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## **The Relationships of Vocational Interest Congruence, Differentiation, and Elevation to Career Preparedness Among University Students**

**Vanessa K. Jaensch<sup>a</sup>**

*Leuphana University of Lüneburg, Germany*

**Andreas Hirschi<sup>b</sup>**

*University of Bern, Switzerland*

**Daniel Spurk<sup>c</sup>**

*University of Bern, Switzerland*

<sup>a</sup> Correspondence concerning this article should be addressed to Vanessa K. Jaensch, Institute for Strategic Human Resource Management, Leuphana University of Lüneburg, Wilschenbrucher Weg 84, DE-21335 Lüneburg. Email: [vanessa.jaensch@leuphana.ch](mailto:vanessa.jaensch@leuphana.ch)

<sup>b</sup> Andreas Hirschi, Institute of Psychology, University of Bern, Hochschulstrasse 8, CH-3012 Bern. Email: [andreas.hirschi@psy.unibe.ch](mailto:andreas.hirschi@psy.unibe.ch)

<sup>c</sup> Daniel Spurk, Institute of Psychology, University of Bern, Hochschulstrasse 8, CH-3012 Bern. Email: [daniel.spurk@psy.unibe.ch](mailto:daniel.spurk@psy.unibe.ch)

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### **Abstract**

Vocational interest characteristics—interest congruence, interest differentiation, and general interest level (elevation)—are useful indicators for career development. However, research on these issues has primarily focused on adolescents in the transition from school to work and analyzed a limited set of career-related correlates. This study extends this line of research by exploring the relationships of interest congruence, interest differentiation, and interest elevation with several indicators of career preparedness (i.e., career planning, occupational self-efficacy beliefs, career decidedness, and career engagement) among a sample of emerging adults during their university studies in Germany. Data from 239 students representing a wide range of majors were collected via an online questionnaire. Controlling for sociodemographic variables, multiple regression analyses revealed that differentiation was positively associated with career decidedness and career engagement and elevation was positively related to occupational self-efficacy beliefs and career engagement. We discuss the findings regarding the importance of differences in vocational interest characteristics for the career preparedness of university students.

**Keywords:** vocational interests, career preparedness, secondary construct

## Introduction

The assessment of vocational interests is a core aspect of career counseling because interests are assumed to be important factors in the processes of career decision-making and career development (Holland, 1997; Savickas & Spokane, 1999). Moreover, vocational interests act as significant predictors of performance, persistence at work, and turnover intentions (Nye, Su, Rounds, & Drasgow, 2012; Van Iddekinge, Roth, Putka, & Lanivich, 2011). According to Holland's theory (1997), secondary interest constructs (e.g., interest congruence and interest differentiation) were introduced to provide additional information about a client's state of interest development that goes beyond information offered solely by the client's interest scores. Secondary constructs are assumed to be indicators of the level of career development and career choice readiness (Holland, 1997; Reardon & Lenz, 1999).

Although these constructs are important in career development theory, to date, only a limited number of studies (e.g., Bergmann, 1993) has empirically investigated the relation of the secondary constructs with other career developmental variables, especially in German-speaking countries. Interestingly, most of the research regarding the relationships of the secondary constructs with career development (e.g., Hirschi & Läge, 2007; Tracey & Robbins, 2005) has focused on adolescents transitioning from school to work, and therefore, on variables of high importance to that target group (e.g., career maturity or career choice). Other research has examined relationships between secondary constructs and a variety of work-related behaviors (e.g., annual income and job satisfaction) among samples of workers (e.g., Donohue, 2006; Huang & Pearce, 2013).

However, we currently know comparatively little about how Holland's secondary constructs are related to emerging adults' career preparedness, for example, during their university studies. The time at university reflects a phase that is crucial to career development. At this stage vocational interests get crystalized and stabilized (Low, Yoon, Roberts, & Rounds, 2005) and students need to be actively concerned with preparing for the transition from university to work by engaging in career-relevant activities (Hirschi, Freund, & Herrmann, 2014). Moreover, compared to adolescents who are confronted with the school to work transition, university students have a higher education, usually aim for more complex and autonomous jobs, and are confronted with more diverse and status-high occupational tasks. Hence, the need for career preparedness and especially proactive career behaviors such as career engagement and exploration increases (Hirschi et al., 2014).

Against this backdrop, first, we aimed to investigate the relationships of interest/study-major congruence, interest differentiation, and interest elevation with career preparedness among the understudied sample of university students in emerging adulthood. Second, we analyzed an extended set of indicators of career preparedness (i.e., career planning, occupational self-efficacy beliefs, career decidedness, and career engagement) that optimally reflects the career development tasks of university students. Overall, this study seeks to address the neglected issue of explaining career preparedness by specific interest attributes and constellations (i.e., secondary constructs). Investigating the meaning of secondary constructs regarding career preparation among university students would be valuable for both researchers

and practitioners. Before explaining the assumed relations from the secondary constructs to career preparedness we introduce the concept of career preparedness for a better understanding of the hypotheses.

