



Relation of person–environment fit to career certainty

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ABSTRACT

This study examined the person–environment fit–career outcome relation by observing interests, self-efficacy and parental support as person aspects and major and occupational choice as separate indicators of the environment. Career certainty was selected as a career outcome. Two dimensional fit indices (People–Things and Data–Ideas) were examined as was the incremental validity of adding prestige fit indices. In addition, we examined the moderation of these PE fit–outcome relations by ethnicity (Anglos vs. Latino/a's). Results revealed that the PE fit predictors were moderately related and none of the two dimensional PE fit predictors significantly related to career certainty, while nearly all of the Prestige PE fit–certainty relations were significant. Support was found for the spherical structure of work types and person variables [Tracey, T. J. G., & Rounds, J. (1996b). Contributions of the spherical representation of vocational interests. *Journal of Vocational Behavior*, 48, 85–95].

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1. Introduction

A cornerstone of the field of vocational psychology, dating back to Parsons (1909), is person–environment fit (PE fit), assisting individuals to select environments that would be optimal. Indeed, most career choice theories are based on the general notion that people perform better and are more satisfied in occupational environments that match their interests or other personal variables (e.g., Dawis & Lofquist, 1984; Holland, 1973, 1997). Despite extensive examination, attention, and application of the congruence model in career counseling and academic advising with diverse groups, the professional literature has yielded equivocal support for the validity of the congruence relation to reliably predict career-related criteria (Assouline & Meir, 1987; Tinsley, 2000a, 2000b; Tracey, Darcy, & Kovalski, 2000). Researchers (Spokane, Meir, & Catalano, 2000; Tinsley, 2000a; Tinsley, 2000b; Tracey, 2007; Tracey et al., 2000) have called for examination of potential moderating factors into question in attempt to explain the ambiguous results of such a “common sense,” heavily used notion. Theorists have identified the structure of interests and environments, common measurements of interest, psychological variables such as self-efficacy, and more recently, contextual constructs, such as culture and family, as potential contributors to the mixed findings of the predictive validity of PE fit (Assouline & Meir, 1987; Tinsley, 2000a; Tinsley, 2000b; Tracey et al. 2000). Research (Spokane, 1985; Tracey & Robbins, 2005) has demonstrated that the congruence index used may be one of the most significant factors in the PE fit relations ability to predict outcome criteria. The purpose of the current study was to further examine the PE fit–outcome relation by examining various different person domains that could moderate the relation between fit and career outcome. Specifically, we examined interest, self-efficacy and parental support as different person aspects used in defining PE fit. In addition, we examined the utility of including prestige as a salient factor in PE fit.

Most all PE fit research has focused on the match of interests to the occupation typically using Holland types. The Spokane (1985) and Assouline and Meir (1987) meta-analyses draw mostly from this area. Researchers are increasingly putting more

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weight on new PE fit relations to predict career outcomes and attempt to explain the equivocal results generated from previous research on interest-occupation congruence (Betz, 2004; Betz & Rottinghaus, 2006). The idea is that other congruence relations may account for the unexplained variance in career outcomes that interest-occupation congruence alone does not seem to explain. Self-efficacy has received extensive empirical attention with respect to career issues (e.g., Lent, Brown, & Hackett, 1984) but less as a basis of PE fit. Vocational self-efficacy is defined as one's beliefs about his or her ability to complete tasks associated with their job (Betz & Rottinghaus, 2006). The similarity between vocational self-efficacy and the work environment has increasingly been assessed as a type of "fit" (Betz & Gwilliam, 2002). Self-efficacy-environment fit continues to be linked to several important career outcomes, such as satisfaction (Betz & Rottinghaus, 2006; Donnay & Borgen, 1999). Thus, career criteria, may be better explained by not only assessing people's interest-occupation congruence, but the match between what they are good at doing and what they actually do.

Perceived parental-support is another congruence relation that has been linked to career decision-making (Whiston & Keller, 2004), especially in cultures that place high priority on familial values in life pursuits (Trusty, Plata, & Salazar, 2003; Turner & Lapan, 2002). Few research studies have assessed the predictive utility of the congruence one experiences between the occupations their parent's support and their actual occupation. One of the few published studies in this area (Trusty et al., 2003) suggested that as individuals make career decisions they may strive to not only achieve congruence between their career choice and interests, but also their career and parental support. Thus, the match between what one's parent's support and one's actual chosen field may be contributing to a proportion of the variance observed in career outcomes. If interest-occupation congruence only predicts career outcome criteria on certain occasions, as demonstrated in research (Spokane, 1985; Spokane et al., 2000; Tinsley, 2000a; Tinsley, 2000b; Tracey et al., 2000), other similarities or fit relations may be important predictors to include in assessing career outcome variance attributed to PE fit.

