of this interview is to review a set of survey items related to evaluating the plans that you secured after graduation. Before we start, I would like you to know that your participation in this interview is completely voluntary. You can choose not to answer any question, or choose to end the interview at any time. I will keep your responses confidential, and remove any information that is particularly identifying from any quotes that are used in my reporting. The interview will be transcribed and coded for themes and patterns, and used to inform revisions to the set of survey items that you are asked about during the interview. I expect this interview to last between 45 minutes and 1 hour, and you will receive a $20 VISA gift card for your participation.

Do I have your permission to record this interview so that I can type up the conversation to aide in my analysis?

Do I have your permission to begin the interview, and begin recording the conversation?

**Part I**

1. First, I'm wondering if you could please describe yourself for me in terms of your demographic characteristics and academic interests.
    a. How would you describe your gender?
    b. How would you describe your race and ethnicity?
    c. Were you born and raised in the United States? If not, where were you born and raised?
    d. Is English your native language? If not, what is? How would you describe your fluency in English?
    e. What is the most recent college degree that you earned (e.g. Bachelor's? Associate's?)
    f. In what month and year did you graduate from college?
    g. What college did you graduate from?
    h. What did you study during college in terms of your majors, minors, and/or concentrations?
2. Now, can you tell me a little bit about the plans that you have secured after you graduated?
    a. What are you doing? What is the job title associated with your position?
    b. Who are you working for? Or what company/organization is affiliated with your position?
    c. How would you describe the industry of the position?
    d. Where are you working in terms of your location? (City, State, Country)
    e. Is the position full-time or part-time? If part-time, how many hours per week?
    f. Is it a paid position? How is the position paid? Are there benefits (e.g., insurance, etc.)?
    g. What are some of the day-to-day tasks that you do in the position?
    h. What types of projects do you work on?

i. Does the position have an end date? If not, how long do you plan to stay in the position?

**Part II.**

I'm interested in getting a better understanding of how college students evaluate the quality of the plans that they secured after they graduated. I'm particularly interested in better understanding how graduates believe their plans do or do not align with who they are as a person. At this point in the interview, I'm going to give you one set of survey items at a time to fill out about the plans that you secured. As you read and respond to each item in the set, I'd like you to talk me through what you're thinking about as you read and answer the item. For example, I'd like you to read the item out loud, and then say any thoughts that come to mind as you're thinking about how to answer the item. After you answer the set, I'll have some questions about each item:

3. What first came to mind when you read the item?
4. Can you rephrase what the item is asking you?
5. Did you have any difficulty responding to the item? Are there any words that you weren't sure what they meant or that you were confused by? If yes, why?
6. How was each item different than the other items presented in the set?
7. Is there anything else, positive or negative, that comes to mind about any item?
8. Do you think there are any items missing from this set of items? In other words, is there anything else you feel like you should have been asked about here that you weren't asked about?

[Repeat for 8 sets of FDF sub-scales: Goals, Values, Interests, Preferences, Needs, Experience, Education, Skills]

Wrapping Up

9. What did you think about these survey items? What were your general impressions?
10. Can you think of anything else that might be missing from this group of questions that you would have liked to be asked about regarding how well your plans align with who you are?
11. Is there anything that you would eliminate from this list of items? If yes, please explain. Is there anything that is redundant or unclear or not relevant?

# Appendix D

## Revised FDF Survey Scales

### Your Work-Related Tasks

For this section of the survey, please **only focus on the work-related tasks that are associated with your position**. These are the tasks that you carry out in order to accomplish the work that is associated with your position. Examples of these tasks are: attending meetings, coding or programming, making deliveries, organizing, presenting, researching, studying, teaching, training, writing, etc.

To what extent are the work-related tasks associated with your position a match with the types of tasks that...

[Response options: A very bad match; More of a bad match than a good match; Sort of a good match, sort of a bad match; More of a good match than a bad match; A very good match]

T1: You want to learn more about
T2: Will improve skills that are important to you
T3: You want to gain more experience doing
T4: You know how to do
T5: You feel skilled in
T6: You feel experienced doing
T7: You want to do, at least in the short-term
T8: You prefer to be doing
T9: Are the "top choices" of tasks that you want to be doing
T10: You enjoy
T11: Interest you
T12: You believe are valuable
T13: Engage you
T14: You believe are meaningful or fulfilling
T15: You are passionate about
T16: You want to continue doing in the future
T17: Are relevant to your long-term goals

**Your Field/Industry**
For this section of the survey, please **only focus on the general field or industry that is associated with your position**. Examples of fields or industries include: Healthcare, Marketing, Education, Law, Business, etc.

**Note**: If you are a ***graduate or professional student or academic fellow***, think about the academic discipline or field associated with your studies and/or research when answering these questions.

[Response options: A very bad match; More of a bad match than a good match; Sort of a good match, sort of a bad match; More of a good match than a bad match; A very good match]

To what extent is the ***field or industry*** associated with your position a match with the fields/industries that...

F1: You want to learn more about
F2: Will improve skills that are important to you
F3: You want to gain more experience working within
F4: You know about
F5: You feel skilled working within
F6: You feel experienced working within
F7: You want to work within, at least in the short-term
F8: You prefer to be working within
F9: Are your "top choices" of fields/industries that you want to work within
F10: You enjoy working within
F11: Interest you
F12: You believe are valuable to work within
F13: Engage you
F14: You believe are meaningful or fulfilling to work within
F15: You are passionate about working within
F16: You want to continue working within in the future
F17: Are relevant to your long-term goals