### **Conceptualization of Career Preparedness**

Lent (2013) described the concept of career-life preparedness as a vigilance that promotes the management of threats concerning one's career well-being. Following his assumption, preparation for one's life and career can result in proactive strategies to manage perceived barriers and to build support systems that successfully manage one's own career-life future. Accordingly, preparedness is regarded as a key element in successful career management (Vondracek & Porfeli, 2003). For instance, career preparedness as a developmental task is assumed to have positive effects on an adult's mental health and sense of well-being (e.g., Herr, 1989; Vondracek, Lerner, & Schulenberg, 1986). Career preparedness can specifically be characterized by a combination of career decidedness, career planning, and career-related confidence (Skorikov, Patton, & Skorikov, 2007).

*Career planning* reflects a planning attitude and a future orientation to attain one's established goals. In the framework of career adaptability, Savickas (1997) has highlighted the importance of career planning for mastering career challenges. *Career decidedness* indicates a clear view of personal interests and preferences. Conversely, undecided individuals tend to have unclear and not well specified vocational aspirations (Creed, Prideaux, & Patton, 2005). Compared to career planning, career decidedness does not refer to developing a strategy of how to reach one's personal career goals. *Confidence* (i.e., self-efficacy; Bandura, 1986) is regarded as self-evaluations

that lead to a belief in one's own abilities to complete tasks or to attain a defined level of achievement in specified domains. According to social cognitive career theory (SCCT; Lent, Brown, & Hackett, 1994) self-efficacy is crucial in the career decision-making process. In our study, we specifically focus on occupational self-efficacy, the degree to which an individual is confident about mastering challenges in the occupational domain. Compared to career planning and decidedness, occupational self-efficacy beliefs are not directly related to career-related goals. They are more a self-evaluation of one's own skills that might be related to one's goals but also to broader occupational tasks or demands of the occupational environment.

In addition to Skorikov's et al. (2007) conceptualization, we analyzed career engagement as an extended indicator of career preparedness, because it refers not to attitudes like career planning, decidedness, and self-efficacy beliefs, but to the exhibition of specific behaviors that enhance a person's career development (Hirschi et al., 2014). Furthermore, as stated above proactive engagement in career behaviors is an important aspect in the university-to-work transition (Hirschi, Lee, Porfeli, & Vondracek, 2013). *Career engagement* is a higher-order construct, which includes several proactive career behaviors such as networking and exploration that are specifically relevant to career development (Hirschi et al., 2014) and career success (Zikic & Klehe, 2006). The here analyzed components of career preparedness are assumed to be positively correlated but nonetheless represent distinct constructs (Hirschi & Herrmann, 2013).

### **Holland's Secondary Constructs and Career Preparedness**

Since its introduction, Holland's theory of vocational interests has changed counseling and career psychology (Nauta, 2010). The theory's basic assumption is that the vocational interests of most people can be characterized by a combination of six types: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional (the RIASEC typology; Holland, 1973). Holland described each type of these interests with specific abilities and values, as well as with preferred activities, and characteristics. These types of interests are organized in a hexagonal structure. Distances between interests display the degree of similarity between them. For example, social and artistic are most related, while artistic and conventional are least related and, therefore, are on opposite positions on the hexagon. Typically, based on a person's interest scores, a code consisting of the first three RIASEC letters—those that optimally characterize the person—is calculated. This personal interest code can be matched to interest codes of the working environment to find a career that fits the individual's abilities, interests, and values.

Most relevant to our study, the theory of Holland also provides a theoretical rationale that secondary interest constructs (i.e., interest congruence, differentiation, and elevation) should be related to career preparedness. Specifically, secondary constructs provide additional information about a person's state of interest development that is linked to career choice readiness (Holland, 1997; Reardon & Lenz, 1999). Therefore, secondary constructs should provide useful additional understanding how interests are linked with career development and variables related to the career decision-making processes

(Reardon & Lenz, 1999), like career preparedness. Besides Holland's theory, social cognitive career theory (SCCT, Lent et al., 1994) that deals with interests, self-efficacy beliefs, and goals provides an additional theoretical rationale why some of the here assumed relationships should occur. Before arguing for every specific relationship, we will introduce the here analyzed secondary constructs in more detail.

