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Modeling Dynamics in Career Construction:

Reciprocal Relationship between Future Work Self and Career Exploration

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Abstract

In extant research, scholars have treated proactive career behavior (e.g., career exploration) primarily as a consequence of future work self. Yet, emerging evidence provides support for a relationship in the opposite direction, suggesting that career exploration may also be an antecedent. Using a cross-lagged panel design, we empirically tested the reciprocal relationship between future work self and career exploration. In Study 1, we measured both future work self and career exploration at two time points with an 8-week lag among 133 Chinese university students. Results showed that future work self and career exploration are reciprocally related over time. In Study 2 ($N = 228$), with a longer time lag (12 weeks), results showed that career exploration (Time 1) is significantly related to future work self (Time 3), but not vice versa. Moreover, career adaptability (measured in week 8, Time 2) mediates the reciprocal effects between future work self and career exploration. We discuss theoretical and practical implications.

Key words: future work self, career exploration, career adaptability

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Future work self is a concept that refers to the possible self that reflects one's hopes for future working life (Strauss, Griffin, & Parker, 2012). According to the proactive motivation model (Parker, Bindl, & Strauss, 2010), future work self captures the self-starting motive (i.e., "reason to") to pursue desirable future career possibilities, thereby stimulating individuals to engage in various proactive career behaviors, such as career planning, skill development, career consultation and network building (Strauss et al., 2012). From a career construction perspective (Savickas, 2002, 2005, 2013), future work self is regarded as an indicator of career adaptivity, which refers to an individual's flexibility or willingness to make changes to oneself or environments in order to achieve adaptive career outcomes. In addition to the "reason to" factors denoted by future work self, the proactive motivation model posits that "can do" factors such as abilities or psychological resources also serve as important driving forces for individuals' proactive career behaviors (Parker et al., 2010). Similarly, from the perspective of career construction theory, the concept of career adaptability denotes the self-regulation resources that help individuals cope with challenges to their career development (Savickas, 2002, 2005, 2013). However, in contrast to the view that "reason to" (i.e., future work self) and "can do" (i.e., career adaptability) factors are independent constructs in the proactive motivation model (Parker et al., 2010), career construction theory suggests that the effects of future work self on proactive career behaviors and adaptive career outcomes can be mediated by career adaptability (Savickas, 2002, 2005, 2013).

The sequential model from career adaptivity to adaptability, adapting behaviors and adaptive outcomes, has received much empirical support (e.g., Hirschi, Herrmann, & Keller, 2015; Hirschi, Lee, Porfeli, & Vondracek, 2013; Hirschi & Valero, 2015; Li et al., 2015;

Neureiter & Traut-Mattausch, 2017; Nilforooshan & Salimi, 2016; Perera & McIlveen, 2017; Rudolph, Lavigne, & Zacher, 2017; Taber & Blankemeyer, 2015). For example, it has been found that the effects of future work self on proactive behaviors such as career planning, skill development, and networking are partially mediated by career adaptability (Taber & Blankemeyer, 2015). In spite of the extensive evidence supporting the sequential model suggested by career construction theory (Savickas, 2002, 2005, 2013), the possibility that these relationships may be reciprocal has been largely ignored in previous research. This seems problematic, since individuals constantly refresh and update their career orientations based on past experiences (Savickas, 2002; Strauss & Kelly, 2017). Savickas (2002) suggested that engaging in vocational behaviors could help individuals accumulate adaptive resources and re-construct their images of future careers. Cangiano and Parker (2016) also proposed that proactive behaviors could in turn influence proactive motivations.

The preceding analysis suggests that there may exist reverse paths from proactive career behaviors to career adaptability and future work self. Although it has been found that proactive career behaviors, such as career exploration (i.e., deeply examining career-related personal or environmental factors; Stumpf, Colarelli, & Hartman, 1983), have time-lagged effects on career adaptability and future work self (Cai et al., 2015; Guan et al., 2015), extant research has yielded limited insights into a reciprocal model for the relationships among these constructs, partly due to the limitations associated with cross-sectional or time-lagged research designs (e.g., Cai et al., 2015; Guan et al., 2015; Li et al., 2015). We aim to address this gap by using a cross-lagged panel design (Kenny, 1975) to test the reciprocal relationship between future work self, an indicator of career adaptivity (i.e., “reason to” factors), and career exploration (an indicator of proactive career behaviors), as well as the mediating role of career adaptability (an indicator of “can do” factors) in this process. We focus on career exploration because this construct reflects important proactive career behaviors that

individuals use to identify relevant information and opportunities to accumulate adaptive resources and achieve important career goals (Sonnentag, 2017).

In Study 1, we test the direct reciprocal relationship between future work self and career exploration over an 8-week time lag. In Study 2, we incorporate career adaptability as a mediator and test the reciprocal mediation model over 12 weeks. Our studies are based on data collected from undergraduates in China, where the job market for new entrants is competitive and the pressure to develop successful careers is high (Guan et al., 2014). According to the Ministry of Education of China (2016a), there were more than 6 million university graduates in 2015, but only 70% were able to secure their first jobs after graduation. Such a context highlights the importance of developing adaptive career resources and making proactive preparations for the school-to-work transition (Li et al., 2015; Parker et al., 2010; Savickas, 2013). Since career adaptability and future work self have been established as important predictors of Chinese university students' job search success (Guan et al., 2014), this research has important practical implications in that it can help educators and career counselors develop a deeper understanding of the dynamic relationships among future work self, career adaptability and career exploration.