Most assessment of the PE fit-career outcome relation have relied upon Holland's (1997) RIASEC model as the means of matching person and environment. However, research has demonstrated that there is an independent third dimension underlying interest assessment, that of prestige (Tracey, 1997; Tracey & Rounds, 1996a, 1996b). Specifically this research has demonstrated that interests can be described as existing in three dimensions: Prediger's (Prediger, 1982; Prediger & Vansickle, 1992) two dimensions of People-Things and Data-Ideas, and prestige. There has been strong support for this representation of interests (Darcy, 2005; Long, Watanabe, & Tracey, 2006; Tracey, 1997, 2002a; Tracey & Rounds, 1996a, 1996b). Because RIASEC scales exist on the People-Things and Data-Ideas plane, all current indices of PE fit use only these dimensions. We sought to examine if prestige is an additional important component of the PE fit-career outcome relation. Prestige has been described as "one of the most prominent factors that people use in evaluating different occupations" (Tracey, 2002a, p.115). Research has demonstrated that the incorporation of a prestige dimension more accurately captures one's interests, career, and the congruence between the two (Tracey & Rounds, 1996a; Tracey & Rounds, 1996b. Tracey and Rounds (1996a), Tracey and Rounds (1996b) reported that though prestige has been noted in vocational literature as a strong determinant of career aspirations and choice, it has not been specifically included in interest research. Thus, an additional purpose of this study was to determine if incorporating a prestige dimension in the fit calculations altered the strength of the relation of PE fit to occupational certainty. Specifically, we hypothesized that adding the fit of the person's prestige to the environment prestige would increase the prediction of career outcomes above that found using more typical PE fit indices that focus on the two dimensions of People-Things and Data-Ideas (and the implied RIASEC scales).

Recent studies have begun to argue for more focus on the role of contextual variables to explain a proportion of the variance in both the congruence outcome and the usefulness of this relationship in predicting future career-related variables (Day & Rounds, 1998; Fouad & Mohler, 2004; Gupta & Tracey, 2005; Toit & Bruinn, 2002; Tsabari, Tziner, & Meir, 2005). In a recent meta-analysis, Tsabari et al. (2005) examined the connection between congruence and satisfaction with consideration of culture as a moderating variable. They (Tsabari et al., 2005) reported that, "Culture is a moderating variable for the correlation between congruence and satisfaction" (p.220), and that, "This correlation will be higher in some cultures than in others" (p.220). Constantine, Wallace, and Kindaichi (2005) found that minority group members in general might place greater priority on familial goals and needs over individual goals to be in line with cultural values that emphasize familism and communalism. Further, Brown (2004) suggested that the strong involvement of the family in directing children and adults has been viewed as reflecting the collectivistic culture of Chicano, Latino/a, and Mexican-Americans. Leal-Muniz and Constantine (2005) suggested that within the myriad of culture specific values Mexican-Americans may possess in relation to career development, parents may be viewed as either supportive or as a barrier to career development, especially if education and nontraditional career choices are not valued within the nuclear unit. The authors (Leal-Muniz & Constantine, 2005) concluded that minority adolescents' may rely heavily on parental support throughout the life course of their career, and therefore, emphasis on individual factors alone in the career counseling process, such as vocational interests, may run counter to the individual's goals to stay in line with family and cultural expectations. Such findings highlight the importance of evaluating the moderating affects of ethnicity on the relation between career predictors and career outcomes. Part of the purpose of this study, then, was to explore ethnic differences in the relation of PE fit to career certainty between a Latino/a/Mexican-American and European-American sample.

Several key findings suggest the urgency to observe the vocational development of Latinos and Mexican-Americans in particular. Trusty et al. (2003) pointed out that the 1997 U.S. Current Population Survey by the U.S. Census Bureau identified Hispanic people comprising roughly 11% of the total U.S. population, of which approximately 63% are Mexican-American. Furthermore, Trusty et al. (2003) explained that "Hispanic undergraduate students were less economically affluent than their White counterparts, and Mexican-Americans and Puerto Ricans were poorer than Cuban American students"

(p.132). Approximately 29% of Hispanics have completed at least some college work, while over 50% of U.S. non-Hispanics have done some college work. Furthermore, Flores and O'Brien (2002) pointed out that Mexican-American college students may experience greater psychological stress than other groups as they attempt to link their career aspirations with familial and cultural values.

The purpose of this investigation was to examine the PE fit-career outcome relation using several different variables. First we sought to examine typical interest-environment fit and its relation to career outcomes. We specifically adopted the Euclidean distance method of operationalizing PE fit used by Tracey and Robbins (2006). They defined PE fit as the Euclidean distance between the person and the environment in the two dimensional space of People-Things and Data-Ideas. This approach of using the dimensions instead of the RIASEC scores themselves obviates many of the problems (de Fruyt, 2002) associated with most RIASEC indices as it relies on the structure of the scales and uses all the information in the profile, not just a few of the scales. However we also examined PE fit using self-efficacy and parental support in addition to interests to examine the relative utility of each of these important person aspects. We also examined the merit of including prestige as a basis of PE fit. Specifically we examined the extent to which people's interest prestige matched the prestige level of the environment. However we also examined the prestige level of people's self-efficacy and parental support. Would the degree of match in prestige of an individual's self-efficacy to the prestige in an environment predict career outcomes? Would the degree of match in prestige of an individual's parental support of occupational choice predict career outcomes? So there were six different PE fit definitions examined: interests represented in two dimensions (People-Things and Data-Ideas), self-efficacy in two dimensions, parental support in two dimensions, interest prestige, self-efficacy prestige and parental support prestige. We examined how each of these would relate to career outcomes. In addition we examined how these PE fit-career outcome relations might be moderated by ethnicity. Specifically we hypothesized that the PE fit- outcome relation would be stronger for Anglos than Latino/a's because of the greater barriers associated with career development in underrepresented groups (Leal-Muniz & Constantine, 2005).