**Interest congruence.** *Interest congruence* is described as the degree of fit between an individual's interests and the characteristics of his or her work environment (Holland, 1997). As Holland (1997) stated, high congruence between a person's characteristics and his or her working environment should lead to positive outcomes such as satisfaction at work. Empirically, positive outcomes of interest congruence (i.e., less turnover, higher performance, higher job satisfaction) have been found in numerous single studies and meta-analyses (Nye et al., 2012; Van Iddekinge et al., 2011). In sum, the significance of congruence for explaining work-related variables has been empirically supported by several studies but comparatively little is known about how congruence is specifically related to career preparedness. An exception is a study that has investigated congruence as the degree of fit between expressed (career aspirations) and measured vocational interests among secondary students (Hirschi & Läge, 2007). That study has revealed a positive correlation between congruence and career decidedness. However, this study did not analyze the congruence between interests and the occupational environment.

University students who are enrolled in a study-major that closely corresponds to their interests (i.e., who show a high interest/study-major congruence) can be expected to have more

positive study experiences and feel reassured in their study choice. This should also be related to an increased sense of certainty about their future career because for most students future career plans will be linked with their current study major. Due to the positive experience of interest/study-major congruence, students with high interest/study-major congruence should also feel more confident that they can master challenges at work. Research showed that interests are systematically related to abilities (Prediger, 2002) and self-efficacy perceptions (Sheu et al., 2010) in a particular vocational domain. When students feel that their study major corresponds to their interests they should thus be more likely to express confidence in mastering challenges at work in their aspired occupation. With respect to career engagement, we also expect a positive relationship to interest/study-major congruence, because students with high interest congruence are also interested in finding an after-university working environment that fits to their major and their interests. Therefore, these students are assumed to engage in more active career behavior to secure a good person-job/organization fit following their studies. Using the same reasoning, students with high interest/study-major congruence can also be expected to be more active in career planning. Therefore, we propose the following hypothesis:

*Hypothesis 1:* Interest congruence is positively related to career preparedness in terms of (a) career planning, (b) career decidedness, (c) occupational self-efficacy beliefs, and (d) career engagement.

**Interest differentiation.** *Interest differentiation* is the degree to which a person or environment's characteristics are clearly distinct. High differentiation reflects greater distinctness and

therefore higher clarity within the career decision-making process (Holland, 1997). Students with differentiated interests are aware of their likes and dislikes regarding professional activities. Therefore, a large discrepancy between the highest and lowest interest types occurs. Holland (1997) stated that individuals with differentiated interests are more likely to show higher career satisfaction and to have less problems in choosing a vocational career, and therefore, should show higher levels of career decidedness. In the context of career development, Bergmann (1993) provided evidence that differentiation might be important for high-school students' career maturity by revealing positive relationships between differentiation and career attitudes such as decidedness. Related to this, previous research has shown that differentiation is negatively related to two of Marcia's (1980) identity statuses (diffusion and foreclosure) that are negatively related to career decidedness (Nauta & Kahn, 2007). We also assume that students with differentiated interests are more likely to show higher career planning because they know their specific interests and can more easily plan for their future career. This assumption is in line with the SCCT (Lent et al., 1994), which suggests that undifferentiated interests hinder the development of career plans (Lent, 2013). Additionally, also according to SCCT students with high differentiation can be expected to be more engaged in career behaviors because they attempt to fulfill their clear differentiated career aspirations. In contrast, students who are unclear about their vocational preferences might be less motivated or directed to engage in career behaviors. Finally, we assume interest differentiation to be positively related to occupational self-efficacy beliefs because

individuals with clear vocational aspirations also confront themselves with occupational challenges that can be seen as one source of self-efficacy beliefs. According to SCCT, the mastery of such challenges is a major source of self-efficacy beliefs. In sum, we hypothesize the following:

*Hypothesis 2:* Interest differentiation is positively related to career preparedness in terms of (a) career planning, (b) career decidedness, (c) occupational self-efficacy beliefs, and (d) career engagement.

**Interest elevation.** *Interest elevation* represents the overall level of the interest scores (Fuller, Holland, & Johnston, 1999). Interest elevation is regarded as a general interest factor that displays openness and the flexibility of one's interests by reflecting whether a person shows higher or lower values for different interest types in general (Darcy & Tracey, 2003). Bullock and Reardon (2005) describe profile elevation as an indicator of a person's energy level. Students with high interests in general should be more motivated to search for strategies that help them reach their career goals (such as working in an environment that suits their interest), because they develop goals in different interest domains. Among high-school students, high interest elevation was positively correlated with career planning and career exploration (Hirschi & Läge, 2007). Because of an individual's higher activation level in case of high elevation the latter should also be positively related to self-efficacy beliefs and career engagement. Hirschi (2009) showed that interest elevation is positively related to exploration behavior, which is a component of career engagement (Hirschi et al., 2014). According to SCCT a high activation level is an optimal precondition for the development of occupational self-efficacy beliefs. We also assume that students

showing high interest levels across many interest domains will show higher career decidedness because such students might be more active in their career decision-making processes due to higher values in openness and general interests. In sum, we hypothesize the following:

*Hypothesis 3:* Interest elevation is positively related to career preparedness in terms of (a) career planning, (b) career decidedness, (c) occupational self-efficacy beliefs, and (d) career engagement.