## Appendix E

### Inter-item Correlations Between FDF Pilot Scale Items, by FDF Element

| | G1 | G2 | G3 | G4 |
|---|---|---|---|---|
| G1 | 1.000 | 0.835 | 0.586 | 0.460 |
| G2 | 0.835 | 1.000 | 0.472 | 0.535 |
| G3 | 0.586 | 0.472 | 1.000 | 0.761 |
| G4 | 0.460 | 0.535 | 0.761 | 1.000 |
| I1 | 0.534 | 0.656 | 0.624 | 0.717 |
| I2 | 0.757 | 0.732 | 0.653 | 0.442 |
| I3 | 0.750 | 0.642 | 0.629 | 0.569 |
| I4 | 0.680 | 0.561 | 0.719 | 0.563 |
| I5 | 0.543 | 0.592 | 0.572 | 0.364 |
| N1 | 0.392 | 0.279 | 0.564 | 0.518 |
| N2 | 0.516 | 0.510 | 0.568 | 0.553 |
| N3 | 0.653 | 0.639 | 0.486 | 0.452 |
| N4 | 0.550 | 0.505 | 0.443 | 0.500 |
| V1 | 0.536 | 0.510 | 0.699 | 0.696 |
| V2 | 0.655 | 0.582 | 0.715 | 0.682 |
| V3 | 0.477 | 0.443 | 0.650 | 0.615 |
| V4 | 0.766 | 0.723 | 0.617 | 0.624 |
| V6 | 0.497 | 0.556 | 0.445 | 0.604 |
| P1 | 0.719 | 0.696 | 0.640 | 0.567 |
| P2 | 0.704 | 0.652 | 0.616 | 0.355 |
| P3 | 0.690 | 0.639 | 0.653 | 0.465 |
| P4 | 0.501 | 0.600 | 0.589 | 0.593 |
| Ex1 | 0.290 | 0.152 | 0.552 | 0.483 |
| Ex2 | 0.404 | 0.400 | 0.597 | 0.590 |
| Ex3 | 0.314 | 0.268 | 0.481 | 0.512 |
| Ex4 | 0.513 | 0.476 | 0.648 | 0.601 |
| Ex5 | 0.398 | 0.283 | 0.503 | 0.510 |
| S1 | 0.630 | 0.537 | 0.683 | 0.580 |
| S2 | 0.621 | 0.661 | 0.529 | 0.486 |
| S3 | 0.661 | 0.672 | 0.574 | 0.568 |
| S4 | 0.547 | 0.587 | 0.554 | 0.579 |
| S5 | 0.765 | 0.611 | 0.654 | 0.531 |
| Ed1 | 0.505 | 0.488 | 0.592 | 0.650 |
| Ed2 | 0.449 | 0.326 | 0.612 | 0.585 |
| Ed3 | 0.201 | 0.165 | 0.374 | 0.383 |
| Ed4 | 0.281 | 0.018 | 0.451 | 0.205 |
| Ed5 | 0.489 | 0.477 | 0.604 | 0.457 |

| | I1 | I2 | I3 | I4 | I5 |
|---|---|---|---|---|---|
| G1 | 0.534 | 0.757 | 0.750 | 0.680 | 0.543 |
| G2 | 0.656 | 0.732 | 0.642 | 0.561 | 0.592 |
| G3 | 0.624 | 0.653 | 0.629 | 0.719 | 0.572 |
| G4 | 0.717 | 0.442 | 0.569 | 0.563 | 0.364 |
| I1 | 1.000 | 0.683 | 0.708 | 0.564 | 0.604 |
| I2 | 0.683 | 1.000 | 0.813 | 0.777 | 0.789 |
| I3 | 0.708 | 0.813 | 1.000 | 0.809 | 0.700 |
| I4 | 0.564 | 0.777 | 0.809 | 1.000 | 0.706 |
| I5 | 0.604 | 0.789 | 0.700 | 0.706 | 1.000 |
| N1 | 0.415 | 0.298 | 0.510 | 0.439 | 0.237 |
| N2 | 0.570 | 0.574 | 0.579 | 0.516 | 0.503 |
| N3 | 0.535 | 0.628 | 0.662 | 0.518 | 0.514 |
| N4 | 0.594 | 0.475 | 0.515 | 0.457 | 0.470 |
| V1 | 0.590 | 0.633 | 0.619 | 0.550 | 0.454 |
| V2 | 0.752 | 0.556 | 0.610 | 0.488 | 0.495 |
| V3 | 0.605 | 0.567 | 0.609 | 0.577 | 0.521 |
| V4 | 0.650 | 0.732 | 0.816 | 0.631 | 0.671 |
| V6 | 0.634 | 0.426 | 0.623 | 0.497 | 0.493 |
| P1 | 0.613 | 0.684 | 0.710 | 0.524 | 0.629 |
| P2 | 0.577 | 0.696 | 0.673 | 0.607 | 0.641 |
| P3 | 0.537 | 0.628 | 0.599 | 0.576 | 0.511 |
| P4 | 0.704 | 0.580 | 0.623 | 0.487 | 0.570 |
| Ex1 | 0.338 | 0.271 | 0.494 | 0.257 | 0.227 |
| Ex2 | 0.584 | 0.534 | 0.465 | 0.408 | 0.380 |
| Ex3 | 0.360 | 0.346 | 0.435 | 0.232 | 0.145 |
| Ex4 | 0.547 | 0.571 | 0.545 | 0.413 | 0.466 |
| Ex5 | 0.365 | 0.320 | 0.455 | 0.291 | 0.396 |
| S1 | 0.643 | 0.506 | 0.691 | 0.597 | 0.484 |
| S2 | 0.650 | 0.574 | 0.587 | 0.377 | 0.667 |
| S3 | 0.656 | 0.644 | 0.648 | 0.626 | 0.381 |
| S4 | 0.766 | 0.629 | 0.599 | 0.524 | 0.441 |
| S5 | 0.653 | 0.676 | 0.688 | 0.620 | 0.368 |
| Ed1 | 0.507 | 0.480 | 0.517 | 0.418 | 0.511 |
| Ed2 | 0.455 | 0.438 | 0.475 | 0.486 | 0.333 |
| Ed3 | 0.409 | 0.178 | 0.329 | 0.323 | 0.486 |
| Ed4 | 0.150 | 0.211 | 0.313 | 0.395 | 0.277 |
| Ed5 | 0.486 | 0.626 | 0.603 | 0.498 | 0.642 |

