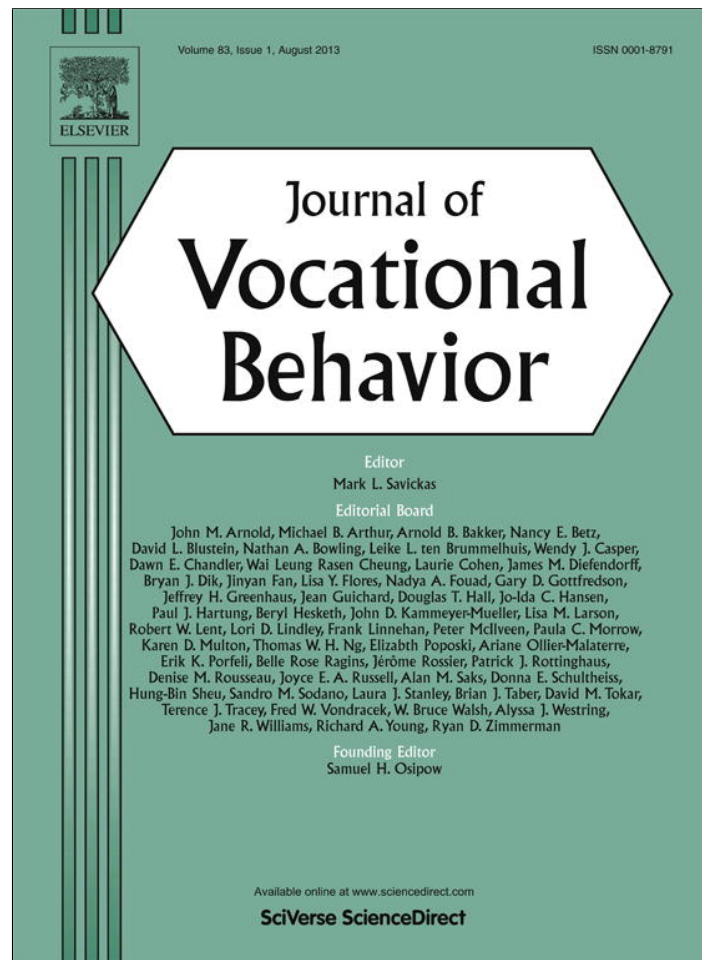


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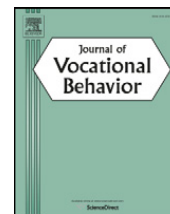
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Calling and career preparation: Investigating developmental patterns and temporal precedence[☆]

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ABSTRACT

The presence of a calling and career development are assumed to be closely related. However, the nature of and reason for this relationship have not been thoroughly investigated. We hypothesized the existence of reciprocal effects between calling and three dimensions of career preparation and assessed the change of the presence of a calling, career planning, decidedness, and self-efficacy with three waves of a diverse sample of German university students ($N = 846$) over one year. Latent growth analyses revealed that the intercepts of calling showed a significant positive correlation with the intercepts of all career preparation measures. The slope of calling was positively related to those of decidedness and self-efficacy but not to planning. Cross-lagged analyses showed that calling predicted a subsequent increase in planning and self-efficacy. Planning and decidedness predicted an increase in the presence of a calling. The results suggest that calling and career preparation are related due to mutual effects but that effects differ for different career preparation dimensions.

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1. Introduction

In today's post-industrialized economies, many people seek intrinsically motivating work. Empirical research (e.g., [Wrzesniewski, McCauley, Rozin, & Schwartz, 1997](#)) shows that a considerable number of individuals in various professions are searching for or trying to implement a calling in their career. [Dobrow and Tosti-Kharas \(2011, p. 1003\)](#) defined calling as a consuming, meaningful passion people experience toward a career domain while [Dik and Duffy \(2009\)](#) described it as a transcendent summons to a meaningful career that is used to serve others. Regardless of the specific definition, the presence of a calling is often described as a psychological resource that promotes vocational development and as connected to identity, confidence, resilience, and adaptability ([Hall & Chandler, 2005](#)). Empirical studies confirmed a positive relationship of calling and several career development variables such as career decidedness ([Duffy & Sedlacek, 2007](#); [Steger, Pickering, Shin, & Dik, 2010](#)) or career self-efficacy beliefs ([Dobrow & Tosti-Kharas, 2011](#); [Duffy, Allan, & Dik, 2011](#); [Hirschi, 2011](#)). However, the reason for and nature of the relationship have not been clearly addressed. As a consequence, we do not know whether callings promote, hinder, precede, follow, or are reciprocally related to pivotal career development constructs. However, such knowledge is crucial to increase our understanding of how a calling emerges and how it affects career development ([Dobrow, in press](#)).

The major general contribution of the present study is that it is the first study to our knowledge to investigate the developmental intersection between calling and career development variables with a true longitudinal design encompassing three measurement points – a feature generally very rare in career and organizational research. Specifically, the present study

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examines the relation of change trajectories of the presence of a calling and three dimensions of career preparation (Skorikov, 2007): Career planning, decision-making, and confidence among university students with three measurement points over a period of one year. Moreover, we investigate to what extent the presence of a calling precedes and/or follows the development of the career preparation dimensions with a cross-lagged study. In this way, the study makes three key contributions. First, we contribute to the calling literature by investigating how callings change over time and what factors affect such changes. Second, we extend this literature by linking calling with three dimension of career preparation among university students and show if and how calling affects those pivotal career development variables. Third, we contribute to career development research by demonstrating how career preparation affects the emergence of a presence of a calling.

2. Theoretical background

Dobrow (in press) suggested that researchers must consider a calling to be a dynamic phenomenon that changes over time and addressed the need for research examining calling in conjunction with possible antecedents and outcomes. Longitudinal research investigating the relation of calling and career development variables has only begun to emerge (Dobrow, in press; Dobrow & Tosti-Kharas, 2011; Duffy, Manuel, Borges, & Bott, 2011) and generally reported positive relations. However, these studies have not tested lagged effects, which would establish whether a change in career development variables is related to a change in calling (or vice versa) and thus make a case for their mutual influence above and beyond mere concurrent relations. The present study extends existing research and attempts to increase our understanding of how calling and dimensions of career preparation are related over time.