## Method

**Participants and Procedure.** We recruited students from different universities in Germany: The students were contacted through email ( $N = 8,197$ ) to addresses provided in a previous study on career development. There was a 10% ( $n = 829$ ) response rate. Of these participants, a random sample completed the interest inventory and the career preparation scales. Only participants with complete responses for the used measures were considered with a final  $n = 239$ ; 64% female, mean age 24.06 years ( $SD = 3.57$ ) and mean study semesters 4.82 ( $SD = 2.05$ ); 72% of the participants were undergraduates and 28% were studying for master's degrees. The students were enrolled in 35 different majors, with the largest groups studying education (16%), business administration (15%), cultural studies (14%), business psychology (10%) and environmental science (8%). As incentives, 1,150 Euros were offered to participants in various lottery drawings.

## Measures

**Vocational interests.** To assess the interests of the participating students, we applied the "Allgemeiner Interessen-Struktur-Test—Revidierte Version" (AIST-R, General Interest-Structure-Inventory - Revised Version; Bergmann & Eder,

2005). This well-established inventory includes 10 items for each interest type. Participants were asked to indicate on a five-point scale how much they are interested in typical RIASEC activities (e.g., “learn a foreign language”). The scale we applied ranged from 1 (*This does not interest me at all; I don't like to do that*) to 5 (*This interests me a lot; I like to do that very much*). Evidence for validation was provided by the test authors, for instance, by revealing a high relationship between the scores of the AIST-R and the German-language adaptation of the Self-Directed Search scales (Jörin, Stoll, Bergmann, & Eder, 2004). To calculate our participants' major interest types, we used standard values from the raw score.

**Congruence.** Normally, congruence describes the degree of fit between a person's interest and his or her actual working environment (Holland, 1997). Because our study examined university students, we measured the fit between a student's vocational interests and his or her major field of study. We specifically calculated congruence between the Holland code and the interest code for each student's major. The former consists of the first letters of the three RIASEC interest types that the participant most resembles (assessed by the AIST-R; Bergmann & Eder, 2005). The three-letter codes for the majors were identified according to the register of vocational codes of EXPLORIX provided by Jörin et al. (2004). Because these EXPLORIX codes did not always fit exactly with our participants' majors, the three authors of this study independently defined the study-major codes and a final solution was reached after consolidating the various codings. Regarding the initial interrater agreement, from 36 study majors, 4 codes were identical (letters and its positions), 6 codes were identical on the first two letters, 9 codes were identical on the first letter while the

other 17 used exactly the same three letters but in different positions.

In the literature, numerous congruence indices exist (cf. Brown & Gore, 1994; Holland, 1997; Rolfs, 2001). Here, we report one of the frequently used indices: the C-index by Brown and Gore (1994). This index is regarded as the best way to calculate congruence (Eggerth & Andrew, 2006) because it has several advantages: (1) based on the hexagonal structure, the index considers all of the three letters; (2) the index is sensitive to the order of the codes; and (3) it is economical to calculate (c.f. Eggerth & Andrew, 2006). To calculate the C-index, one must compare the first, second, and third letters of the person with those of the environment code. Next, these comparisons are weighted: The comparison between the first letters is multiplied by three, the next by two, and the final comparison among the third letters is multiplied by one. The sum of the products represents the value of the C-index. We applied the following formula:  $C = 3(X_1) + 2(X_2) + (X_3)$ , where  $X_i$  displays the score (3, 2, 1, and 0) based on the distance between the interest code and study-major code position on the hexagon. For instance, the comparison between the interests *Realistic* (person) and *Artistic* (environment) results in a score of 1. The comparison of *Investigative* (person) and *Investigative* (environment) results in a score of 3. The congruence based on the C-index ranges between 0 and 18, with higher values suggesting greater congruence between person and environment. Within our sample, the mean degree of congruence with the C-index was  $M = 9.46$  ( $SD = 3.91$ ).

**Differentiation.** To evaluate the level of differentiation, we applied the *dispersion-index* (Holland, 1997). This index represents the standard deviation of the standard values of all six

interest scores. Within our sample, the dispersion-index ranged between 1.87 and 16.69. The mean standard differentiation in our sample was  $M = 8.00$  ( $SD = 0.87$ ).