| | N1 | N2 | N3 | N4 |
|---|---|---|---|---|
| G1 | 0.392 | 0.516 | 0.653 | 0.550 |
| G2 | 0.279 | 0.510 | 0.639 | 0.505 |
| G3 | 0.564 | 0.568 | 0.486 | 0.443 |
| G4 | 0.518 | 0.553 | 0.452 | 0.500 |
| I1 | 0.415 | 0.570 | 0.535 | 0.594 |
| I2 | 0.298 | 0.574 | 0.628 | 0.475 |
| I3 | 0.510 | 0.579 | 0.662 | 0.515 |
| I4 | 0.439 | 0.516 | 0.518 | 0.457 |
| I5 | 0.237 | 0.503 | 0.514 | 0.470 |
| N1 | 1.000 | 0.701 | 0.638 | 0.593 |
| N2 | 0.701 | 1.000 | 0.843 | 0.771 |
| N3 | 0.638 | 0.843 | 1.000 | 0.766 |
| N4 | 0.593 | 0.771 | 0.766 | 1.000 |
| V1 | 0.489 | 0.636 | 0.617 | 0.606 |
| V2 | 0.547 | 0.603 | 0.583 | 0.701 |
| V3 | 0.386 | 0.505 | 0.536 | 0.368 |
| V4 | 0.425 | 0.492 | 0.629 | 0.573 |
| V6 | 0.312 | 0.273 | 0.459 | 0.450 |
| P1 | 0.576 | 0.815 | 0.793 | 0.782 |
| P2 | 0.492 | 0.640 | 0.741 | 0.566 |
| P3 | 0.636 | 0.709 | 0.710 | 0.685 |
| P4 | 0.665 | 0.733 | 0.784 | 0.806 |
| Ex1 | 0.470 | 0.501 | 0.414 | 0.332 |
| Ex2 | 0.442 | 0.588 | 0.470 | 0.484 |
| Ex3 | 0.370 | 0.528 | 0.425 | 0.459 |
| Ex4 | 0.521 | 0.706 | 0.683 | 0.567 |
| Ex5 | 0.575 | 0.550 | 0.559 | 0.560 |
| S1 | 0.581 | 0.620 | 0.533 | 0.541 |
| S2 | 0.538 | 0.677 | 0.630 | 0.637 |
| S3 | 0.469 | 0.695 | 0.601 | 0.551 |
| S4 | 0.334 | 0.569 | 0.591 | 0.640 |
| S5 | 0.452 | 0.648 | 0.672 | 0.612 |
| Ed1 | 0.508 | 0.680 | 0.674 | 0.659 |
| Ed2 | 0.446 | 0.512 | 0.442 | 0.489 |
| Ed3 | 0.303 | 0.191 | 0.351 | 0.407 |
| Ed4 | 0.393 | 0.327 | 0.339 | 0.425 |
| Ed5 | 0.452 | 0.583 | 0.630 | 0.600 |

| | V1 | V2 | V3 | V4 | V5 |
|---|---|---|---|---|---|
| G1 | 0.536 | 0.655 | 0.477 | 0.766 | 0.497 |
| G2 | 0.510 | 0.582 | 0.443 | 0.723 | 0.556 |
| G3 | 0.699 | 0.715 | 0.650 | 0.617 | 0.445 |
| G4 | 0.696 | 0.682 | 0.615 | 0.624 | 0.604 |
| I1 | 0.590 | 0.752 | 0.605 | 0.650 | 0.634 |
| I2 | 0.633 | 0.556 | 0.567 | 0.732 | 0.426 |
| I3 | 0.619 | 0.610 | 0.609 | 0.816 | 0.623 |
| I4 | 0.550 | 0.488 | 0.577 | 0.631 | 0.497 |
| I5 | 0.454 | 0.495 | 0.521 | 0.671 | 0.493 |
| N1 | 0.489 | 0.547 | 0.386 | 0.425 | 0.312 |
| N2 | 0.636 | 0.603 | 0.505 | 0.492 | 0.273 |
| N3 | 0.617 | 0.583 | 0.536 | 0.629 | 0.459 |
| N4 | 0.606 | 0.701 | 0.368 | 0.573 | 0.450 |
| V1 | 1.000 | 0.646 | 0.818 | 0.621 | 0.708 |
| V2 | 0.646 | 1.000 | 0.570 | 0.697 | 0.555 |
| V3 | 0.818 | 0.570 | 1.000 | 0.573 | 0.606 |
| V4 | 0.621 | 0.697 | 0.573 | 1.000 | 0.770 |
| V6 | 0.708 | 0.555 | 0.606 | 0.770 | 1.000 |
| P1 | 0.714 | 0.693 | 0.523 | 0.627 | 0.436 |
| P2 | 0.484 | 0.679 | 0.526 | 0.573 | 0.391 |
| P3 | 0.506 | 0.779 | 0.502 | 0.622 | 0.345 |
| P4 | 0.611 | 0.724 | 0.569 | 0.643 | 0.504 |
| Ex1 | 0.487 | 0.533 | 0.402 | 0.436 | 0.297 |
| Ex2 | 0.578 | 0.608 | 0.483 | 0.536 | 0.345 |
| Ex3 | 0.661 | 0.501 | 0.376 | 0.482 | 0.372 |
| Ex4 | 0.747 | 0.573 | 0.560 | 0.462 | 0.371 |
| Ex5 | 0.520 | 0.522 | 0.304 | 0.490 | 0.370 |
| S1 | 0.508 | 0.553 | 0.488 | 0.629 | 0.489 |
| S2 | 0.618 | 0.650 | 0.497 | 0.576 | 0.446 |
| S3 | 0.707 | 0.666 | 0.603 | 0.564 | 0.541 |
| S4 | 0.752 | 0.614 | 0.652 | 0.612 | 0.648 |
| S5 | 0.710 | 0.706 | 0.623 | 0.599 | 0.442 |
| Ed1 | 0.717 | 0.621 | 0.557 | 0.538 | 0.495 |
| Ed2 | 0.595 | 0.546 | 0.401 | 0.443 | 0.329 |
| Ed3 | 0.197 | 0.471 | 0.133 | 0.278 | 0.474 |
| Ed4 | 0.382 | 0.387 | 0.282 | 0.377 | 0.381 |
| Ed5 | 0.690 | 0.682 | 0.505 | 0.584 | 0.487 |