Specifically, we investigated the intersection of calling and three dimensions of career development that represent three commitment-focused dimensions of career adaptability (Savickas, 2005) that Skorikov (2007; Stringer, Kerpelman, & Skorikov, 2011) defined as career preparation: Planning, decision-making, and confidence. Previous research showed that those dimensions are pivotal constructs of career development and related to important career outcomes such as, for example, fewer career concerns among first-year university students (Creed, Fallon, & Hood, 2009) or better psychological adjustment after high school (Skorikov, 2007). In our study, we investigated the relation of those career preparation variables with calling among a large and diverse group of German university students. This allowed us to tap into a critical period in terms of career and identity development. First, engaging in career preparation is particularly pivotal for students to address the specific career task of transitioning from university to work or postgraduate degrees, which is characterized by the need for active career planning, decision-making, addressing uncertainty about future work, an active job search, and career self-management (see Abele & Spurk, 2009, for a study with German university graduates). Second, during the period of emerging adulthood, which encompasses the university years, the development and establishment of a student's identity, values, goals, and life structures are particularly prevalent (Arnett, 2000). Therefore, investigating the emergence of a presence of a calling appears timely for this population. Empirical research confirmed that the concept of a calling is relevant for a considerable number of university students in the US (Hunter, Dik, & Banning, 2010) and Germany (Hagmaier & Abele, 2012; Hirschi, 2011).

Because university students are concerned with career preparation and the notion of a calling is important for a considerable number among them, investigating the developmental intersection of career preparation and calling seems important and fruitful to increase our understanding of the nature, antecedents, and consequences of callings. A calling is frequently considered as a psychological resource that positively affects career development (Hall & Chandler, 2005) and empirical research showed positive relations to different career development variables (Dobrow & Tosti-Kharas, 2011; Duffy, Allan, et al., 2011; Duffy & Sedlacek, 2007; Hirschi, 2011; Steger et al., 2010). It is hence reasonable to expect meaningful positive relations with dimensions of career preparation among university students. However, previous research has not investigated the developmental intersection of those career constructs.

In the next paragraphs, we review the relation of calling with the three dimensions of career preparation in terms of career planning, career decision making (i.e., career decidedness), and career confidence (i.e., career self-efficacy beliefs). All three dimensions can be conceptualized as positive indicators of career preparation (Skorikov, 2007) and we hence expect no fundamental differences in their relation to the presence of calling. However, empirical research (Stringer et al., 2011) suggested that they show different antecedents, developmental patterns, and outcomes which make it important to treat them as distinct dimensions in their own right.

2.1. Career planning and calling

People with a sense of calling should be motivated to proactively consider and plan their career because they are likely to aim to implement their calling at work, which allows them to live their calling and achieve higher job satisfaction (Duffy, Bott, Allan, Torrey, & Dik, 2012). As such, callings can represent an ideal possible (future) work self that motivates anticipatory and future-oriented career behavior, such as career planning (Strauss, Griffin, & Parker, 2012). On the other hand, it is also possible that active career planning facilitates the development and confirmation of one's calling. Career planning entails future-oriented thinking and envisioning future work states (Savickas, 1997). Thus, it allows people to envision themselves in different future work contexts and to construct a possible future self (Markus & Nurius, 1986), which is important in identity construction and finding meaning. This future-oriented identity construction can lead to the discovery or confirmation of a sense of calling.

Therefore, one could expect a concurrent as well as reciprocal relationship over time between the presence of a calling and career planning.

Hypothesis 1. Career planning and the presence of a calling are positively related to each other (a) within and (b) across time; (c) more career planning will predict an increase in the presence of a calling; (d) a stronger presence of a calling will predict an increase in career planning.

2.2. Career decidedness and calling

Based on theoretical and empirical grounds, we can expect a close positive relation of career decidedness and the presence of a calling (Duffy & Sedlacek, 2007; Hirschi, 2011; Steger et al., 2010). Theoretically, this relationship can be explained in the way in which a calling gives people a sense of direction in their career because it entails a certain vocational path toward which one feels called (Dik & Duffy, 2009). As such, the presence of a calling facilitates a career choice that implements one's self-concept into the work role (Duffy & Sedlacek, 2010). Second, calling is related to self-clarity (Duffy & Sedlacek, 2007), which is in turn an important prerequisite for career decision making and career decidedness (Super, 1990). Therefore, a calling can be assumed to enhance decidedness because it facilitates career decision making by providing clarity regarding oneself and one's goals. However, having a clear perspective of one's career in terms of career decidedness could reinforce a sense of direction, control, meaning, and purpose in one's career (Savickas, 2005), which could strengthen or develop the presence of a calling. Therefore, we can assume that career decidedness and calling reinforce each other over time.

Hypothesis 2. Career decidedness and the presence of a calling are positively related to each other (a) within and (b) across time; (c) more career decidedness will predict an increase in the presence of a calling; (d) a stronger presence of a calling will predict an increase in career decidedness.

2.3. Career self-efficacy and calling

People with a sense of calling are assumed to express their strengths through their calling and as such should possess high confidence in their ability to master career-related tasks (Hall & Chandler, 2005). Similarly, individuals with a sense of calling are enacting their "true selves" in the work role, which entails expressing their core strengths (Peterson, Park, Hall, & Seligman, 2009). Therefore, although the presence of a calling may not directly translate into a specific level of a person's objective ability (Dobrow, *in press*), we could assume that a calling can promote a sense of career self-efficacy. Supporting this assumption, research on college students has found that those with a sense of calling reported on average more career decision making self-efficacy (Duffy, Allan, et al., 2011), that career self-efficacy was a defining component across different types of callings (Hirschi, 2011), and that a calling predicted career self-efficacy even several years later (Dobrow & Tosti-Kharas, 2011). At the same time, a sense of efficacy in mastering work- and career-related tasks could in turn facilitate the development of the presence of a calling because a sense of competence is essential to develop intrinsic motivation and self-determination in a given domain (Deci & Ryan, 2000), both important components of the presence of a calling (Dik & Duffy, 2009; Hall & Chandler, 2005). Hall and Chandler (2005) also stated that finding one's calling can lead to a success cycle where positive career experiences that emerge out of one's calling reinforce the person's self-confidence.

Hypothesis 3. Career self-efficacy and presence of a calling are positively related to each other (a) within and (b) across time; (c) more career self-efficacy will predict an increase in the presence of a calling; (d) a stronger presence of a calling will predict an increase in career self-efficacy.

3. Materials and method

3.1. Participants and procedure

We used a panel design with refreshment sample (Deng, Hillygus, Reiter, Si, & Zheng, *in press*) to assess two groups of students across all majors enrolled at a medium-sized German university. Specifically, we collected three waves of data, each six months apart (T1 to T3). We chose a time lag of six months between the waves because we deemed this period to be sufficient to observe any meaningful change in the assessed career variables that might occur. Previous research successfully applied the same time lag when examining change in career constructs (e.g., Strauss et al., 2012). Group one participated in all three waves. Group two was the refreshment sample consisting of new participants recruited six months after T1 and hence participating only in the last two waves (T2 and T3). This procedure hence assesses different groups of participants with temporally overlapping measurement points (T2 and T3) in order to assess common developmental trends. Data were collected with a web-based questionnaire and participation in a lottery drawing offering two prizes of EUR 450 each were offered as an incentive at each assessment point.