We selected certainty as our career outcome. The degree of certainty one experiences toward their chosen field has been termed career certainty, and it is increasingly recognized as an important concept in career development (Daniels, Clifton, Perry, Mandzuk, & Hall, 2006; Temple & Osipow, 1994; Tracey & Darcy, 2002). Higher career certainty has been linked to self-efficacy in one's chosen field (Tempe & Osipow, 1994), career and academic persistence and self-confidence (Singaravelu, White, & Bringaze, 2005), stronger commitment to developing a vocational identity (Schulenberg, Vondracek, & Kim, 1993), and greater career aspirations (Constantine & Flores, 2006). Career certainty is also a primary factor of career decision status (Winnie Ma & Yeh, 2005), which has been found to be strongly related to career maturity (Winnie Ma & Yeh, 2005). General consensus is that certainty of choices throughout the career decision-making process matters because with certainty comes a reduction in career-related anxiety (Constantine & Flores, 2006; Daniels et al., 2006). Thus, more researchers have begun to look at the necessary ingredients to achieve a sense of certainty about career choices (Constantine & Flores, 2006; Daniels et al., 2006; Schulenberg et al., 1993; Singaravelu et al., 2005; Tracey & Darcy, 2002). Increased psychological distress (Constantine & Flores, 2006), greater career anxiety (Daniels et al., 2006), and vocational interests that deviate from the normative RIASEC model (Tracey & Darcy, 2002) have all been found to predict career certainty. How well the career "fits" the person has been cited numerous times as a strong predictor of other career outcome criteria (Tsabari et al., 2005; Spokane et al., 2000), yet few studies have investigated the relation of PE fit to career certainty. We specifically focused on both major and occupational certainty. While they are related, each involves a separate decision and certainty can vary for each of these important decisions.

Three general research questions were thus addressed in this study: (1) What are the relations among the different PE fit measures and environmental certainty (both major and occupational), (2) what is the relative relation of the fit predictors with certainty of career choice, as determined by the congruence index employed, and (3) what cultural differences exist in these relations; (A) are there differences on any of the variables across ethnicity (Latino/a versus whites), and (B) will ethnicity moderate the relations of congruence and certainty. Specifically, we hypothesized that there would be a positive, significant relation between the PE fit predictors and between PE fit and career certainty, both at the major and occupational level. Further, we expected the strength of these relations to increase when prestige is added to the typical two dimensional PE fit indices. For example, we expected that the more congruent one's interests are to their major or occupational tasks, the more certain they will be about that choice. Finally, we hypothesized that family may play a more significant role in the career decision-making of minority American individuals than European-Americans. It has been found that Mexican-American and Latino/a students may strive to stay in line with ethnic values such as familial support as opposed to following their own vocational interests in making a career choice (Flores & O'Brien, 2002). Thus, it was hypothesized that Mexican-American and Latino/a students would have greater parental support-occupation and major congruence but weaker interest and self-efficacy-occupation and major congruence. In other words, we expected ethnicity to moderate the PE fit to career certainty relation.

2. Methods

2.1. Sample

The sample consisted of 118 undergraduate students (38 males and 80 females) at a large public university in the Southwest of the United States. The ethnic breakdown was: two African-Americans (1.7%), 55 Mexican-Americans, Mexicans, or

Latino/a's (47.4%), two Asian-Americans (1.7%), 51 Anglo Americans (44%), three biracial (2.6%), two international (1.7%), and one identified as other (.8%). The mean age was 22 years old ($SD = 6.32$). There was variance in the college major of the participants with the five largest majors reported being Elementary Education (15.3%), General Education (10.2%), Business and Management (9.3%), Psychology (6.8%), and Biology (5.1%).

2.2. Measures

2.2.1. Personal Globe Inventory (PGI-Activities version; Tracey, 2002a)

The PGI Activities version consists of 113 occupational activities to which an individual responds to each activity with respect to interest (1 = very strongly dislike, 7 = very strongly like) and with respect to perceived competence (i.e., self-efficacy) (1 = unable to do, 7 = very competent). These responses can be scored to reflect interest and self-efficacy separately in many manners, including RIASEC scores and Prediger's (1982) People-Things and Data-Ideas dimensions. However the PGI is based on the spherical model (Tracey, 1997; Tracey & Rounds, 1996a; Tracey & Rounds, 1996b) and can yield 18 scores in a three dimensional representation. This representation is based on the People-Things and Data-Ideas dimensions along with the addition of an orthogonal prestige dimension. For the purposes of this study only the People-Things, Data-Ideas, and Prestige dimension scores will be used. These were generated for both interests and self-efficacy separately.