**Elevation.** To calculate interest elevation as the overall level of a student's interest, we summed the standard scores from the six interest dimensions (Fuller et al., 1999). The resulting scores can range from 420 to 780. In our sample, interest elevation lay between 521 and 722 ( $M = 605.03$ ;  $SD = 30.28$ ).

**Career planning.** To measure career planning, we applied the German adaptation (Abele & Wiese, 2008) of the 6-item scale developed by Gould (1979) and Wayne, Liden, Kraimer, and Graf (1999). Participants were asked to indicate their career planning (e.g., "I know what I need to do to reach my career goals.") on a five-point Likert-scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Construct validity was supported in terms of significant associations with career success among a sample of German professionals (Abele & Wiese, 2008). Cronbach's alpha was .87.

**Career decidedness.** The German version of the My Vocational Identity Scale (Holland, Daiger, & Power, 1980; Jörin et al., 2004) was applied to measure career decidedness. This scale consists of seven negatively formulated items (e.g., "I still need to figure out which professional direction I should pursue") and a five-point Likert-scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The tool is frequently applied in career counseling and vocational research and its construct validity has been supported by significant correlations, for example, with career planning and exploration (Hirschi & Läge, 2007). Cronbach's alpha was .89.

**Occupational self-efficacy beliefs.** We measured occupational self-efficacy with a six-item scale (e.g., "Whatever comes my way in my job,

*I can usually handle it*") developed and validated by Rigotti, Schyns, and Mohr (2008). Participants were asked to respond on a six-point Likert scale ranging from 1 (*not at all*) to 6 (*completely*). The authors of the scale reported a Cronbach's alpha reliability estimate of .86 and evidence for construct validity in terms of positive relationships to job satisfaction, organizational commitment, and job performance among German employees (Rigotti et al., 2008). The scale was already successfully applied among German university students and showed a high construct validity in these studies (e.g., Hirschi & Herrmann, 2013). Cronbach's alpha was .83.

**Career engagement.** We applied the career engagement scale (Hirschi et al., 2014), including nine items that assesses the general degree to which an individual has shown proactive behaviors to develop his or her career in the previous six months (e.g., collecting information about potential employers). Answers were provided on a five-point Likert scale ranging from 1 (*almost never*) to 5 (*very often*). A Cronbach's alpha of .87 and construct validity were determined with positive correlations to job and career satisfaction and specific career behaviors, such as networking among German employees (Hirschi et al., 2014). Cronbach's alpha was .89.

**Control variables.** In addition, we used our participants' gender (coded: 1 = female, 2 = male) and semester (of studying, open question) as control variables because these variables might affect interest development and career preparedness (Hirschi et al., 2013; Low, Yoon, Roberts, & Rounds, 2005).



**Results**

**Preliminary Analysis.** To ensure the distinctness of career preparation measures, we had to demonstrate that career planning, career decidedness, occupational self-efficacy beliefs, and career engagement are distinct constructs, each of which captures something different. Therefore, we conducted a series of confirmatory factor analyses and compared the model fits of a single-factor model, several two-factor models (pairing two or three of the measures versus two or one measures; e.g., career planning, career decidedness, and occupational self-efficacy beliefs as one factor and career engagement as the second factor), and several three-factor models (e.g., career planning and career decidedness as one factor; occupational self-efficacy beliefs as the second factor and career engagement as the third factor) with a model distinguishing among career planning, career decidedness, occupational self-efficacy beliefs, and career engagement. Model comparisons were based on the  $\chi^2$ -difference test using the robust maximum likelihood estimator MLR and the Satorra-Bentler correction (Satorra & Bentler, 2001).

Overall, the fit of the four-factor model ( $\chi^2 = 566.87$ ,  $df = 344$ , CFI = .92; TLI = .92; RMSEA = .06) provided a significantly better fit than all of the other models (CFIs from .59 to .85, TLIs from .54 to .88, RMSEA from .08 to .13). Because gender differences are frequently found in studies on vocational interests (e.g., Lippa, 1998; Su, Rounds, & Armstrong, 2009), we also evaluated whether the six types of interests in our sample are affected by gender. Therefore, we compared the mean standard values of the interest scales separated by gender. In line with previous findings in other samples (e.g., Lippa, 1998), male students showed significantly higher scores in realistic,  $t(224) = -5.36$ ,  $p < .001$ , and investigative interests,  $t(224) = -4.00$ ,  $p < .001$ , whereas females scored higher in artistic,  $t(224) = 2.87$ ,  $p = .004$ , and social interests,  $t(224) = 2.57$ ,  $p = .011$ . No gender differences were found in enterprising and conventional interests.

**Career Preparedness and the Secondary Constructs.** Means, standard deviations, Cronbach's alpha estimates, and correlations between measures are displayed in Table 1.