The first group of students were recruited by sending an email invitation to all students in the second semester of their second and third years of study (approx. 3500 students), resulting in response levels of $N = 1207$ and 34% (T1). Participating students

were contacted again two times, each six months apart, resulting in response rates of 45% (T2) and 24% (T3), respectively, with 206 participating in both follow-ups. The *second group* consisted of students starting their second study year at T2 (approx.1800 students) and were also invited by email, resulting in a response rate of $N = 700$ and 39%. Participants were again contacted six month later (T3) with a response rate of 30%.

One advantage of using a panel design with refreshment sample over a classical longitudinal panel design is that attrition from the first group can be compensated with a new random sample of participants (group two) (Hirano, Imbens, Ridder, & Rubin, 2001). We compared participants from the first group at T2 to those from the second group at T2 on the assessed variables. The results showed no significant differences on any of the assessed constructs, indicating no group effects and hence supporting all subsequent analyses being conducted with participants treated as one group. Due to design and individual attrition, not all students participated in all three measurement waves. The impact of “missingness” on the study was assessed by examining the relationship between the number of missing time points per participant and the other study variables. The results showed that missingness was not significantly correlated with any of the assessed variables. Because we did not find any indication of a systematic bias of missingness nor significant differences between the first group and the refreshment sample, all participants participating on at least two measurement points were retained for the final sample. For participants who did not provide data on one occasion, we estimated missing data with a full information maximum likelihood estimator of missing data. This procedure was shown to yield very accurate parameter estimates and has been particularly recommended for longitudinal studies where missing data is common (Graham, 2009). In fact, it has been shown to be the preferable approach as it leads to less biased results in comparison to listwise deletion where only participants with complete data on all measurement occasions are retained (Duncan & Duncan, 1995).

The final sample consisted of 846 students, 64% were female, and the mean age was 23.73 years, $SD = 2.40$, at the first time of study participation. Participants enrolled in 33 different majors, ranging from mechanical engineering to social work, with the largest groups stemming from Management and Entrepreneurship (16%), Business Psychology (16%), Business Administration (14%), Environmental Science (7%), and Business Law (5%). As is customary in Germany, race was not assessed.

3.2. Measures

Unless stated otherwise, all measures used a five-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Cronbach's alpha estimates, means, standard deviations, and correlations between measures are reported in Table 1.

3.2.1. Presence of calling

The German language version (Hirschi, 2011) of the presence subscale of the brief calling scale (BCS; Dik, Eldridge, Steger, & Duffy, 2012) was applied. It consisted of two statements (“I have a calling to a particular kind of work”, and “I have a good understanding of my calling as it applies to my career”). This measure has the advantage of not imposing a specific notion of calling on the study participants. A recent validation study (Dik et al., 2012) found that the BCS scores showed moderate to strong correlations with scores of other measures of calling ($r = .24$ to $.69$) and with informants' reports of participants' perceptions of their calling ($r = .27$ to $.46$). Previous research using this scale reported high correlations between the two items ($r = .76$ to $.82$) and showed moderate to high relationships with career decision making self-efficacy, intrinsic work motivation, religious commitment, and meaning in life (Duffy & Sedlacek, 2007; Steger et al., 2010).

3.2.2. Career planning

Planning was assessed with the German six-item (e.g., “I have a strategy for reaching my career goals”) career planning scale proposed by Abele and Wiese (2008), adopted from respective scales from Gould (1979) and Wayne, Liden, Kraimer, and Graf (1999). Abele and Wiese (2008) reported a reliability of $\alpha = .86$ and support for the construct validity of the scale among a large

Table 1
Reliability, correlations, means and standard deviations for calling and career preparation scales.

		1	2	3	4	M	SD
<i>Time 1 (N = 633)</i>	1. Planning	.88	.73	.45	.46	3.28	0.84
	2. Decidedness		.88	.45	.48	3.51	0.88
	3. Self-efficacy			.78	.31	2.50	0.96
	4. Calling				.72	3.17	1.02
<i>Time 2 (N = 760)</i>	1. Planning	.87	.72	.38	.45	3.29	0.85
	2. Decidedness		.89	.43	.47	3.46	0.89
	3. Self-efficacy			.81	.32	2.64	0.97
	4. Calling				.72	3.11	0.98
<i>Time 3 (N = 505)</i>	1. Planning	.87	.74	.40	.45	3.29	0.86
	2. Decidedness		.89	.50	.46	3.47	0.91
	3. Self-efficacy			.81	.41	2.83	1.00
	4. Calling				.73	3.12	1.01

Note. Entries in *italic* in diagonal are the Cronbach's alpha reliability coefficients for the career preparation scales and the bivariate correlations of the two calling items respectively.

All correlations $> .14$ are $p < .001$, $.06-.14$ are $p < .01$.

group of university-educated German professionals in terms of medium relationships with subjective and objective career success.

3.2.3. Career decidedness

We applied the German-language adaptation of the vocational identity scale (Holland, Daiger, & Power, 1980; Jörin, Stoll, Bergmann, & Eder, 2004) using seven items (e.g., “I’m not sure yet which occupations I could perform successfully”). Research with the German-language version reported scale reliabilities between $\alpha = .81$ and $.89$ and showed that the scale correlated highly with other measures of career decidedness, moderately with career planning, and low with career exploration among adolescents and college students (Hirschi, Niles, & Akos, 2011; Jörin Fux, 2006).

3.2.4. Career self-efficacy

We used the six-item (e.g., “Whatever comes my way in my job, I can usually handle it”) German short version of the occupational self-efficacy scale developed and validated by Rigotti, Schyns, and Mohr (2008) with a six-point Likert scale from 1 (*not at all true*) to 6 (*completely true*). Rigotti et al. (2008) reported a scale reliability of $\alpha = .84$ and evidence for construct validity among a large group of German employees with moderate relationships to job satisfaction, organizational commitment, job performance, and job insecurity.

3.3. Analytical approach

In order to test our hypotheses that calling and career preparation are related within and across time, Hypotheses 1 to 3 (a) and (b), we first applied Latent Growth Modeling (LGM), a statistical analysis that estimates growth trajectories of intraindividual change over time (for an introduction, see Martens & Haase, 2006). Specifically, we assessed whether, over the assessed three time points, the intercept (initial levels) and slope (intraindividual change trajectory) of calling were related to the intercepts and slopes of the career preparation measures.