Tracey (2002a) provided psychometric support for the instrument using separate samples of high school and college students. Individual scale reliability was found to be good with most values of alpha greater than .80. Good test-retest reliability was also found over a two to three week period with the vast majority higher than $r = .80$. There was also strong structural validity for the PGI by checking the fit of the eight basic interest and RIASEC scales of the PGI to a circular model and the entire 18 scales to a spherical model by means of a randomization test of hypothesized order relations (RANDALL, Tracey, 1997). This support was not found to vary by age, gender or ethnicity. As for content validity, the PGI RIASEC scales were correlated with the same RIASEC interest scales from the Strong Interest Inventory (SII) and the correlations were all relatively high (mean $r = .70$). The PGI prestige scale has been found to correlate highly with prestige ratings of occupations and with perceptions of prestige, effort and ability (Sodano & Tracey, 2008). So there is good support for the structure and validity of the PGI scales as for the three dimensional representation. For the present study, the internal consistency for the three dimensional scales was estimated to be $\alpha = .89$ for People-Things, .91 for Data-Ideas and .93 for Prestige. These dimensional scores were converted to T scores using sample parameters.

2.2.2. Personal Globe Inventory-Parental Support (PGI-PS)

The PGI-PS was created for the purposes of this study and had the same 113 activity items as the PGI but individuals were requested to respond to each regarding how supportive their parents were for them to engage in each activity (1 = would strongly not support, 7 = would strongly support). Responses were scored in an identical manner to yield the three dimensional subscale scores of People-Things, Data-Ideas and Prestige. Internal consistency estimates of $\alpha = .86$ for People-Things, .89 for Data-Ideas and .92 for Prestige were obtained on the present sample. These parental dimension scores were converted to T scores using sample parameters.

2.2.3. Major and occupational choice and certainty

Respondents were requested to select their current or most likely major from a listing of majors used by ACT which contained over 300 majors (ACT, 1997). Following this selection, respondents were asked to indicate the degree of certainty of continuing in this major (1 = uncertain and 7 = certain). The respondents then were requested to write their occupational choice. If they did not have one, they were requested to write their most likely choice. The certainty of their occupational choice was also rated using the seven point scale. A separate sample of 35 predominately sophomore college students completed the major and occupational choice and certainty portion twice, 2 weeks apart and test-retest correlations of $r = .89$ and .84 were obtained for major and occupational certainty, respectively.

Both the major and occupations were converted to People/Things and Data/Ideas scores using the same procedures as Tracey and Robbins (2006). Both majors and occupations were translated onto the World-of-Work map (ACT, 2001; Prediger & Vansickle, 1992; Swaney, 1995) defined by People-Things and Data-Ideas. Occupational prestige was defined by using the prestige scores based on the national census (Stevens & Cho, 1985). As there are no available scores for prestige of majors. These were generated for the purposes of this study. Nine graduate students in either a Counselor Education master's program or Counseling Psychology doctoral program in the southwest university ranked the majors using a seven point scale (1 = Not Prestigious to 7 = Very Prestigious). The students were in either their first or second year of the program and all had completed an occupational information course. The reliability of these ratings was assessed using intraclass correlation coefficient (with the items as fixed and the raters as random). The absolute ICC was found to be .87. All occupational and major dimension scores were converted to scores that approximated T scores (mean 50, $SD = 10$).

2.3. Derived measures

2.3.1. Interest-environment fit, parental support-environment fit, and self-efficacy-environment fit

These three fit measures were assessed by using the Things-People, Data-Ideas, and Prestige dimensional scores from the PGI scales and the majors and occupations. The Euclidean distance between the Things-People, Data-Ideas and Prestige

scores in the interest, parental support, and self-efficacy space and the Things-People, Data-Ideas, and Prestige scores in the occupation and major space were used as indexes of fit. This index ranges from 0, or no distance between person (interest, parental support, or self-efficacy) and environment (major or occupation) to infinity, where larger scores indicate greater distance between person and environment. As noted, there are several different types of PE fit assessed in this study. First the fit of the person variables to major were calculated. For interests, parental support and self-efficacy we calculated the two dimensional Euclidean distance using the People-Things and Data-Ideas dimension scores. We also calculated the Euclidean distance score for interest prestige, parental support prestige, and self-efficacy prestige with major prestige. This same series of scores was calculated with respect to occupations (three two dimensional Euclidean distance scores (interest, parental support and self-efficacy), and three Euclidean distance prestige scores (interest, parental support and self-efficacy)). To have the scale match the concept of fit, each Euclidean distance score was subtracted from 100. This resulted in a fit score with high values indicative of fit and low values a lack of fit.

A separate sample of 35 predominately sophomore college students completed the measures twice, 2 weeks apart and test-retest correlations of $r = .85$ (interest-major two dimension congruence), $.82$ (parental support-major two dimension congruence), and $.83$ (self-efficacy-major two dimension congruence), $.81$ (interest-major prestige congruence), $.82$ (parental support-major prestige congruence), $.78$ (Self-efficacy-major prestige congruence) were obtained. For the occupation fit indexes, 2 week test-retest correlations of $r = .80$ (interest-major two dimension congruence), $.86$ (parental support-major two dimension congruence), and $.80$ (self-efficacy-major two dimension congruence), $.85$ (interest-major prestige congruence), $.82$ (parental support-major prestige congruence), $.75$ (Self-efficacy-major prestige congruence) were obtained.

2.4. Procedures

The sample was obtained in using the subject pool in educational psychology courses where students receive extra credit for participation ($n = 74$) and via email solicitations ($n = 57$). The email solicitations were sent over the listserv's of six student organizations that served predominantly Hispanic, Mexican, Latina/o or Chicana/o students and this step was added to increase the number of Latina/o students in the sample. Students that were interested responded to the researcher via email and they were sent the study materials. There were approximately 356 students on the six listserv's that were used to solicit participation. Of these, responses were obtained from 57 individuals. A total of 131 responses were obtained using both methods, however only 118 had completed at least 90% of the items. These 118 served as the sample in this study.