With this research, we make two main contributions to existing literature. First, by examining the reciprocal relationship between future work self and career exploration, we advance academic understandings of career construction theory (Savickas, 2013) and the proactive motivation model (Parker et al., 2010) by extending the one-way sequential models that dominate the existing literature (Rudolph et al., 2017). This research also addresses the call for more research on the behavioral antecedents of future work self (Strauss et al., 2012). Second, by testing the mediation effect of career adaptability, we show that career adaptability could channel the reciprocal effects between career adaptivity and proactive career behavior, thereby contributing additional evidence on the central role of adaptive

resources in career development (Savickas, 2002, 2005, 2013). In the following section, we review relevant literature and develop our hypotheses.

Literature Review and Hypotheses Development

Future work self, career adaptability and career exploration

Career construction theory (Savickas, 2013) posits that individuals who are willing or flexible to make changes (adaptivity) are more likely to accumulate adaptive resources (adaptability), which will further enable them to engage in career-related activities (adapting behaviors) and achieve positive outcomes (adaptation). Since future work self encapsulates desirable future work states and shifts individuals' focuses to these future possibilities (Parker et al., 2010; Strauss et al., 2012), it has been proposed as an important indicator of career adaptivity (Guan et al., 2014; Rudolph et al., 2017; Taber & Blankemeyer, 2015). Future work self helps individuals envision desirable futures and highlights discrepancies between current and ideal states. Recognizing these discrepancies enables individuals to imagine the potential obstacles and challenges they might encounter as they pursue their future career goals. To prepare themselves for these challenges, individuals are motivated to cultivate their adaptive abilities (Strauss et al., 2012). Accordingly, a salient future work self can motivate individuals to develop a high level of career adaptability (Guan et al., 2014; Rudolph et al., 2017; Taber & Blankemeyer, 2015).

As a meta-construct that includes career concern (being future-oriented), career control (being decisive), career curiosity (being inquisitive), and career confidence (being efficacious), career adaptability reflects one's career-related self-regulation resources to cope with vocational problems, challenges and difficulties (Savickas, 1997; Savickas & Porfeli, 2012; Savickas, 2013). A high level of career adaptability enables individuals to effectively engage in various proactive career behaviors such as career exploration (Li et al., 2015). The sequential model from indicators of career adaptivity to adaptability and adapting behaviors

has received much support from previous studies (Hirschi et al., 2013; Hirschi et al., 2015; Hirschi & Valero, 2015; Nilforooshan & Salimi, 2016; Perera & McIlveen, 2017; Rudolph et al., 2017). For example, Li et al. (2015) found that career adaptability serves as an important mediator for the relationship between personality (big-five personality and BIS/BAS traits) and career exploration. Likewise, Taber and Blankemeyer (2015) found that career adaptability significantly mediates the effects of future work self on career planning, skill development and networking.

Consistent with these findings, we argue that career adaptability may also mediate the positive effect of future work self on career exploration. That is, a salient future work self motivates an individual to develop career-related adaptive abilities, which in turn enables him or her to engage in career exploration activities. Thus, we propose:

Hypothesis 1: Future work self is positively related to career exploration (H1a); this relationship is mediated by career adaptability (H1b).

Career exploration, career adaptability and future work self

Savickas (2002) pointed out that career development is a dynamic process through which individuals construct their career experiences into life meanings. Cangiano and Parker (2016) also argued that proactive career behaviors help individuals improve career capabilities and refine their motivations and future hopes. As an important type of proactive behavior, career exploration consists of self-exploration, whereby individuals look into themselves to identify their personal attributes, as well as environmental exploration, whereby individuals investigate external opportunities and constraints (Stumpf et al., 1983). These explorative activities can help individuals develop abilities to search for and collect new information across various situations, and thus can have positive effects on *career curiosity*, a key element of career adaptability (Savickas, 1997). Second, career exploration could help individuals orient themselves to prepare for their future careers (Zikic & Klehe,

2006), thus promoting *career concern*. Third, the information collected through career exploration can be used to make deliberate decisions (Blustein & Phillips, 1988), thus strengthening *career control*. Finally, career exploration involves various development tasks, which offer good opportunities for individuals to improve their career skills and confidence (Blustein, 1989; Cheung & Arnold, 2014; Lent & Hackett, 1987). Career exploration can thus improve individuals' *career confidence* through these learning experiences. In sum, career exploration may have a positive effect on career adaptability (Cai et al., 2015; Guan et al., 2015).