In order to assess our hypotheses which suggest that calling and career preparation predict change in each other over time, Hypotheses 1 to 3 (c) and (d), we next applied cross-lagged analyses (CLA, see Martens & Haase, 2006, for a basic introduction). This type of analysis is particularly useful to estimate whether a variable temporally precedes and/or follows another variable. While LGM is concerned with intercepts and slopes over the entire assessed time span, CLA focuses on how the variables are related to each other from one point in time to the next. Hence, the latter provides a complementary perspective to LGM. In all analyses, calling and the different career preparation dimensions were assessed as latent constructs with their respective items as indicators. All analyses were conducted using *Mplus* (Version 6.1; Muthén & Muthén, 2010) with the robust maximum likelihood estimation MLR.

To assess model fit, the Satorra–Bentler corrected ($SB-\chi^2$) significance test (2001) was used which is suitable for nonnormally distributed data as is the case in our study. It is an absolute fit index that indicates how well the model fits the sample data. A significant test result (i.e. $p < .05$) suggests that the data differs significantly from the proposed model. However, because the test is very sensitive to sample size, it was supplemented with the comparative fit index (CFI) and the root mean square error of approximation (RMSEA). The CFI is a normed goodness-of-fit index that ranges from 0.0 to 1.0. Higher values indicate better fit relative to the independence model. The index adjusts for model parsimony and model complexity. Values close to .95 and above indicate acceptable model fit (Hu & Bentler, 1999). The RMSEA is a residual-based fit index. In addition to the noncentrality parameter, the sample size and degrees of freedom are included in its computation. A perfectly fitting model will obtain an RMSEA of zero. The index increases as the model misspecification becomes more severe. Values of .06 or less are considered acceptable (Hu & Bentler, 1999). Model comparisons were based on the Satorra–Bentler scaled χ^2 -difference test where the degrees of freedom are specified as the difference in degrees of freedoms between both models (Satorra & Bentler, 2001).

4. Results

4.1. Preliminary analyses

Before testing the hypotheses, it is necessary to prove that calling is a distinct construct that captures something different than the career preparation scales. We thus compared the model fit of a single-factor model with a model distinguishing calling from planning, decidedness, and self-efficacy among all students who participated at T1 ($N = 1207$). Poor model fit was obtained for the one-factor model ($SB-\chi^2 = 3413.47$, $df = 189$, $p < .001$; $CFI = .70$; $RMSEA = .12$). The fit of the four-factor model achieved good model fit ($SB-\chi^2 = 1106.16$, $df = 183$, $p < .001$; $CFI = .92$; $RMSEA = .06$) and provided significantly better fit than the one-factor model (SB -scaled $\Delta\chi^2 = 2307.31$, $df = 3$; $p < .001$). Moreover, we established that a three-factor model distinguishing the three career preparation dimensions provided a significant better fit than a model where the three dimensions are treated as indicators of a single career preparation factor (one-factor model: $SB-\chi^2 = 2726.91$, $df = 152$, $p < .001$; $CFI = .73$; $RMSEA = .12$; three-factor model: $SB-\chi^2 = 1001.45$, $df = 149$, $p < .001$; $CFI = .91$; $RMSEA = .07$; model comparison: SB -scaled $\Delta\chi^2 = 1725.45$, $df = 3$; $p < .001$). This confirmed our approach to analyze the relationships between calling and each of the three career preparation dimensions separately. Confirming the scales' construct validity, all standardized factor loadings of the scale items on their respective career preparation construct were of considerable size (.54 to .92) and highly significant (all $p < .001$).

Prior to assessing change over time, it is further necessary to provide evidence of measurement invariance across time points (Horn & McArdle, 1992). Measurement invariance assures that the measures assess the same construct at different points in time regarding factor structure and item functioning (for more details on the procedure see Lance, Vandenberg, & Self, 2000). To proceed with LGM analyses, it was necessary to demonstrate at least scalar invariance. Scalar invariance is confirmed when equivalent factors structures and equal factor loadings are observed across time points (Horn & McArdle, 1992). All scales either fulfilled or exceeded this minimum requirement and the suitability of the scales for the subsequent LGM was confirmed.

4.2. Test of hypotheses

4.2.1. Latent growth model

First, we assessed linear and non-linear univariate LGM of calling and the three career preparation scales to establish which growth curve best describes the change of each construct over time. Non-linear growth was modeled by freely estimating the slope factor at T3 (Curran & Hussong, 2003). For career planning and decidedness linear growth was confirmed. For self-efficacy and calling a non-linear model provided significantly better fit than a linear model and thus was used in subsequent analyses. The results support models of linear and non-linear growth despite the fact that the manifest means reported in Table 1 did not change substantially over time. This is possible because, firstly, the constructs are modeled as latent variables in LGM and estimates of growth are hence not based on the assumption that the constructs are equally well represented by each item. Second, the data can imply growth even if this growth is statistically nonsignificant, as indicated by nonsignificant slope means for our constructs. The means and variances of the intercepts of all constructs were significant, with the latter indicating that there were differences between individuals with regard to their initial level in the assessed constructs. Moreover, the slope variance of all career preparation measures was significant, suggesting meaningful differences between individuals with regard to their rates of change. This insight is provided by LGM because this method does not simply assess to what extent the sample mean changes across time. Instead the increase is modeled by a latent slope factor. Thus, while the assumption of growth over the course of the study may not be supported by our data in general, it is still possible that some individuals in the sample increased considerably while others remained stable or even experienced a decline in their level of the construct in question. Such difference in developmental patterns, also referred to as variability of change, is assessed by the slope variance. We hence proceeded to investigate bivariate LGM in order to detect to what extent the observed interindividual variability of initial level and subsequent change in calling and the career preparation measures are related.

We specifically examined the hypotheses that calling would be significantly related to career preparation (a) within and (b) across time, and specified bivariate latent growth models estimating the correlations of the slopes and intercepts of calling and one of the career preparation scales, respectively. Table 2 displays the model fit indices and correlations between slopes and intercepts of the variables (full results of the LGM analyses can be obtained from the authors upon request). Confirming the bivariate correlations among the observed measures reported in Table 1, the results in Table 2 showed significant correlations between the intercept of calling and the intercepts of each of the three career preparation scales, ranging from .48 to .62. This confirms significant relations of calling and career preparation within time, supporting H1 to H3 (a). Second, a positive relationship between the slopes of calling and the slopes of decidedness and self-efficacy was obtained, suggesting that an increase in one of the constructs was associated with an increase in the other construct and confirming H2 and H3 (b), respectively. For planning, no significant relationship between its slope with the slope of calling was observed, thus rejecting H1 (b).