3. Results

3.1. Major fit analyses

The correlations among the major fit indices are presented in Table 1. Within the two dimensional major fit indices, there was only a significant relation between interest-major and self-efficacy-major fit ($r = .36, p < .05$) and interest-major and parental support-major fit ($r = .44, p < .05$). There was no significant relation between self-efficacy major fit and parental-support-major fit ($r = .08, p > .05$). For the prestige fit indices all three were significantly related to each other: interest-major fit with parent support-major fit ($r = .61, p < .05$), interest-major fit with self-efficacy-major fit ($r = .33, p < .05$), and parental support-major fit with self-efficacy-major fit ($r = .28, p < .05$). So almost all of the fit indices involving major were related but mostly to a moderate degree.

The main question concerned the relation of the different fit indices to major certainty. None of the two dimensional fit indices were significantly related to major certainty (interest-major fit $r = .13, p > .05$; self-efficacy-major fit $r = -.02, p > .05$; and parental support-major fit $r = .13, p > .05$). There were significant correlations for two of the three prestige fit indices

Table 1
Correlations among the person-major congruence predictors and major certainty.

Variable	1	2	3	4	5	6	7
(1) Major certainty	1.00						
<i>Two dimensional congruence (P/T & I/D)</i>							
(2) Interest-major congruence	0.13	1.00					
(3) Self-efficacy-major congruence	-.02	0.36*	1.00				
(4) Parental-support-major congruence	0.13	0.44*	0.08	1.00			
<i>Prestige congruence</i>							
(5) Interest-major congruence	0.23*	0.02	0.15	-0.03	1.00		
(6) Self-efficacy-major congruence	0.15	0.05	0.15	0.12	0.33*	1.00	
(7) Parental-Support-major congruence	0.26*	0.07	0.15	-0.04	0.61*	0.28*	1.00
Mean	6.03	83.55	82.46	83.64	89.39	88.76	88.73
Stand deviation	1.43	8.10	8.31	8.41	8.13	8.59	8.69

* $p < .05$.

with major certainty (interest-major prestige fit $r = .23, p < .05$; and parental support-major prestige fit $r = .26, p < .05$). Only self-efficacy-major prestige fit was not significantly related to major certainty ($r = .15, p > .05$). So the major-level fit variables (interest-major fit, parental support-major fit, and self-efficacy-major fit) generally related significantly to major certainty with only the relation of two dimensional self-efficacy-major fit and major certainty not being significant.

We were also interested in the proportion of career certainty variance that could be explained by the PE fit predictors both within type (i.e., among the two dimensional fit indices and among the prestige fit indices) and across type (two dimensional versus prestige). We expected that two dimensional self-efficacy-major fit and two dimensional parental support-major fit each to account for additional major certainty variance beyond that explained by interest-major fit. Hierarchical regression was used to assess the increase in major certainty prediction. Neither two dimensional parental support-major fit (R^2 change = .02, $F(1, 108) = 1.61, p > .05$) nor two dimensional self-efficacy-major fit (R^2 change = .00, $F(1, 107) = 1.13, p > .05$) significantly added to the prediction of major certainty beyond two dimensional interest-major fit. So there was no incremental validity among the two dimensional fit indices above that of interest-major fit in predicting major certainty.

We used a similar procedure to examine if adding prestige fit predicted career certainty above that obtained using the two dimensional fit index. This hierarchical regression was conducted separately for each type of fit (interest, self-efficacy, and parental support). For interest fit, adding prestige fit to the two dimensional interest-major fit resulted in a significant gain in prediction (R^2 change = .052, $F(1, 115) = 6.38, p < .05$). A similar pattern was found for adding parent support-major prestige fit to two dimensional parent support-major fit in predicting major certainty (R^2 change = .070, $F(1, 115) = 8.78, p < .05$). However there was no significant increment in major certainty prediction by adding self-efficacy-major prestige fit to two dimensional self-efficacy-major fit (R^2 change = .023, $F(1, 115) = 2.71, p > .05$). So both interest and parental support prestige fit measures added to prediction of major certainty uniquely above that obtained by the typical two dimensional indices.

3.2. Occupational fit analyses

The analyses of the occupational fit indices was identical to that for the major fit indices. The correlations among the occupational fit indices are presented in Table 2. Within the two dimensional occupational fit indices, there was only a significant relation between interest-occupation and self-efficacy-occupation fit ($r = .31, p < .05$) and interest-occupation and parental support-occupation fit ($r = .29, p < .05$). There was no significant relation between self-efficacy occupation fit and parental-support-occupation fit ($r = .04, p > .05$). For the prestige fit indices, all three were significantly related to each other: interest-occupation fit with parent support- occupation fit ($r = .65, p < .05$), interest-occupation fit with self-efficacy-occupation fit ($r = .38, p < .05$), and parental support- occupation fit with self-efficacy occupation fit ($r = .25, p < .05$). So almost all of the fit indices involving occupation were related but mostly to a moderate degree and this result is identical to the results yielded for the major fit indices.