| | P1 | P2 | P3 | P4 |
|---|---|---|---|---|
| G1 | 0.719 | 0.704 | 0.690 | 0.501 |
| G2 | 0.696 | 0.652 | 0.639 | 0.600 |
| G3 | 0.640 | 0.616 | 0.653 | 0.589 |
| G4 | 0.567 | 0.355 | 0.465 | 0.593 |
| I1 | 0.613 | 0.577 | 0.537 | 0.704 |
| I2 | 0.684 | 0.696 | 0.628 | 0.580 |
| I3 | 0.710 | 0.673 | 0.599 | 0.623 |
| I4 | 0.524 | 0.607 | 0.576 | 0.487 |
| I5 | 0.629 | 0.641 | 0.511 | 0.570 |
| N1 | 0.576 | 0.492 | 0.636 | 0.665 |
| N2 | 0.815 | 0.640 | 0.709 | 0.733 |
| N3 | 0.793 | 0.741 | 0.710 | 0.784 |
| N4 | 0.782 | 0.566 | 0.685 | 0.806 |
| V1 | 0.714 | 0.484 | 0.506 | 0.611 |
| V2 | 0.693 | 0.679 | 0.779 | 0.724 |
| V3 | 0.523 | 0.526 | 0.502 | 0.569 |
| V4 | 0.627 | 0.573 | 0.622 | 0.643 |
| V6 | 0.436 | 0.391 | 0.345 | 0.504 |
| P1 | 1.000 | 0.772 | 0.784 | 0.773 |
| P2 | 0.772 | 1.000 | 0.820 | 0.690 |
| P3 | 0.784 | 0.820 | 1.000 | 0.827 |
| P4 | 0.773 | 0.690 | 0.827 | 1.000 |
| Ex1 | 0.497 | 0.377 | 0.456 | 0.550 |
| Ex2 | 0.585 | 0.476 | 0.532 | 0.616 |
| Ex3 | 0.489 | 0.288 | 0.420 | 0.515 |
| Ex4 | 0.677 | 0.516 | 0.535 | 0.655 |
| Ex5 | 0.651 | 0.372 | 0.418 | 0.522 |
| S1 | 0.663 | 0.511 | 0.590 | 0.633 |
| S2 | 0.785 | 0.636 | 0.609 | 0.675 |
| S3 | 0.675 | 0.548 | 0.687 | 0.597 |
| S4 | 0.657 | 0.435 | 0.446 | 0.617 |
| S5 | 0.719 | 0.656 | 0.602 | 0.576 |
| Ed1 | 0.666 | 0.526 | 0.504 | 0.707 |
| Ed2 | 0.568 | 0.471 | 0.478 | 0.427 |
| Ed3 | 0.401 | 0.387 | 0.263 | 0.282 |
| Ed4 | 0.334 | 0.360 | 0.353 | 0.221 |
| Ed5 | 0.687 | 0.616 | 0.583 | 0.613 |

| | Ex1 | Ex2 | Ex3 | Ex4 | Ex5 |
|---|---|---|---|---|---|
| G1 | 0.290 | 0.404 | 0.314 | 0.513 | 0.398 |
| G2 | 0.152 | 0.400 | 0.268 | 0.476 | 0.283 |
| G3 | 0.552 | 0.597 | 0.481 | 0.648 | 0.503 |
| G4 | 0.483 | 0.590 | 0.512 | 0.601 | 0.510 |
| I1 | 0.338 | 0.584 | 0.360 | 0.547 | 0.365 |
| I2 | 0.271 | 0.534 | 0.346 | 0.571 | 0.320 |
| I3 | 0.494 | 0.465 | 0.435 | 0.545 | 0.455 |
| I4 | 0.257 | 0.408 | 0.232 | 0.413 | 0.291 |
| I5 | 0.227 | 0.380 | 0.145 | 0.466 | 0.396 |
| N1 | 0.470 | 0.442 | 0.370 | 0.521 | 0.575 |
| N2 | 0.501 | 0.588 | 0.528 | 0.706 | 0.550 |
| N3 | 0.414 | 0.470 | 0.425 | 0.683 | 0.559 |
| N4 | 0.332 | 0.484 | 0.459 | 0.567 | 0.560 |
| V1 | 0.487 | 0.578 | 0.661 | 0.747 | 0.520 |
| V2 | 0.533 | 0.608 | 0.501 | 0.573 | 0.522 |
| V3 | 0.402 | 0.483 | 0.376 | 0.560 | 0.304 |
| V4 | 0.436 | 0.536 | 0.482 | 0.462 | 0.490 |
| V6 | 0.297 | 0.345 | 0.372 | 0.371 | 0.370 |
| P1 | 0.497 | 0.585 | 0.489 | 0.677 | 0.651 |
| P2 | 0.377 | 0.476 | 0.288 | 0.516 | 0.372 |
| P3 | 0.456 | 0.532 | 0.420 | 0.535 | 0.418 |
| P4 | 0.550 | 0.616 | 0.515 | 0.655 | 0.522 |
| Ex1 | 1.000 | 0.675 | 0.748 | 0.621 | 0.652 |
| Ex2 | 0.675 | 1.000 | 0.526 | 0.605 | 0.607 |
| Ex3 | 0.748 | 0.526 | 1.000 | 0.653 | 0.485 |
| Ex4 | 0.621 | 0.605 | 0.653 | 1.000 | 0.645 |
| Ex5 | 0.652 | 0.607 | 0.485 | 0.645 | 1.000 |
| S1 | 0.502 | 0.551 | 0.545 | 0.416 | 0.492 |
| S2 | 0.376 | 0.531 | 0.407 | 0.608 | 0.554 |
| S3 | 0.334 | 0.555 | 0.373 | 0.659 | 0.305 |
| S4 | 0.289 | 0.551 | 0.464 | 0.605 | 0.418 |
| S5 | 0.452 | 0.591 | 0.563 | 0.615 | 0.423 |
| Ed1 | 0.598 | 0.663 | 0.546 | 0.830 | 0.772 |
| Ed2 | 0.582 | 0.550 | 0.539 | 0.660 | 0.613 |
| Ed3 | 0.266 | 0.264 | 0.135 | 0.235 | 0.422 |
| Ed4 | 0.300 | 0.171 | 0.344 | 0.171 | 0.276 |
| Ed5 | 0.499 | 0.552 | 0.392 | 0.601 | 0.646 |