4.2.2. Cross-lagged analysis

Prior to examining the cross-lagged models, we tested measurement models which allowed the latent constructs assessed at the three time points to correlate freely (Bagozzi & Edwards, 1998). Each measurement model displayed acceptable to good fit with $RMSEA = .03$ to $.05$ and $CFI = .93$ to $.97$. To assess the longitudinal associations between calling and each of the three career preparation scales, we next conducted comparisons between a series of nested cross-lagged models (see Fig. 1). The starting point was the autoregressive model (M1) which estimates the stability of the constructs over time (Burkholder & Harlow, 2003). In the second model (M2), cross-lagged pathways were added from calling assessed at previous waves to the career preparation measures assessed at later waves. For the third model (M3), the relationships were reversed, and paths leading from the career preparation measures to calling were specified. The final model (M4) contained both cross-lagged effects, thus testing reciprocal effects.

Table 2

Model fit indices, parameters estimates and correlations between intercepts and slopes for bivariate latent growth curve models.

	Model fit			Correlations of intercepts and slopes	
	SB- χ^2 (df)	CFI	RMSEA	Intercept calling with intercept career preparation measure	Slope calling with slope career preparation measure
Planning	611.96 (257)	.95	.04	.48***	-.09
Decidedness	530.97 (337)	.98	.03	.62***	.47*
Self-efficacy	401.09 (260)	.98	.03	.50***	.29*

Note. $N = 846$; $RMSEA =$ root mean square Error of approximation; $CFI =$ comparative fit index.

* $p < .05$.

*** $p < .001$.

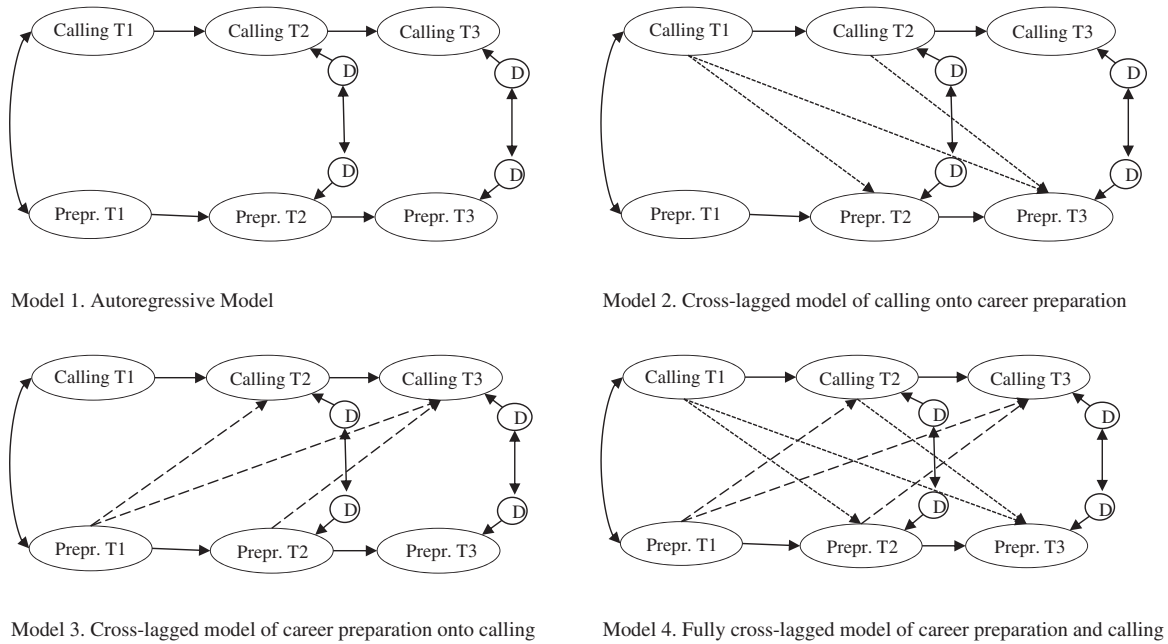


Fig. 1. Models 1 to 4 of the cross-lagged analysis of calling and the respective career preparation measure over three time points. Prepr. = career preparation measure, D = disturbance terms associated with the latent variables at T2 and T3. All latent constructs were measured by their respective items. For clarity, only the structural model is shown. Items and paths representing residual covariances between like-items of the three measurement points of calling and career preparation respectively are omitted.

First, we tested the autoregressive model (M1) and found acceptable fit for all calling-career preparation models, with fit indices ranging from .04 to .05 for the *RMSEA* and from .93 to .96 for the *CFI*. We then tested whether either or both of the cross-lagged models (M2 or M3) provided a significantly better fit to the data than the more parsimonious autoregressive model. If significant, the better-fitting model of these two models was compared with the fully cross-lagged model (M4) to determine the most appropriate model (Martens & Haase, 2006). Table 3 shows the autoregressive paths linking the same constructs across time points and the cross-lagged standardized regression paths between calling and the career preparation scales of the fully cross-lagged models.

For career planning and calling, the fully cross-lagged model was found to be most appropriate, confirming a mutual relation of calling and career planning as stated in H1 (c) and (d). With regard to decidedness and calling, M3, which specified temporal precedence of decidedness over calling, was identified as best-fitting, confirming H2 (c) but rejecting H2 (d) stating that calling would also precede decidedness. For self-efficacy the best-fitting model was M2, which specified that calling precedes the career preparation construct, confirming H3 (d). However, the fully cross-lagged model did not improve the model fit in either case, refuting H3 (c), the assumption that self-efficacy would also precede presence of calling.

In sum, our CLA analyses showed that calling temporarily preceded career planning and self-efficacy, but not decidedness. On the other hand, career planning and decidedness, but not self-efficacy, temporally preceded presence of calling.

5. Discussion

Previous theoretical and empirical work has suggested that calling and dimensions of career preparation are significantly and positively related. However, the nature of their relationship has not been thoroughly examined. Our study increases our

Table 3
Cross-lagged standardized regression paths and autoregressive paths.

	Cross-lagged paths (Standard regression estimate)						Autoregressive path ^a			
	Career preparation → Calling			Calling → Career preparation			Career preparation		Calling	
	T1 → T2	T1 → T3	T2 → T3	T1 → T2	T1 → T3	T2 → T3	T1 → T2	T2 → T3	T1 → T2	T2 → T3
Planning	.05	.18*	-.04	.06	.11**	-.03	.60	.68	.59	.68
Decidedness	.14**	.17*	.02	.06	.03	.08	.73	.71	.58	.67
Self-efficacy	-.02	.04	-.01	.21***	.02	.19***	.36	.42	.65	.75

Note. N = 846.