As was true for the two dimensional major fit indices, none of the two dimensional occupational fit indices were significantly related to occupational certainty (interest-occupation fit $r = .14, p > .05$; parental support-occupation fit $r = .03, p > .05$; and self-efficacy occupation fit $r = .09, p > .05$). With regard to prestige fit, only parental support-occupational prestige fit was significantly related to occupational certainty ($r = .19, p < .05$). Unlike the major results which also had interest prestige fit significantly related to certainty, interest-occupational prestige fit was not significantly related to occupational certainty ($r = .12, p > .05$).

Hierarchical regression was used to assess the increase in occupation certainty prediction across the different two dimensional occupational fit indices. Neither two dimensional parental support-occupation fit (R^2 change = .02, $F(1, 108) = 1.61, p > .05$) nor two dimensional self-efficacy-occupation fit (R^2 change = .00, $F(1, 107) = 1.13, p > .05$) significantly added to the prediction of occupation certainty beyond two dimensional interest-occupation fit. So there was no incremental validity among the two dimensional fit indices above that of interest-occupation fit in predicting occupation certainty.

Table 2

Correlations among the person-occupation congruence predictors and occupational certainty.

Variable	1	2	3	4	5	6	7
(1) Occupational certainty	1.00						
<i>Two Dimensional Congruence (P/T & I/D)</i>							
(2) Interest-occ congruence	0.14	1.00					
(3) Self-Efficacy-occ congruence	0.09	0.31*	1.00				
(4) Parental-Supp-occ congruence	0.03	0.29*	0.04	1.00			
<i>Prestige congruence</i>							
(5) Interest-occ congruence	0.12	-0.13	0.05	-.10	1.00		
(6) Self-efficacy-occ congruence	0.07	-.06	0.14	0.24*	0.38*	1.00	
(7) Parental-Support-occ congruence	0.19*	0.00	0.10	-.14	0.65*	0.25*	1.00
Mean	5.29	84.08	82.88	83.95	88.75	89.30	88.73
Standard deviation	1.68	7.29	8.32	7.82	8.70	8.04	8.78

* $p < .05$.

We used a similar procedure to examine if adding prestige fit predicted career certainty above that obtained using the two dimensional fit index. This hierarchical regression was conducted separately for each type of fit (interest, self-efficacy, and parental support). For interest fit, adding prestige congruence to the two dimensional interest-occupation fit resulted in a significant gain in prediction (R^2 change = .052, $F(1, 115) = 6.38, p < .05$). A similar pattern was found for adding parent support-occupation prestige fit to two dimensional parent support-occupation fit in predicting occupation certainty (R^2 change = .070, $F(1, 115) = 8.78, p < .05$). However there was no significant increment in occupation certainty prediction by adding self-efficacy-occupation prestige fit to two dimensional self-efficacy-occupation fit (R^2 change = .023, $F(1, 115) = 2.71, p > .05$). So both interest and parental support prestige fit measures added to prediction of occupation certainty uniquely above that obtained by the typical two dimensional indices.

3.3. Latino/a–Anglo differences

The potential ethnic differences between the measures of interest in this study were also investigated between the Anglos and Latino/a's in the sample. A MANOVA conducted on the two certainty indices and all 12 congruence indices across these two ethnic groups was not significant (Pillai's Trace $F(14, 83) = 0.87, p > .05$). Both ethnic groups had similar mean scores on the variables examined in this study. However we did hypothesize that ethnicity would have a moderating effect on the relations between the fit indices and certainty.

To examine this moderation, we conducted hierarchical regression analyses to evaluate the interactions between ethnicity and PE fit in explaining the variability in environmental certainty. Hierarchical regressions were conducted with ethnicity and each computation of the three PE fit measures (i.e., interest-major fit with two dimensional index and ethnicity) as the interaction term. Similar to all other analyses, this was done at both the major and then occupational level. We started with the major level predictors and major certainty. Surprisingly, ethnicity did not moderate the relation between interest-major fit and major certainty when fit was determined by the two dimensional index, (R^2 change = .01, $F(1, 102) = .70, p > .05$), or the prestige only index, (R^2 change = .01, $F(1, 102) = 1.11, p > .05$). The same was true of the interaction of self-efficacy-major fit and ethnicity in predicting major certainty and parental support-major fit and ethnicity in predicting major certainty. Ethnicity did not moderate fit to certainty regardless of the fit indices employed at the major level.

For the most part, the major level findings were repeated at the occupational level. Neither the interaction of ethnicity and interest-occupation fit or ethnicity and parental support-fit, regardless of fit indices, to occupational certainty, was significant. The lone significant finding in regards to ethnicity interacting with PE fit to predict career certainty came with self-efficacy-occupation fit. Unlike the interaction of ethnicity and PE fit to career certainty thus far, the interaction term with the two dimensional index of self-efficacy-occupation fit and ethnicity accounted for a significant proportion of the occupation certainty variance after controlling for the effects of the two dimensional fit index of self-efficacy-occupation fit and ethnicity by themselves (R^2 change = .06, $F(1, 96) = .646, p = .01$). However, the interaction term including the prestige only index of self-efficacy-occupation fit and ethnicity did not account for a significant proportion of the occupation certainty variance, (R^2 change = .00, $F(1, 94) = .29, p > .05$). An examination of the graph of the interaction revealed that there was a positive relation between two dimensional self-efficacy-occupational fit and occupational certainty for the Latino/a sample but there was no relation for Anglos. Thus, ethnicity did not moderate the relation between self-efficacy-occupation fit and occupation certainty when fit was determined by the prestige only index, but ethnicity did moderate this relation when fit was computed by the two dimensional index. In sum, ethnicity did not moderate the relation between PE fit and certainty with the exception of self-efficacy-occupation fit as determined by the two dimensional index.