**Table 1**

*Summary of Intercorrelations, Means, Standard Deviations, and Cronbach's Alpha among the Assessed Constructs*

	Mean	SD	1	2	3	4	5	6	7
1 Congruence	9.46	3.91	(-)						
2 Differentiation	8.00	2.87	.19**	(-)					
3 Elevation	605.03	30.28	.08	-.14*	(-)				
4 Career planning	3.35	0.85	.06	.06	.05	(.87)			
5 Career decidedness	3.54	0.87	.05	.17**	.07	.73**	(.89)		
6 Self-efficacy beliefs	4.31	0.73	-.05	.02	.25**	.40**	.54**	(.83)	
7 Career engagement	3.20	0.84	-.06	.16*	.24**	.47**	.37**	.38**	(.89)

Note.  $N = 239$ ; entries in parentheses in diagonal are the Cronbach's alpha reliability coefficients.

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$  (two-tailed)

In general, we did not find consistent correlations between secondary constructs and components of career preparedness (see Table 1). However, in particular, interest elevation showed the highest correlation to some components of career preparedness (occupational self-efficacy beliefs,  $r = .25$ ; and career engagement,  $r = .24$ ). Significant but small correlations were found between interest differentiation and specific components of career preparedness (career decidedness,  $r = .17$ ; career engagement,  $r = .16$ ).

To test Hypotheses 1 to 3, we conducted a series of multiple regression analyses, one analysis for each of the four criterion variables (i.e., career planning, career decidedness, occupational self-efficacy beliefs, and career engagement). To conduct the multiple regression analyses (Table 2), we first entered the control variables (age, semester) into the equations. The results showed that occupational self-efficacy beliefs were significantly predicted by gender. Men had higher self-efficacy beliefs than women. The other criterions were not significantly predicted by the control variables. In a next step, we added the predictors (i.e., interest congruence, interest differentiation, and interest elevation; see second step in Table 2) simultaneously in the equations. By controlling for gender and semester and entering all predictors simultaneously into the regression equation we were able to obtain a better understanding of the specific effects of each variable.

Contrary to Hypothesis 1, *congruence* was a nonsignificant predictor of career planning ( $\beta = .03$ , *ns*), career decidedness ( $\beta = -.01$ , *ns*), occupational self-efficacy beliefs ( $\beta = -.06$ , *ns*) and career engagement ( $\beta = -.12$ , *ns*). However, interest *differentiation* was positively associated with career decidedness ( $\beta = .19$ ,  $p < .01$ ) and career

engagement ( $\beta = .21$ ,  $p < .01$ ), suggesting that individuals showing greater distinctness in their interests are more likely to have decided on their careers and tend to show more career engagement. Interest differentiation was not significantly related to career planning and occupational self-efficacy beliefs. Hence, Hypotheses 2b and 2d were supported, whereas Hypotheses 2a and 2c received no support.

Finally, interest *elevation* related positively to occupational self-efficacy beliefs ( $\beta = .23$ ,  $p < .001$ ) and career engagement ( $\beta = .26$ ,  $p < .001$ ), thus supporting Hypotheses 3c and 3d. Therefore, students who had a higher level of interest in general tend to be more confident regarding occupational tasks and show higher engagement in proactive behavior. Interest elevation was not significantly related to career planning and career decidedness, refuting Hypotheses 3a and 3b.

Combined, the assessed secondary interest variables explained 6% of the variance in occupational self-efficacy beliefs ( $\Delta R^2 = .06$ ,  $p < .01$ ), 3% of the variance in career decidedness ( $\Delta R^2 = .03$ , *ns*), 9% of the variance in career engagement ( $\Delta R^2 = .09$ ,  $p < .001$ ), and 1% of the variance in career planning ( $\Delta R^2 = .01$ , *ns*) beyond the controlled sociodemographic variables.

**Table 2**

*Results of Multiple Hierarchical Regression Analysis for Predicting Career Preparedness by Secondary Constructs*

Predictor	Career Engagement			Career Decidedness			Self-Efficacy Beliefs			Career Planning			
	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$	
<b>Step 1</b>													
Constant	29.12	1.87		26.0	1.53		22.35	1.12		21.52	1.31		
				7									
Gender	-1.70	1.04	-.11	-1.00	.85	-.08	1.51	.62	.17*	-.74	.73	-.07	
Semester	.43	.25	.12	.06	.20	.02	.32	.15	.14*	-.07	.17	-.03	
<i>R</i> <sup>2</sup>		.03			.01			.05**			.01		
<i>F</i> for first step		<i>F</i> (2, 213) = 2.70			<i>F</i> (2, 213) = .72			<i>F</i> (2, 213) = 5.61**			<i>F</i> (2, 213) = .61		
<b>Step 2</b>													
Constant													
Gender	-1.41	1.01	-.09	-.58	.86	-.05	1.56	.61	.17*	-.62	.75	-.06	
Semester	.24	.24	.07	-0.00	.20	.00	.23	.15	.11	-.10	.18	-.04	
Congruence	-.23	.13	-.12	-.01	.10	-.01	-.07	.08	-.06	.04	.09	-.03	
Differentiation	.54	.17	<b>.21**</b>	.39	.15	<b>.19**</b>	.16	.11	.10	.12	.13	.07	
Elevation	.06	.02	<b>.26***</b>	.01	.01	.07	.03	.01	<b>.23**</b>	.01	.01	.09	
<i>R</i> <sup>2</sup>		.12***			.04			.11**			.02		
$\Delta R^2$		.09***			.03			.06**			.01		