^a All autoregressive paths $p < .001$.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

understanding of how and why the presence of a calling is related to career preparation and in doing so also enhances our knowledge of how callings emerge and develop over time – a question also largely unaddressed in the empirical literature. First, we found that the level of the presence of a calling related positively and moderately to career planning and high to decidedness and self-efficacy. This finding supports theoretical assumptions that people with a calling would also possess more career metacompetencies (Hall & Chandler, 2005) as well as empirical findings showing positive correlations between calling and career decidedness and self-efficacy (Dobrow & Tosti-Kharas, 2011; Duffy & Sedlacek, 2007; Hirschi, 2011; Steger et al., 2010). We further showed that the presence of a calling is empirically distinct from the assessed dimensions of career preparation and thus add to the existing literature suggesting the empirical distinctness of calling from constructs such as, for example, work engagement or career commitment (Dobrow & Tosti-Kharas, 2011).

Second, moving beyond establishing mere concurrent relations, the present study advances the literature by providing an in-depth analysis of how such relations can be explained by using a longitudinal design and applying LGM and CLA, both statistical methods particularly suited to investigate developmental change among multiple variables. Using bivariate LGM, we first investigated whether changes in one construct were related to changes in the other. As expected, change in the presence of a calling showed a moderate positive relation with changes in decidedness and self-efficacy, indicating that the constructs develop in parallel over time and that students who changed in the degree of the presence of a calling also changed similarly in their level of decidedness and self-efficacy. However, no relations between the slopes of calling and planning were observed, indicating that a change in calling was not related to corresponding changes in career planning. Therefore, whereas we could confirm that calling is significantly related to career preparation within time, our study advances the existing literature by suggesting that different change processes across time might be at work.

To further examine the relationship between the presence of a calling and career preparation over time, we then conducted CLA. Whereas other longitudinal studies have established that calling is related to the degree of vocational development (Duffy, Manuel, et al., 2011) or career self-efficacy (Dobrow & Tosti-Kharas, 2011) even across several years, our results provide a more sophisticated analysis of their relation by investigating cross-lagged effects. Going beyond extant research, CLA allowed us to tap more closely into the temporal precedence linking the presence of a calling and career preparation by controlling for internal stability over time and the concurrent relationships of the constructs. On a general level, the results supported a model of reciprocal effects between the presence of a calling and dimensions of career preparation. However, the direction of temporal precedence differed between career preparation dimensions, and we did not find consistent support for full reciprocal effects.

Specifically, the presence of a calling preceded increases in career planning and self-efficacy but not career decidedness. It thus appears that the presence of a calling motivates students to envision their vocational future and make plans for their careers, possibly to find ways of actualizing their callings in the work role. Calling also seems to enhance confidence in mastering challenges at work. Conversely, possibly because students with a sense of calling already possess high career decidedness (Duffy & Sedlacek, 2007; Hirschi, 2011), the presence of a calling did not substantially further enhance decidedness over time.

In turn, the presence of a calling was also preceded by aspects of career preparation, specifically career decidedness and planning. These findings support the notion that callings are dynamic (Dobrow, *in press*) and advance the literature by showing that having a sense of control over one's vocational development, clarity about personal preferences and career goals (i.e., career decidedness) as well as envisioning future career stages and possible selves (i.e., career planning) can strengthen and confirm a sense of calling among students. One could imagine that experiencing certainty about one's future career and making corresponding plans can contribute to the emergence of a calling because it might help students to discover their passion towards a particular career. Consistent with other studies reporting no relationship between ability and calling (Dobrow, *in press*), we could not confirm that self-efficacy promotes a sense of calling.

To summarize, our results enrich our understanding of how a calling develops and how and why it is related to career preparation among university students. We can confirm that the presence of a calling is meaningfully related to career preparation within time. This relation can in turn be explained by callings preceding changes in certain aspects of career preparation (i.e., planning, self-efficacy) and certain aspects of career preparation (i.e., decidedness, planning) preceding changes in a calling.

5.1. Limitations

Some limitations must be considered when interpreting our results. First, we assessed a relatively brief time span of only one year. Although we tapped into a developmentally critical period and other research has observed meaningful change in career development variables within similar time lags, this approach may nonetheless limit our ability to observe developmental patterns among the assessed variables that may become apparent over the course of several years. This limitation is especially important to note because our results show that the presence of a calling and career preparation were relatively stable constructs in our sample over the assessed time-frame. Future studies are encouraged to assess developmental relationships over longer periods of time. Second, our sample was restricted to university students, and future research must examine the generalizability of our results among working samples as well. Third, we relied on self-report measures. Although the longitudinal design does diminish method effects, common method bias may be an issue and could be avoided by future research applying multi-source measures. Fourth, we applied a brief calling scale that allows participants to use their own notion of calling. Although the scale has received empirical support in several other studies, one limitation is that it is not clear what participants mean when indicating a "calling". A recent study by Hagmaier and Abele (2012) among German university students suggests that our measure taps mostly into the notion of a "transcendent guiding force" as a defining component of calling. Future studies are encouraged to assess

developmental relations of calling and other career constructs with other measures of calling to enrich our understanding of how different aspects of calling are related to career development. Moreover, it is possible that the two items of our applied calling measure refer to different concepts. The first item addresses the presence of a calling more generally while the second refers to whether somebody knows how to apply a calling to her or his career development. A post-hoc analysis revealed that the second item showed consistently larger correlations with the applied career preparation measures than the first item. It might thus be important to distinguish between having a calling and knowing how to implement it into a career. We encourage further research to address this distinction. Fifth, we measured confidence in terms of occupational self-efficacy beliefs which might imply certain validity constraints among a student sample. Future research could investigate efficacy beliefs regarding other career relevant domains such as decision making. Sixth, although our research design allowed cross-lagged analyses that are particularly useful for investigating potential causal mechanisms among constructs in field research, one must be careful when making causal claims. Inferences about causality may be wrong because the assessed variables have not reached equilibrium or because variables that might alter the influences are missing from the model (Shadish, Cook, & Campbell, 2002). Therefore, causal effects must be further studied in more rigorously controlled experiments to be certain about the true causal influences between calling and career preparation. Finally, as common in longitudinal research attrition was an issue in our sample. Attrition might have been somewhat larger than occurred in other studies with university students (Duffy, Manuel, et al., 2011) because we did not sample students attending a specific class or study field but all students attending the university which made it harder to track them for follow-up surveys. However, we believe that this setback is compensated by the increased external validity of our sample compared to investigating considerably narrower selection of students attending a particular subject class. Moreover, we did not find systematic effects of missingness in our data. Furthermore, utilizing sophisticated estimation procedures that provide accurate estimates of missing data as done in the present study is beneficial for two reasons. First, we were able to use the data of a large number of participants and hence increase the power of our analyses. Second, we avoided the potential bias of listwise deletion of participants with incomplete data (see Graham, 2009, for more details on how to treat missing data).