4. Discussion

The results of our analyses indicate that the fit indices (interest-environment, self-efficacy-environment, and parent-support-environment) were generally related to a moderate degree. This was true for both the major and occupation. Interest-environment fit was moderately related to the other PE fit predictors for both major and occupation, while self-efficacy and parental support PE fit indicators were less related to each other. So interest PE fit served as more the connection between self-efficacy and parental PE fit measures. Thus, greater similarity between interests and work type led to increased similarity between competence beliefs and work type and parental support and work type. This finding supports previous research (Betz & Rottinghaus, 2006; Tracey, 2002b) indicating that interests are strongly related to both contextual and personal variables, and that as one's competence performing certain tasks increases so do their interests in that area.

The strongest relation yielded for both major and occupation between the PE fit indices was between parent-support-major fit and interest-major fit when determined by the Prestige index. This is a fascinating finding. This indicates that the greater the match one experiences between majors supported by their parents and their actual major, the greater in line their interest may become with that major or occupational area as well. Such findings hint to the influence of parental support on interest development, as individuals may develop interests in areas that are supported by parents.

The moderate relations found between most of the fit relations supported growing evidence that other PE fit relations besides interest-environment fit may predict career outcomes (Betz & Rottinghaus, 2006). While past research has demonstrated that self-efficacy and interests share a common structure (Tracey, 1997), we expected that there would be a greater correspondence between these two fit indices. However this moderate relation could be indicative of the uniqueness of each.

The unique predictiveness of each has been supported at least with respect to predicting occupational choice (Donnay & Borgen, 1999; Tracey & Hopkins, 2001). As expected, both parent-support-environment and self-efficacy-environment fit appear to not only relate to interest-environment fit, but also add unique information that may explain equivocal results from the past on the utility of PE fit. Contrary to what was found in analyses of the relations between the PE fit predictors, neither self-efficacy-environment nor parent-support-environment fit predicted additional career certainty variance beyond that predicted by interest-environment fit when determined by the two dimensional indices. Thus, each PE fit predictor appears to relate uniquely to career certainty but may not predict career certainty when measured by People-Things and Data-Ideas only. Future research is needed on the role of various fit relations beyond interest-environment fit in determining the predictive validity of PE fit to career outcomes.

We found support for our hypothesis that the congruence index used to determine fit may be one of the most significant factors in the PE fit relations ability to predict career outcome criteria. More specifically, results supported previous research (Tracey & Rounds, 1996a; Tracey & Rounds, 1996b) indicating that incorporation of a third dimension of prestige may add additional information to the fit between person variables and occupational environment, as well as improve the ability of PE fit to reliably predict career outcomes such as career certainty. Where none of the two dimensional fit indices related significantly to career certainty at either the major or occupational level, two of the three of the major level and one of the three of the occupational level Prestige fit indices related significantly to certainty of choice. As hypothesized, PE fit generally correlated significantly when prestige was included as a determinant of fit. Parent-support-environment fit related significantly to certainty of choice at both the major and occupational level when determined by Prestige. As a result, we concluded that the more parental support college students receive toward their major in regards to prestige, the more certain they will become about that selection. The significant parent-support-environment fit to certainty relation may indicate that when students feel they have chosen a major in line with what their parent's support, or expect them to achieve in regards to status, they feel more certain about their choice. It also suggests that college students may look to the environment more than within themselves to gain confidence about the career they've selected or what they can accomplish.

Overall, we found no relation of any of the self-efficacy PE fit with any of the outcomes. This result is surprising given past research showing significant relations of self-efficacy with occupational choice (Donnay & Borgen, 1999; Tracey & Hopkins, 2001). However the present study focused not on the relation of self-efficacy to occupational choice but it went a step further and looked at the congruence of self-efficacy and occupational choice as related to certainty. So self-efficacy may indeed be an important predictor of occupational and major choice, but these results do not support using it in a PE fit index to examine outcomes. This is a complex finding given the weight placed on aligning competencies with career in advising and education.

Further support was gained for the importance of prestige in PE fit as addition of the prestige fit predictor typically added to the vitality of the two dimensional fit indices prediction of certainty. Both Prestige interest-environment and parent-support-environment fit indices predicted additional career certainty variance beyond that explained by the two dimensional indices. In other words, fit based on prestige predicted career certainty beyond that predicted by fit based on the typical two dimensional indices of People-Things and Data-Ideas for both interests and parent-support. For example, an additional 5% of career certainty was predicted by Prestige interest-major fit after that predicted by the two dimensional interest-major fit. More simply, additional certainty was achieved about career choice when the environment matched prestige interests, indicating there is more to PE fit than the two dimensions of People-Things and Data-Ideas (or the included RIASEC types). The same was true for parent-support, as Prestige parent-support-major fit added 8% prediction to the two dimensional parent-support-environment fit prediction of certainty. These findings support the spherical structure of vocational interests and competence beliefs as first stated by Tracey and Rounds (1996a), Tracey and Rounds (1996b) and as operationalized in the PGI (Tracey, 2002a), as it appears a third dimension of prestige adds additional information to work types and career-related person variables. Thus, as hypothesized, the presence of prestige in career decision-making was generally supported.