*Note.* *N* = 239. *B* = unstandardized coefficient, *SE B* = standard error of unstandardized coefficient,  $\beta$  = standardized coefficient \**p* < .05. \*\**p* < .01. \*\*\**p* < .001.

## Discussion

Our study investigated the relationship of Holland's (1997) secondary interest constructs (i.e., interest/study-major congruence, interest differentiation, and interest elevation) with attitudes and behaviors of career preparedness among university students in emerging adulthood. We assumed that components of career preparedness (i.e., career planning, occupational self-efficacy beliefs, career decidedness, and career engagement; Hirschi et al., 2014; Skorikov et al., 2007) play a significant role during university studies, because students begin to prepare for the university-to-work transition. The basic idea of our study was that the secondary interest constructs can be regarded as indicators for the state of vocational interest development and thus are theoretically linked with career preparedness (Holland, 1997; Reardon & Lenz, 1999).

Our results regarding the predictive validities of the secondary constructs revealed mixed results: Interest congruence was not significantly related to career preparedness whereas interest differentiation and elevation were each positively related to two indicators of career preparedness.

The finding that interest congruence was not related to any component of career preparedness is somewhat surprising because theoretical assumptions from Holland's theory as well as SCCT provide rationales for these relationships. Moreover, a study found some of the expected relations within a sample of adolescents (Hirschi & Läge, 2007). Therefore, it might be possible that the relation between congruence and career preparedness is specific for adolescent samples and not transferable to young adults and other educational backgrounds. However, because this reasoning lacks a clear theoretical underpinning,

we think it might be more a methodological artefact resulting from the complex endeavor to classify multidisciplinary and more and more diverse study majors by three Holland letters. Related to this, study-major congruence was low among our sample. This can be explained by the heterogeneity in interest types within some study fields. For instance, among students engaged in cultural studies, we identified 16 different combinations of three-letter Holland codes in their interest profiles.

Interest differentiation was positively associated with career decidedness, meaning that university students with a large discrepancy between different interest types are also more decided and have a clearer picture of their occupational goals. This finding is in line with Holland's assumption (1997) that differentiation is associated with higher clarity within the decision-making process. Furthermore, this result mirrors Bergmann's (1993) findings among Austrian high-school students – but is different from results of a study about secondary constructs and career maturity among Swiss secondary students (Hirschi & Läge, 2007). This suggests that in contrast to secondary students, interest differentiation might have another function for university students. Additionally, interest differentiation was positively linked with career engagement. Therefore, students with differentiated interests are more engaged in career behaviors. This might be explained by the possibility that differentiated interest profiles provide a clear picture of how to fulfill career aspirations.

In our study, interest differentiation did not show any relationship with career planning or occupational self-efficacy beliefs. It might be that career planning can be relevant for students with

low differentiation they are also very concerned about future career options. Regarding occupational self-efficacy beliefs, the nonsignificant relation was marginally (non)significant. Therefore, taking into account the sample size of our study, we would caution against drawing strong conclusions from this finding.

Interest elevation was related to occupational self-efficacy beliefs and career engagement. This relationship is in line with SCCT (Lent et al., 1994), which states a close connection between vocational interests and occupational self-efficacy beliefs. Moreover, high interest elevation goes along with high levels of activation, which might be a suitable explanation why students who have a broad interest in many domains also have higher efficacy beliefs and show a higher level of engagement in career activities. Furthermore, the relationship of interest elevation to broader occupational self-efficacy beliefs makes especially sense because tasks and demands in occupations are usually associated with more than one interest type.

An explanation for the nonsignificant correlation of interest elevation with career planning and career decidedness is that interest elevation may also represent vocational flexibility (Darcy & Tracey, 2003), which may also distract from a focused career planning and reduce decidedness. In sum, different processes associated with interest elevation which work in opposite directions, may lead to nonsignificant relationships of interest elevation to career planning and decidedness.