6. Conclusions and implications

Our study advances the theoretical understanding of how callings develop as well as how and why they are related to other prominent career development constructs, specifically, dimensions of career preparation. In sum, our results suggest that showing higher career preparedness in terms of career decidedness and planning can help people to develop and/or confirm a sense of calling in their careers. In turn, experiencing a calling appears to be a motivating force for engaging in career preparation and might thus help to navigate a complex career terrain and address career development tasks (Hall & Chandler, 2005).

With regard to counseling practice, addressing callings might be important for a considerable number of clients (e.g., Hunter et al., 2010; Wrzesniewski et al., 1997). Our results imply that helping clients to find or develop a calling can be beneficial because callings may have positive effects on the general ability to cope with vocational demands by increasing subsequent engagement in career preparation. Dik and Duffy (2009) suggested that introspection might be important in order to find a calling stemming from an external source. Offering a complementary perspective, our results imply that increasing the degree of career preparation might also be important in order to develop (Dobrow, in press) a calling among university students. For example, clarifying personal preferences and career goals and envisioning possible future states and selves (Markus & Nurius, 1986) may be useful tools in this regard. Career counselors could enhance their regular practice by linking such activities more explicitly to questions of meaning and purpose in work and how clients might develop a sense of calling in their career.

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References

- Abele, A. E., & Spurk, D. (2009). The longitudinal impact of self-efficacy and career goals on objective and subjective career success. *Journal of Vocational Behavior*, 74(1), 53–62. <http://dx.doi.org/10.1016/j.jvb.2008.10.005>.
- Abele, A. E., & Wiese, B. S. (2008). The nomological network of self-management strategies and career success. *Journal of Occupational and Organizational Psychology*, 81(4), 733–749. <http://dx.doi.org/10.1348/096317907X256726>.
- Arnett, J. J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist*, 55(5), 469–480. <http://dx.doi.org/10.1037/0003-066X.55.5.469>.
- Bagozzi, R. P., & Edwards, J. R. (1998). A general approach for representing constructs in organizational research. *Organizational Research Methods*, 1(1), 45–87.
- Burkholder, G. J., & Harlow, L. L. (2003). An illustration of a longitudinal cross-lagged design for larger structural equation models. *Structural Equation Modeling*, 10(3), 465–486. http://dx.doi.org/10.1207/S15328007SEM1003_8.
- Creed, P. A., Fallon, T., & Hood, M. (2009). The relationship between career adaptability, person and situation variables, and career concerns in young adults. *Journal of Vocational Behavior*, 74(2), 219–229. <http://dx.doi.org/10.1016/j.jvb.2008.12.004>.
- Curran, P. J., & Hussong, A. M. (2003). The use of latent trajectory models in psychopathology research. *Journal of Abnormal Psychology*, 112(4), 526–544. <http://dx.doi.org/10.1037/0021-843x.112.4.526>.
- Deci, E. L., & Ryan, R. M. (2000). The “what” and “why” of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11(4), 227–268. http://dx.doi.org/10.1207/S15327965pli1104_01.
- Deng, Y., Hillygus, D. S., Reiter, J. P., Si, Y., & Zheng, S. (in press). Handling attrition in longitudinal studies: The case for refreshment samples. *Statistical Science*.
- Dik, B. J., & Duffy, R. D. (2009). Calling and vocation at work: Definitions and prospects for research and practice. *The Counseling Psychologist*, 37(3), 424–450. <http://dx.doi.org/10.1177/0011000008316430>.