Although results of most analyses were similar across major and occupation, major and occupational choice were not thought to be isomorphic. In general, stronger relations were detected for major than the occupation. This may be due to the fact that major is more immediate and concrete for a sample of college students. Unlike the major results, which had interest prestige fit significantly related to certainty, interest-occupation prestige fit was not significantly related to occupational certainty.

Based on the results, the role of ethnicity was minimal in determining PE fit, career certainty, and the relation between the two. Surprisingly, there were no differences detected in major or occupational certainty on the population means between Mexican-American/Latinos and European-Americans. There were also no mean differences on any of the person-environment fit variables between ethnic groups. Based on these findings, PE match does not vary as a function of ethnicity. This seems contrary to recent findings highlighting career barriers for Mexican-Americans (Flores & O'Brien, 2002), which we hypothesized to interrupt the process of achieving congruence in career choice and ultimately leading to differences across ethnicity on PE fit. However, our study is among the first to explicitly examine PE fit-outcome relations across ethnicity.

Similar findings emerged from analyses of the interaction of ethnicity and fit in determining career certainty. There was a surprising lack of significance attributed to ethnicity. The results indicated that at both the major and occupational level, ethnicity did not moderate the relation between the person-environment fit predictors and certainty, regardless of fit indices. The one exception to this finding was that ethnicity moderated the relation between self-efficacy-occupation fit and career certainty. When measured by the two dimensional congruence indices, the ethnicity-self-efficacy fit interaction explained additional certainty variance. In other words, the role of self-efficacy fit to career certainty may be determined

in part by ethnicity, as the value placed on doing what you're good at may mean different things to different cultural groups. This may support previous research suggesting that the factors that young adults base career decisions on may vary by ethnicity (Brown, 2004). The results indicated that self-efficacy fit plays a different role in determining the degree of certainty one experiences about their career choice for Mexican-Americans than it does European-Americans. However, the overall lack of moderating effects found between Mexican-Americans and Anglos on the relation between PE fit and career certainty came as a surprise given the extensive literature currently focused on the differences in meaning prescribed to career constructs (Gupta & Tracey, 2005; Tsabari et al., 2005). With the exception of self-efficacy-occupation fit and certainty, as discussed, these findings suggest that there were few differences between Mexican-Americans and European-Americans in the proportion of occupational certainty variance explained by PE fit. This may be attributable to the relatively low sample size. Further research is clearly needed to replicate these findings.

Thus, several important findings emerged from this study. The results suggest that a significant moderate relation exists between the three PE fit predictors. Each of the three PE fit predictors most likely adds unique information about career outcomes. Interest-environment and parental support-environment fit related moderately to career certainty. The results also supported previous findings (Tracey, 2002a) indicating a need to incorporate a prestige dimension in calculating the Euclidean distance between person variables and work types, as fit determined in this manner may improve the predictive validity of PE fit to career outcomes. The prestige dimension incorporated in determining fit in this study typically added to the vitality of the traditional two dimensional model's prediction of career certainty. The results support the existence of three dimensions underlying interest data and other person variables (Tracey & Rounds, 1996b). The relation between the PE fit measures and between the PE fit measures and certainty increased, in general, when prestige was involved in determining fit. Thus, findings in the current study support building evidence suggesting prestige is an important factor of fit that should be incorporated in career theory and practice. Measuring PE fit on the traditional two dimensional indices alone without considering fit of prestige may leave out important data that alters career outcomes. Recognition of prestige expectations for a career may be vital in the career counseling process. Assisting clients find work environments that match their responsibility, status, time, and training expectations may be key in leading to certainty of choice, as well as other important career outcomes. Further investigation into prestige and the role it plays in career decision-making is clearly needed, as most commonly used career assessments and theories today rest their cap solely on the Things-People and Data-Ideas dimensions alone.

Based on the current findings, career counselors may be better off assisting clients focus on developing their interests in tandem with what they are good at, and at the same time helping clients explore how to accept support from peers and family in a productive manner. The career counseling process may be enhanced by moving beyond simply measuring interests and matching an occupation to that interest type, and taking account cultural considerations in the meaning prescribed to various PE fit measures. Further, practitioner's may want to consider ethnic differences in the importance given to finding a job that client's are "good at," as ethnicity moderated the self-efficacy-environment fit relation to career certainty in this sample. The results from this study lend insight on the contributing factors of the certainty one experiences about their career decision. Finding occupations that match client's interest areas and family value areas will most likely help them find greater certainty of their career choices.

Finally, the results from this study suggest that career decision-making is a complex process that involves both personal forces such as self-efficacy or interests, and external, contextual forces such as parental support and ethnicity. The evidence yielded in this study suggests that the relation of self-efficacy-environment fit, parent-support-environment fit, and interest-environment fit to environmental certainty may vary by ethnicity and congruence index, and that these factors may be important to consider in devising theory or counseling interventions with diverse groups.

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