| | S1 | S2 | S3 | S4 | S5 |
|---|---|---|---|---|---|
| G1 | 0.630 | 0.621 | 0.661 | 0.547 | 0.765 |
| G2 | 0.537 | 0.661 | 0.672 | 0.587 | 0.611 |
| G3 | 0.683 | 0.529 | 0.574 | 0.554 | 0.654 |
| G4 | 0.580 | 0.486 | 0.568 | 0.579 | 0.531 |
| I1 | 0.643 | 0.650 | 0.656 | 0.766 | 0.653 |
| I2 | 0.506 | 0.574 | 0.644 | 0.629 | 0.676 |
| I3 | 0.691 | 0.587 | 0.648 | 0.599 | 0.688 |
| I4 | 0.597 | 0.377 | 0.626 | 0.524 | 0.620 |
| I5 | 0.484 | 0.667 | 0.381 | 0.441 | 0.368 |
| N1 | 0.581 | 0.538 | 0.469 | 0.334 | 0.452 |
| N2 | 0.620 | 0.677 | 0.695 | 0.569 | 0.648 |
| N3 | 0.533 | 0.630 | 0.601 | 0.591 | 0.672 |
| N4 | 0.541 | 0.637 | 0.551 | 0.640 | 0.612 |
| V1 | 0.508 | 0.618 | 0.707 | 0.752 | 0.710 |
| V2 | 0.553 | 0.650 | 0.666 | 0.614 | 0.706 |
| V3 | 0.488 | 0.497 | 0.603 | 0.652 | 0.623 |
| V4 | 0.629 | 0.576 | 0.564 | 0.612 | 0.599 |
| V6 | 0.489 | 0.446 | 0.541 | 0.648 | 0.442 |
| P1 | 0.663 | 0.785 | 0.675 | 0.657 | 0.719 |
| P2 | 0.511 | 0.636 | 0.548 | 0.435 | 0.656 |
| P3 | 0.590 | 0.609 | 0.687 | 0.446 | 0.602 |
| P4 | 0.633 | 0.675 | 0.597 | 0.617 | 0.576 |
| Ex1 | 0.502 | 0.376 | 0.334 | 0.289 | 0.452 |
| Ex2 | 0.551 | 0.531 | 0.555 | 0.551 | 0.591 |
| Ex3 | 0.545 | 0.407 | 0.373 | 0.464 | 0.563 |
| Ex4 | 0.416 | 0.608 | 0.659 | 0.605 | 0.615 |
| Ex5 | 0.492 | 0.554 | 0.305 | 0.418 | 0.423 |
| S1 | 1.000 | 0.662 | 0.462 | 0.578 | 0.738 |
| S2 | 0.662 | 1.000 | 0.483 | 0.550 | 0.532 |
| S3 | 0.462 | 0.483 | 1.000 | 0.750 | 0.745 |
| S4 | 0.578 | 0.550 | 0.750 | 1.000 | 0.828 |
| S5 | 0.738 | 0.532 | 0.745 | 0.828 | 1.000 |
| Ed1 | 0.513 | 0.601 | 0.547 | 0.492 | 0.500 |
| Ed2 | 0.423 | 0.475 | 0.400 | 0.481 | 0.520 |
| Ed3 | 0.326 | 0.361 | 0.155 | 0.200 | 0.147 |
| Ed4 | 0.380 | 0.320 | 0.183 | 0.345 | 0.364 |
| Ed5 | 0.408 | 0.562 | 0.554 | 0.457 | 0.477 |

| | Ed1 | Ed2 | Ed3 | Ed4 | Ed5 |
|---|---|---|---|---|---|
| G1 | 0.505 | 0.449 | 0.201 | 0.281 | 0.489 |
| G2 | 0.488 | 0.326 | 0.165 | 0.018 | 0.477 |
| G3 | 0.592 | 0.612 | 0.374 | 0.451 | 0.604 |
| G4 | 0.650 | 0.585 | 0.383 | 0.205 | 0.457 |
| I1 | 0.507 | 0.455 | 0.409 | 0.150 | 0.486 |
| I2 | 0.480 | 0.438 | 0.178 | 0.211 | 0.626 |
| I3 | 0.517 | 0.475 | 0.329 | 0.313 | 0.603 |
| I4 | 0.418 | 0.486 | 0.323 | 0.395 | 0.498 |
| I5 | 0.511 | 0.333 | 0.486 | 0.277 | 0.642 |
| N1 | 0.508 | 0.446 | 0.303 | 0.393 | 0.452 |
| N2 | 0.680 | 0.512 | 0.191 | 0.327 | 0.583 |
| N3 | 0.674 | 0.442 | 0.351 | 0.339 | 0.630 |
| N4 | 0.659 | 0.489 | 0.407 | 0.425 | 0.600 |
| V1 | 0.717 | 0.595 | 0.197 | 0.382 | 0.690 |
| V2 | 0.621 | 0.546 | 0.471 | 0.387 | 0.682 |
| V3 | 0.557 | 0.401 | 0.133 | 0.282 | 0.505 |
| V4 | 0.538 | 0.443 | 0.278 | 0.377 | 0.584 |
| V6 | 0.495 | 0.329 | 0.474 | 0.381 | 0.487 |
| P1 | 0.666 | 0.568 | 0.401 | 0.334 | 0.687 |
| P2 | 0.526 | 0.471 | 0.387 | 0.360 | 0.616 |
| P3 | 0.504 | 0.478 | 0.263 | 0.353 | 0.583 |
| P4 | 0.707 | 0.427 | 0.282 | 0.221 | 0.613 |
| Ex1 | 0.598 | 0.582 | 0.266 | 0.300 | 0.499 |
| Ex2 | 0.663 | 0.550 | 0.264 | 0.171 | 0.552 |
| Ex3 | 0.546 | 0.539 | 0.135 | 0.344 | 0.392 |
| Ex4 | 0.830 | 0.660 | 0.235 | 0.171 | 0.601 |
| Ex5 | 0.772 | 0.613 | 0.422 | 0.276 | 0.646 |
| S1 | 0.513 | 0.423 | 0.326 | 0.380 | 0.408 |
| S2 | 0.601 | 0.475 | 0.361 | 0.320 | 0.562 |
| S3 | 0.547 | 0.400 | 0.155 | 0.183 | 0.554 |
| S4 | 0.492 | 0.481 | 0.200 | 0.345 | 0.457 |
| S5 | 0.500 | 0.520 | 0.147 | 0.364 | 0.477 |
| Ed1 | 1.000 | 0.682 | 0.392 | 0.279 | 0.828 |
| Ed2 | 0.682 | 1.000 | 0.359 | 0.465 | 0.539 |
| Ed3 | 0.392 | 0.359 | 1.000 | 0.522 | 0.413 |
| Ed4 | 0.279 | 0.465 | 0.522 | 1.000 | 0.461 |
| Ed5 | 0.828 | 0.539 | 0.413 | 0.461 | 1.000 |