- Dik, B. J., Eldridge, B. M., Steger, M. F., & Duffy, R. D. (2012). Development and validation of the Calling and Vocation Questionnaire (CVQ) and Brief Calling Scale (BCS). *Journal of Career Assessment*, 20(3), 242–263. <http://dx.doi.org/10.1177/1069072711434410>.
- Dobrow, S. R. (in press). Dynamics of calling: A longitudinal study of musicians. *Journal of Organizational Behavior*. <http://dx.doi.org/10.1002/job.1808>.
- Dobrow, S. R., & Tosti-Kharas, J. (2011). Calling: The development of a scale measure. *Personnel Psychology*, 64(4), 1001–1049. <http://dx.doi.org/10.1111/j.1744-6570.2011.01234.x>.
- Duffy, R. D., Allan, B. A., & Dik, B. J. (2011a). The presence of a calling and academic satisfaction: Examining potential mediators. *Journal of Vocational Behavior*, 79(1), 74–80. <http://dx.doi.org/10.1016/j.jvb.2010.11.001>.
- Duffy, R. D., Bott, E. M., Allan, B. A., Torrey, C. L., & Dik, B. J. (2012). Perceiving a calling, living a calling, and job satisfaction: Testing a moderated, multiple mediator model. *Journal of Counseling Psychology*, 59(1), 50–59. <http://dx.doi.org/10.1037/a0026129>.
- Duffy, R. D., Manuel, R. S., Borges, N. J., & Bott, E. (2011b). Calling, vocational development, and well being: A longitudinal study of medical students. *Journal of Vocational Behavior*, 79(2), 361–366. <http://dx.doi.org/10.1016/j.jvb.2011.03.023>.
- Duffy, R. D., & Sedlacek, W. E. (2007). The presence of and search for a calling: Connections to career development. *Journal of Vocational Behavior*, 70(3), 590–601. <http://dx.doi.org/10.1016/j.jvb.2007.03.007>.
- Duffy, R. D., & Sedlacek, W. E. (2010). The salience of a career calling among college students: Exploring group differences and links to religiousness, life meaning, and life satisfaction. *Career Development Quarterly*, 59(1), 27–41. <http://dx.doi.org/10.1002/j.2161-0045.2010.tb00128.x>.
- Duncan, T. E., & Duncan, S. C. (1995). Modeling the processes of development via latent variable growth curve methodology. *Structural Equation Modeling*, 2(3), 187–213. <http://dx.doi.org/10.1080/10705519509540009>.
- Gould, S. (1979). Characteristics of career planners in upwardly mobile occupations. *The Academy of Management Journal*, 22(3), 539–550. <http://dx.doi.org/10.2307/255743>.
- Graham, J. W. (2009). Missing data analysis: Making it work in the real world. *Annual Review of Psychology*, 60(1), 549–576. <http://dx.doi.org/10.1146/annurev.psych.58.110405.085530>.
- Hagmaier, T., & Abele, A. E. (2012). The multidimensionality of calling: Conceptualization, measurement and a bicultural perspective. *Journal of Vocational Behavior*, 81(1), 39–51. <http://dx.doi.org/10.1016/j.jvb.2012.04.001>.
- Hall, D. T., & Chandler, D. E. (2005). Psychological success: When the career is a calling. *Journal of Organizational Behavior*, 26(2), 155–176. <http://dx.doi.org/10.1002/job.301>.
- Hirano, K., Imbens, G. W., Ridder, G., & Rubin, D. B. (2001). Combining panel data sets with attrition and refreshment samples. *Econometrica*, 69(6), 1645–1659. <http://dx.doi.org/10.1111/1468-0262.00260>.
- Hirschi, A. (2011). Callings in career: A typological approach to essential and optional components. *Journal of Vocational Behavior*, 79(1), 60–73. <http://dx.doi.org/10.1016/j.jvb.2010.11.002>.
- Hirschi, A., Niles, S. G., & Akos, P. (2011). Engagement in adolescent career preparation: Social support, personality and the development of choice decidedness and congruence. *Journal of Adolescence*, 34(1), 173–182. <http://dx.doi.org/10.1016/j.adolescence.2009.12.009>.
- Holland, J. L., Daiger, D. C., & Power, P. G. (1980). *My Vocational Situation*. Palo Alto, CA: Consulting Psychologists Press.
- Horn, J. L., & McArdle, J. J. (1992). A practical and theoretical guide to measurement invariance in aging research. *Experimental Aging Research*, 18(3), 117–144. <http://dx.doi.org/10.1080/03610739208253916>.
- Hu, L.-T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6(1), 1–55. <http://dx.doi.org/10.1080/10705519909540118>.
- Hunter, I., Dik, B. J., & Banning, J. H. (2010). College students' perceptions of calling in work and life: A qualitative analysis. *Journal of Vocational Behavior*, 76(2), 178–186. <http://dx.doi.org/10.1016/j.jvb.2009.10.008>.
- Jörin Fux, S. (2006). *Persönlichkeit und Berufstätigkeit [Personality and Work]*. Göttingen: Cuviller Verlag.
- Jörin, S., Stoll, F., Bergmann, C., & Eder, D. (2004). *Explorix® - das Werkzeug zur Berufswahl und Laufbahnplanung [Explorix - the tool for career choice and career planning]*. Berne, Switzerland: Hans Huber.
- Lance, C. E., Vandenberg, R. J., & Self, R. M. (2000). Latent growth models of individual change: The case of newcomer adjustment. *Organizational Behavior and Human Decision Processes*, 83(1), 107–140. <http://dx.doi.org/10.1006/obhd.2000.2904>.
- Markus, H., & Nurius, P. (1986). Possible selves. *American Psychologist*, 41(9), 954–969.
- Martens, M. P., & Haase, R. F. (2006). Advanced applications of structural equation modeling in counseling psychology research. *The Counseling Psychologist*, 34(6), 878–911. <http://dx.doi.org/10.1177/0011000005283395>.
- Muthén, L. K., & Muthén, B. O. (2010). *Mplus user's guide* (6th ed.). Los Angeles, CA: Authors.
- Peterson, C., Park, N., Hall, N., & Seligman, M. E. P. (2009). Zest and work. *Journal of Organizational Behavior*, 30(2), 161–172. <http://dx.doi.org/10.1002/job.584>.
- Rigotti, T., Schyns, B., & Mohr, G. (2008). A short version of the Occupational Self-Efficacy Scale: Structural and construct validity across five countries. *Journal of Career Assessment*, 16(2), 238–255. <http://dx.doi.org/10.1177/1069072707305763>.
- Satorra, A., & Bentler, P. M. (2001). A scaled difference chi-square test statistic for moment structure analysis. *Psychometrika*, 66(4), 507–514. <http://dx.doi.org/10.1007/Bf02296192>.
- Savickas, M. L. (1997). Career adaptability: An integrative construct for life-span, life-space theory. *Career Development Quarterly*, 45(3), 247–259. <http://dx.doi.org/10.1002/j.2161-0045.1997.tb00469.x>.
- Savickas, M. L. (2005). The theory and practice of career construction. In S. D. Brown, & R. W. Lent (Eds.), *Career development and counseling* (pp. 42–70). Hoboken, NJ: Wiley & Sons Inc.
- Shadish, W., Cook, T. D., & Campbell, D. T. (2002). *Experimental and quasi-experimental design for generalized causal inference*. Boston, MA: Houghton-Mifflin.
- Skorikov, V. B. (2007). Continuity in adolescent career preparation and its effects on adjustment. *Journal of Vocational Behavior*, 70(1), 8–24. <http://dx.doi.org/10.1016/j.jvb.2006.04.007>.
- Steger, M. F., Pickering, N. K., Shin, J. Y., & Dik, B. J. (2010). Calling in work: Secular or sacred? *Journal of Career Assessment*, 18(1), 82–96. <http://dx.doi.org/10.1177/1069072709350905>.
- Strauss, K., Griffin, M. A., & Parker, S. K. (2012). Future work selves: How salient hoped-for identities motivate proactive career behaviors. *Journal of Applied Psychology*, 97(3), 580–598. <http://dx.doi.org/10.1037/a0026423>.
- Stringer, K., Kerpelman, J., & Skorikov, V. (2011). Career preparation: A longitudinal, process-oriented examination. *Journal of Vocational Behavior*, 79(1), 158–169. <http://dx.doi.org/10.1016/j.jvb.2010.12.012>.
- Super, D. E. (1990). A life-span, life-space approach to career development. In D. Brown, & L. Brooks (Eds.), *Career choice and development* (pp. 197–262) (2nd ed.). San Francisco, CA: Jossey-Bass.
- Wayne, S. J., Liden, R. C., Kraimer, M. L., & Graf, I. K. (1999). The role of human capital, motivation and supervisor sponsorship in predicting career success. *Journal of Organizational Behavior*, 20(5), 577–595. [http://dx.doi.org/10.1002/\(sici\)1099-1379\(199909\)20:5<577::aid-job958>3.0.co;2-0](http://dx.doi.org/10.1002/(sici)1099-1379(199909)20:5<577::aid-job958>3.0.co;2-0).
- Wrzesniewski, A., McCauley, C., Rozin, P., & Schwartz, B. (1997). Jobs, careers, and callings: People's relations to their work. *Journal of Research in Personality*, 31(1), 21–33. <http://dx.doi.org/10.1006/jrpe.1997.2162>.