Overall, our findings partially supported the assumption that secondary constructs are associated with career preparedness (Hirschi et al., 2014). In particular, career engagement as a

behavioral component of career preparedness showed the strongest, most frequent, and diverse relationships with the secondary constructs. Moreover, we found that with regard to explained variance occupational self-efficacy beliefs can be relatively well predicted by the secondary constructs. Initially, we therefore cautiously conclude that Holland's secondary constructs are differentially related to different components of career preparedness among university students.

### **Limitations**

Besides the mentioned contributions of our study some limitations should also be discussed. First, the study is based on cross-sectional data, which limits the casual interpretation of the results. Although we theoretically argued for the interest-career preparedness direction, some associations can be reasoned in both directions. Therefore, other studies might also collect longitudinal data to investigate reciprocal relationships between secondary constructs and career preparedness. Also, although the constructs studied here can be considered distinct from each other, common method bias cannot be ruled out because all variables were collected as self-report data at the same time (Podsakoff, MacKenzie, & Podsakoff, 2012). Related to this point, methodological artefacts resulting from the possible confounding of interest elevation and acquiescence bias in the career preparation measures might have occurred. Because items of the AIST-R and most career preparedness scales were positively formulated, the relationships between interest elevation and variables of career preparedness might have been overestimated in our study.

Second, the coding of study-majors according to the RIASEC typology was sometimes challenging. The study majors were coded by the

three raters who were not experts for each of the study fields. Consequently, different raters coded many study majors with different Holland codes and the final coding was based on a common agreement. Additionally, majors such as cultural studies, business psychology, and environmental science can represent a range of different interest types that are difficult to display in a single three-letter interest code. Hence, future research should pay much close attention to the generation of the Holland codes. For example, Holland codes could be assessed empirically by using the "Umwelt-Struktur-Test" (Environment-Structure-Inventory; Bergmann & Eder, 2005) or experts of the study fields such as teaching staff could be interviewed (for more details see Rolfs & Schuler, 2002). Furthermore, AIST-R (Bergmann & Eder, 2005), as the herein applied interest inventory, is very broad in terms of included interest related activities (e.g., "counsel other people") which might not perfectly match activities in study majors. However, these limitations only explain the nonsignificant findings regarding interest congruence but are not a valid limitation for the results of the other secondary constructs.

Third, the interpretation of the results should be made with a certain degree of caution because the here found effect sizes are rather small to moderate and our study is one of few studies dedicated to this topic (Hirschi & Läge, 2007). However, other studies that deal with similar constructs have found similar effect sizes between secondary constructs and career-related variables (e.g., Hirschi & Läge, 2007). Nonetheless, future research should replicate the here found results and analyze moderation effects, which might explain under which condition the here found effects might be stronger or weaker.

Fourth, the low response rate of our study questions the generalizability of the results to the whole population of university students in Germany. It might have been that specific population subgroups were attracted by the study, and therefore, were oversampled. For instance, students with low interest congruence or career decidedness might have been attracted by the survey with the aim to get a clearer picture about their occupational attitudes and interest. Related to this point, it might be possible that some students replied to the occupational self-efficacy scale in reference to a current part-time job while others responded in anticipation of their future graduate employment. This might systematically change the content validity of this measure between different groups of students and bias some of the results. However, based on research on generalized self-efficacy (Chen, Gully, & Eden, 2004), it seems reasonable to assume a strong overlap between such potentially different reference frames for occupational self-efficacy.

### **Practical Implications**

Our study expanded knowledge from earlier studies (e.g., Hirschi & Läge, 2007) and can provide some implications not only relevant for research but also for career counseling practice with university students. First, as we highlighted the importance of some secondary constructs for some components of career preparedness among emerging adults in higher education, career counseling endeavors that tap the secondary constructs might also foster positive career development among university students. Therefore, career counseling programs at universities might include components that especially are directed to the clear differentiation of interests or to develop multiple career-related interests.

Second, by analyzing a behavioral component of preparedness (i.e., career engagement), we were able to draw a broader picture compared to studies that have investigated career-related attitudes in relation to secondary interest constructs (e.g., Hirschi & Läge, 2007). This leads to the implication that important career behaviors like networking and information seeking could be affected by interest profile shaping within counseling activities.

Finally, career counselors working with university students can take the secondary constructs as a valuable source of information about their clients' state of career development. According to our study, different interest profiles also inform the counselor about different career developmental outcomes (i.e., career decidedness, occupational self-efficacy beliefs, and career engagement). Although a detailed inspection of interest profiles cannot replace other types of counseling assessments they nonetheless might provide useful additional information about further career development of the clients. Optimally, career interventions for students should include several diverse components like fostering social support or increasing job search occupational self-efficacy beliefs and clarifying future occupational aspirations (Hirschi et al., 2013).

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