## Appendix F

## Inter-item Correlations Between FDF Final Scale Items

| | T1 | T2 | T3 | T4 | T5 | T6 | T7 | T8 | T9 |
|---|---|---|---|---|---|---|---|---|---|
| T1 | 1.000 | 0.651 | 0.743 | 0.282 | 0.366 | 0.316 | 0.580 | 0.717 | 0.732 |
| T2 | 0.651 | 1.000 | 0.795 | 0.230 | 0.326 | 0.212 | 0.538 | 0.605 | 0.622 |
| T3 | 0.743 | 0.795 | 1.000 | 0.147 | 0.259 | 0.175 | 0.551 | 0.695 | 0.693 |
| T4 | 0.282 | 0.230 | 0.147 | 1.000 | 0.813 | 0.803 | 0.303 | 0.332 | 0.336 |
| T5 | 0.366 | 0.326 | 0.259 | 0.813 | 1.000 | 0.800 | 0.403 | 0.416 | 0.383 |
| T6 | 0.316 | 0.212 | 0.175 | 0.803 | 0.800 | 1.000 | 0.253 | 0.337 | 0.334 |
| T7 | 0.580 | 0.538 | 0.551 | 0.303 | 0.403 | 0.253 | 1.000 | 0.728 | 0.715 |
| T8 | 0.717 | 0.605 | 0.695 | 0.332 | 0.416 | 0.337 | 0.728 | 1.000 | 0.842 |
| T9 | 0.732 | 0.622 | 0.693 | 0.336 | 0.383 | 0.334 | 0.715 | 0.842 | 1.000 |
| T10 | 0.680 | 0.543 | 0.578 | 0.446 | 0.501 | 0.390 | 0.660 | 0.732 | 0.748 |
| T11 | 0.673 | 0.552 | 0.652 | 0.345 | 0.446 | 0.359 | 0.614 | 0.737 | 0.700 |
| T12 | 0.520 | 0.571 | 0.606 | 0.267 | 0.382 | 0.282 | 0.517 | 0.539 | 0.517 |
| T13 | 0.627 | 0.618 | 0.662 | 0.327 | 0.431 | 0.335 | 0.606 | 0.626 | 0.650 |
| T14 | 0.501 | 0.549 | 0.571 | 0.370 | 0.460 | 0.352 | 0.522 | 0.606 | 0.600 |
| T15 | 0.632 | 0.613 | 0.634 | 0.365 | 0.495 | 0.343 | 0.605 | 0.765 | 0.707 |
| T16 | 0.696 | 0.588 | 0.698 | 0.284 | 0.341 | 0.292 | 0.636 | 0.788 | 0.784 |
| T17 | 0.646 | 0.574 | 0.657 | 0.229 | 0.329 | 0.250 | 0.539 | 0.639 | 0.645 |
| F1 | 0.537 | 0.557 | 0.636 | 0.255 | 0.258 | 0.214 | 0.409 | 0.501 | 0.533 |
| F2 | 0.592 | 0.633 | 0.690 | 0.268 | 0.326 | 0.226 | 0.483 | 0.587 | 0.557 |
| F3 | 0.573 | 0.587 | 0.692 | 0.252 | 0.308 | 0.210 | 0.466 | 0.556 | 0.586 |
| F4 | 0.421 | 0.327 | 0.332 | 0.546 | 0.502 | 0.573 | 0.266 | 0.370 | 0.373 |
| F5 | 0.286 | 0.294 | 0.293 | 0.466 | 0.512 | 0.549 | 0.229 | 0.358 | 0.415 |
| F6 | 0.248 | 0.215 | 0.224 | 0.543 | 0.535 | 0.670 | 0.141 | 0.286 | 0.323 |
| F7 | 0.490 | 0.487 | 0.441 | 0.365 | 0.358 | 0.309 | 0.483 | 0.434 | 0.470 |
| F8 | 0.595 | 0.528 | 0.589 | 0.265 | 0.324 | 0.237 | 0.440 | 0.578 | 0.586 |
| F9 | 0.563 | 0.524 | 0.587 | 0.252 | 0.288 | 0.238 | 0.383 | 0.528 | 0.555 |
| F10 | 0.571 | 0.533 | 0.602 | 0.374 | 0.438 | 0.308 | 0.464 | 0.621 | 0.587 |
| F11 | 0.598 | 0.532 | 0.600 | 0.314 | 0.389 | 0.289 | 0.439 | 0.631 | 0.533 |
| F12 | 0.437 | 0.470 | 0.507 | 0.266 | 0.347 | 0.264 | 0.342 | 0.450 | 0.403 |
| F13 | 0.554 | 0.614 | 0.634 | 0.313 | 0.383 | 0.299 | 0.522 | 0.562 | 0.546 |
| F14 | 0.385 | 0.480 | 0.490 | 0.356 | 0.378 | 0.290 | 0.350 | 0.512 | 0.445 |
| F15 | 0.526 | 0.475 | 0.523 | 0.353 | 0.404 | 0.288 | 0.376 | 0.626 | 0.544 |
| F16 | 0.539 | 0.476 | 0.557 | 0.244 | 0.246 | 0.222 | 0.366 | 0.554 | 0.559 |
| F17 | 0.540 | 0.510 | 0.596 | 0.199 | 0.246 | 0.220 | 0.372 | 0.539 | 0.553 |

| | T10 | T11 | T12 | T13 | T14 | T15 | T16 | T17 |
|---|---|---|---|---|---|---|---|---|
| T1 | 0.680 | 0.673 | 0.520 | 0.627 | 0.501 | 0.632 | 0.696 | 0.646 |
| T2 | 0.543 | 0.552 | 0.571 | 0.618 | 0.549 | 0.613 | 0.588 | 0.574 |
| T3 | 0.578 | 0.652 | 0.606 | 0.662 | 0.571 | 0.634 | 0.698 | 0.657 |
| T4 | 0.446 | 0.345 | 0.267 | 0.327 | 0.370 | 0.365 | 0.284 | 0.229 |
| T5 | 0.501 | 0.446 | 0.382 | 0.431 | 0.460 | 0.495 | 0.341 | 0.329 |
| T6 | 0.390 | 0.359 | 0.282 | 0.335 | 0.352 | 0.343 | 0.292 | 0.250 |
| T7 | 0.660 | 0.614 | 0.517 | 0.606 | 0.522 | 0.605 | 0.636 | 0.539 |
| T8 | 0.732 | 0.737 | 0.539 | 0.626 | 0.606 | 0.765 | 0.788 | 0.639 |
| T9 | 0.748 | 0.700 | 0.517 | 0.650 | 0.600 | 0.707 | 0.784 | 0.645 |
| T10 | 1.000 | 0.793 | 0.498 | 0.688 | 0.680 | 0.790 | 0.729 | 0.532 |
| T11 | 0.793 | 1.000 | 0.641 | 0.758 | 0.647 | 0.762 | 0.729 | 0.585 |
| T12 | 0.498 | 0.641 | 1.000 | 0.767 | 0.638 | 0.567 | 0.557 | 0.496 |
| T13 | 0.688 | 0.758 | 0.767 | 1.000 | 0.692 | 0.680 | 0.690 | 0.581 |
| T14 | 0.680 | 0.647 | 0.638 | 0.692 | 1.000 | 0.767 | 0.612 | 0.492 |
| T15 | 0.790 | 0.762 | 0.567 | 0.680 | 0.767 | 1.000 | 0.760 | 0.640 |
| T16 | 0.729 | 0.729 | 0.557 | 0.690 | 0.612 | 0.760 | 1.000 | 0.776 |
| T17 | 0.532 | 0.585 | 0.496 | 0.581 | 0.492 | 0.640 | 0.776 | 1.000 |
| F1 | 0.466 | 0.549 | 0.420 | 0.479 | 0.498 | 0.491 | 0.567 | 0.650 |
| F2 | 0.510 | 0.570 | 0.496 | 0.566 | 0.503 | 0.564 | 0.607 | 0.713 |
| F3 | 0.511 | 0.548 | 0.460 | 0.527 | 0.501 | 0.518 | 0.623 | 0.691 |
| F4 | 0.379 | 0.367 | 0.282 | 0.396 | 0.398 | 0.406 | 0.355 | 0.352 |
| F5 | 0.402 | 0.408 | 0.351 | 0.424 | 0.371 | 0.398 | 0.408 | 0.368 |
| F6 | 0.303 | 0.317 | 0.349 | 0.367 | 0.346 | 0.293 | 0.275 | 0.220 |
| F7 | 0.448 | 0.487 | 0.392 | 0.449 | 0.369 | 0.420 | 0.484 | 0.513 |
| F8 | 0.552 | 0.615 | 0.429 | 0.502 | 0.508 | 0.580 | 0.673 | 0.672 |
| F9 | 0.461 | 0.578 | 0.469 | 0.490 | 0.487 | 0.502 | 0.601 | 0.641 |
| F10 | 0.648 | 0.704 | 0.554 | 0.595 | 0.573 | 0.656 | 0.637 | 0.622 |
| F11 | 0.579 | 0.725 | 0.516 | 0.589 | 0.486 | 0.618 | 0.619 | 0.642 |
| F12 | 0.447 | 0.552 | 0.571 | 0.568 | 0.497 | 0.453 | 0.478 | 0.485 |
| F13 | 0.584 | 0.657 | 0.568 | 0.693 | 0.560 | 0.562 | 0.622 | 0.651 |
| F14 | 0.488 | 0.575 | 0.532 | 0.543 | 0.643 | 0.554 | 0.502 | 0.461 |
| F15 | 0.589 | 0.674 | 0.460 | 0.525 | 0.507 | 0.664 | 0.605 | 0.627 |
| F16 | 0.508 | 0.598 | 0.425 | 0.495 | 0.470 | 0.541 | 0.687 | 0.684 |
| F17 | 0.463 | 0.598 | 0.429 | 0.513 | 0.451 | 0.543 | 0.664 | 0.764 |

| | F1 | F2 | F3 | F4 | F5 | F6 | F7 | F8 | F9 |
|---|---|---|---|---|---|---|---|---|---|
| T1 | 0.537 | 0.592 | 0.573 | 0.421 | 0.286 | 0.248 | 0.490 | 0.595 | 0.563 |
| T2 | 0.557 | 0.633 | 0.587 | 0.327 | 0.294 | 0.215 | 0.487 | 0.528 | 0.524 |
| T3 | 0.636 | 0.690 | 0.692 | 0.332 | 0.293 | 0.224 | 0.441 | 0.589 | 0.587 |
| T4 | 0.255 | 0.268 | 0.252 | 0.546 | 0.466 | 0.543 | 0.365 | 0.265 | 0.252 |
| T5 | 0.258 | 0.326 | 0.308 | 0.502 | 0.512 | 0.535 | 0.358 | 0.324 | 0.288 |
| T6 | 0.214 | 0.226 | 0.210 | 0.573 | 0.549 | 0.670 | 0.309 | 0.237 | 0.238 |
| T7 | 0.409 | 0.483 | 0.466 | 0.266 | 0.229 | 0.141 | 0.483 | 0.440 | 0.383 |
| T8 | 0.501 | 0.587 | 0.556 | 0.370 | 0.358 | 0.286 | 0.434 | 0.578 | 0.528 |
| T9 | 0.533 | 0.557 | 0.586 | 0.373 | 0.415 | 0.323 | 0.470 | 0.586 | 0.555 |
| T10 | 0.466 | 0.510 | 0.511 | 0.379 | 0.402 | 0.303 | 0.448 | 0.552 | 0.461 |
| T11 | 0.549 | 0.570 | 0.548 | 0.367 | 0.408 | 0.317 | 0.487 | 0.615 | 0.578 |
| T12 | 0.420 | 0.496 | 0.460 | 0.282 | 0.351 | 0.349 | 0.392 | 0.429 | 0.469 |
| T13 | 0.479 | 0.566 | 0.527 | 0.396 | 0.424 | 0.367 | 0.449 | 0.502 | 0.490 |
| T14 | 0.498 | 0.503 | 0.501 | 0.398 | 0.371 | 0.346 | 0.369 | 0.508 | 0.487 |
| T15 | 0.491 | 0.564 | 0.518 | 0.406 | 0.398 | 0.293 | 0.420 | 0.580 | 0.502 |
| T16 | 0.567 | 0.607 | 0.623 | 0.355 | 0.408 | 0.275 | 0.484 | 0.673 | 0.601 |
| T17 | 0.650 | 0.713 | 0.691 | 0.352 | 0.368 | 0.220 | 0.513 | 0.672 | 0.641 |
| F1 | 1.000 | 0.794 | 0.869 | 0.459 | 0.296 | 0.219 | 0.602 | 0.748 | 0.759 |
| F2 | 0.794 | 1.000 | 0.814 | 0.447 | 0.360 | 0.295 | 0.683 | 0.791 | 0.763 |
| F3 | 0.869 | 0.814 | 1.000 | 0.467 | 0.367 | 0.245 | 0.710 | 0.816 | 0.799 |
| F4 | 0.459 | 0.447 | 0.467 | 1.000 | 0.724 | 0.722 | 0.429 | 0.433 | 0.420 |
| F5 | 0.296 | 0.360 | 0.367 | 0.724 | 1.000 | 0.825 | 0.406 | 0.432 | 0.372 |
| F6 | 0.219 | 0.295 | 0.245 | 0.722 | 0.825 | 1.000 | 0.303 | 0.312 | 0.314 |
| F7 | 0.602 | 0.683 | 0.710 | 0.429 | 0.406 | 0.303 | 1.000 | 0.770 | 0.731 |
| F8 | 0.748 | 0.791 | 0.816 | 0.433 | 0.432 | 0.312 | 0.770 | 1.000 | 0.904 |
| F9 | 0.759 | 0.763 | 0.799 | 0.420 | 0.372 | 0.314 | 0.731 | 0.904 | 1.000 |
| F10 | 0.667 | 0.733 | 0.707 | 0.423 | 0.458 | 0.354 | 0.671 | 0.789 | 0.795 |
| F11 | 0.718 | 0.756 | 0.709 | 0.433 | 0.378 | 0.284 | 0.632 | 0.796 | 0.793 |
| F12 | 0.647 | 0.634 | 0.657 | 0.398 | 0.399 | 0.351 | 0.510 | 0.641 | 0.679 |
| F13 | 0.684 | 0.684 | 0.718 | 0.395 | 0.402 | 0.270 | 0.619 | 0.699 | 0.691 |
| F14 | 0.654 | 0.664 | 0.689 | 0.427 | 0.362 | 0.307 | 0.582 | 0.691 | 0.681 |
| F15 | 0.620 | 0.706 | 0.689 | 0.429 | 0.426 | 0.331 | 0.624 | 0.777 | 0.731 |
| F16 | 0.730 | 0.748 | 0.804 | 0.380 | 0.358 | 0.253 | 0.661 | 0.836 | 0.816 |
| F17 | 0.782 | 0.774 | 0.817 | 0.427 | 0.381 | 0.255 | 0.642 | 0.827 | 0.804 |

| | F10 | F11 | F12 | F13 | F14 | F15 | F16 | F17 |
|---|---|---|---|---|---|---|---|---|
| T1 | 0.571 | 0.598 | 0.437 | 0.554 | 0.385 | 0.526 | 0.539 | 0.540 |
| T2 | 0.533 | 0.532 | 0.470 | 0.614 | 0.480 | 0.475 | 0.476 | 0.510 |
| T3 | 0.602 | 0.600 | 0.507 | 0.634 | 0.490 | 0.523 | 0.557 | 0.596 |
| T4 | 0.374 | 0.314 | 0.266 | 0.313 | 0.356 | 0.353 | 0.244 | 0.199 |
| T5 | 0.438 | 0.389 | 0.347 | 0.383 | 0.378 | 0.404 | 0.246 | 0.246 |
| T6 | 0.308 | 0.289 | 0.264 | 0.299 | 0.290 | 0.288 | 0.222 | 0.220 |
| T7 | 0.464 | 0.439 | 0.342 | 0.522 | 0.350 | 0.376 | 0.366 | 0.372 |
| T8 | 0.621 | 0.631 | 0.450 | 0.562 | 0.512 | 0.626 | 0.554 | 0.539 |
| T9 | 0.587 | 0.533 | 0.403 | 0.546 | 0.445 | 0.544 | 0.559 | 0.553 |
| T10 | 0.648 | 0.579 | 0.447 | 0.584 | 0.488 | 0.589 | 0.508 | 0.463 |
| T11 | 0.704 | 0.725 | 0.552 | 0.657 | 0.575 | 0.674 | 0.598 | 0.598 |
| T12 | 0.554 | 0.516 | 0.571 | 0.568 | 0.532 | 0.460 | 0.425 | 0.429 |
| T13 | 0.595 | 0.589 | 0.568 | 0.693 | 0.543 | 0.525 | 0.495 | 0.513 |
| T14 | 0.573 | 0.486 | 0.497 | 0.560 | 0.643 | 0.507 | 0.470 | 0.451 |
| T15 | 0.656 | 0.618 | 0.453 | 0.562 | 0.554 | 0.664 | 0.541 | 0.543 |
| T16 | 0.637 | 0.619 | 0.478 | 0.622 | 0.502 | 0.605 | 0.687 | 0.664 |
| T17 | 0.622 | 0.642 | 0.485 | 0.651 | 0.461 | 0.627 | 0.684 | 0.764 |
| F1 | 0.667 | 0.718 | 0.647 | 0.684 | 0.654 | 0.620 | 0.730 | 0.782 |
| F2 | 0.733 | 0.756 | 0.634 | 0.684 | 0.664 | 0.706 | 0.748 | 0.774 |
| F3 | 0.707 | 0.709 | 0.657 | 0.718 | 0.689 | 0.689 | 0.804 | 0.817 |
| F4 | 0.423 | 0.433 | 0.398 | 0.395 | 0.427 | 0.429 | 0.380 | 0.427 |
| F5 | 0.458 | 0.378 | 0.399 | 0.402 | 0.362 | 0.426 | 0.358 | 0.381 |
| F6 | 0.354 | 0.284 | 0.351 | 0.270 | 0.307 | 0.331 | 0.253 | 0.255 |
| F7 | 0.671 | 0.632 | 0.510 | 0.619 | 0.582 | 0.624 | 0.661 | 0.642 |
| F8 | 0.789 | 0.796 | 0.641 | 0.699 | 0.691 | 0.777 | 0.836 | 0.827 |
| F9 | 0.795 | 0.793 | 0.679 | 0.691 | 0.681 | 0.731 | 0.816 | 0.804 |
| F10 | 1.000 | 0.862 | 0.700 | 0.773 | 0.708 | 0.822 | 0.741 | 0.737 |
| F11 | 0.862 | 1.000 | 0.732 | 0.779 | 0.701 | 0.850 | 0.781 | 0.780 |
| F12 | 0.700 | 0.732 | 1.000 | 0.767 | 0.743 | 0.662 | 0.685 | 0.679 |
| F13 | 0.773 | 0.779 | 0.767 | 1.000 | 0.760 | 0.724 | 0.720 | 0.743 |
| F14 | 0.708 | 0.701 | 0.743 | 0.760 | 1.000 | 0.773 | 0.755 | 0.732 |
| F15 | 0.822 | 0.850 | 0.662 | 0.724 | 0.773 | 1.000 | 0.837 | 0.788 |
| F16 | 0.741 | 0.781 | 0.685 | 0.720 | 0.755 | 0.837 | 1.000 | 0.881 |
| F17 | 0.737 | 0.780 | 0.679 | 0.743 | 0.732 | 0.788 | 0.881 | 1.000 |