Since career adaptability is a malleable attribute that reflects an individual's career building capacity (Savickas, 1997), it may also play a key role in helping individuals translate their proactive career behaviors into meaningful reflections. According to career construction theory (Savickas, 2002, 2005, 2013), career concern helps individuals envision future career possibilities, and career curiosity enables individuals to effectively explore personal characteristics and occupational opportunities. It has been argued that these two dimensions of career adaptability can facilitate the formation of future work hopes; the positive effects of career concern and career curiosity on Chinese social work students' callings have been revealed in previous research (Guo et al., 2014). In addition, career control and confidence can help individuals make high-quality decisions and reduce the anxiety associated with new choices. Through these mechanisms, career adaptability can help individuals construct and revise their desires, hopes and visions of their ideal futures (Savickas, 2002; Strauss & Kelly, 2017). Previous studies have provided preliminary support for this proposition by showing a positive relationship between career adaptability and career-related identity (Negru-Subtirica, Pop, & Crocetti, 2015; Porfeli & Savickas, 2012). Taken together, we propose:

Hypothesis 2: Career exploration is positively related to future work self (H2a); this relationship is mediated by career adaptability (H2b).

Based on the logic of the preceding arguments, we posit that future work self (career adaptivity/ “reason to” factor) motivates one’s engagement in career exploration (proactive career behavior) by shaping career adaptability (“can do” factor). It is likely that career exploration improves career adaptability, which in turn facilitates the reflection process that contributes to a salient future work self. Thus, we propose:

Hypothesis 3: Future work self and career exploration have reciprocal effects on each other (H3a); these effects are mediated by career adaptability (H3b).

Method

Research overview

We conducted two studies to test our hypotheses. Results of a longitudinal field experiment show that interventions based on future work self induced behavioral changes over a 2-month period (Strauss & Parker, 2015). In order to ensure that there was sufficient time for individuals to display changes in career exploration behavior and future work self, we adopted an 8-week time lag for Study 1 and a 12-week time lag for Study 2. In Study 1, we adopted a panel design by collecting data on future work self and career exploration at both time points to examine their reciprocal relationship (Williams & Podsakoff, 1989). In Study 2, we examined the mediating role of career adaptability by measuring it at Time 2 (week 8); we measured future work self and career exploration at both Time 1 (week 1) and Time 3 (week 12).

Study 1

Participants and procedures

We collected data from Chinese undergraduates in 2015. We asked staff who worked in university career centers to circulate our invitation to participate in the study to undergraduates via email. Students were also encouraged to forward the invitation to other undergraduates. As an incentive, we told students that we would email them a report on

recent research findings related to career adaptability after they completed the two waves of surveys. At Time 1, 152 participants from 30 universities in Beijing, Tianjin and other cities completed online questionnaires on demographics, future work self and career exploration. After 8 weeks (Time 2), we sent emails reminding them to complete the online questionnaires related to future work self and career exploration. When participants submitted their responses, the online system automatically checked for missing data and reminded participants to provide answers to all the questions. There were no organized career-related activities during the 8-week time lag that might have influenced the relationships of interest. In total, 133 participants (88%) provided complete responses, which we used for data analysis. Results of additional analyses show no significant differences in demographics, future work self and career exploration between students who dropped out of the study and those who remained, which suggests that sampling bias should not be a concern. Among participants, average age was 20.41 ($SD = 1.52$); 32% were male and 68% were female; 24% were first-year undergraduates, 21% were second-year undergraduates, 29% were third-year undergraduates, 21% were fourth-year undergraduates, and 5% were fifth-year undergraduates.

Measures

Career exploration. We measured career exploration using the Chinese version (Cai et al., 2015; Li et al., 2015) of the scale originally developed by Stumpf et al. (1983). This scale covers two sub-dimensions of career exploration: self and environmental exploration. We asked participants to indicate their levels of agreement with 11 items (e.g., “I focus my thoughts on me as a person”) using a scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Similar to previous studies (Cai et al., 2015; Li et al., 2015), we treated career exploration as a latent multidimensional construct rather than focusing on its sub-dimensions, because we are interested in overall exploration behavior rather than the differences between

self and environmental exploration. The Cronbach's alpha coefficients are .91 for Time 1 and .90 for Time 2. Second-order CFA analyses for both Time 1 ($\chi^2 = 106.69$, $df = 43$, $p < .001$, $CFI = .92$, $RMSEA = .11$, $SRMR = .06$) and Time 2 ($\chi^2 = 77.10$, $df = 43$, $p < .01$, $CFI = .95$, $RMSEA = .08$, $SRMR = .06$) show satisfactory model fit.

Future work self. We measured future work self using the Chinese version (Cai et al., 2015; Guan et al., 2014) of the scale originally developed by Strauss et al. (2012). This scale includes four items (e.g., "This future is very easy for me to imagine"). Following the procedure proposed by Strauss et al. (2012), we asked participants to imagine their desirable future selves in relation to work, keep the mental images in mind, and then indicate their levels of agreement with the items using a scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The Cronbach's alpha coefficients are .87 for Time 1 and .89 for Time 2. CFA analyses for both Time 1 ($\chi^2 = 4.17$, $df = 2$, ns , $CFI = .99$, $RMSEA = .09$, $SRMR = .02$) and Time 2 ($\chi^2 = .78$, $df = 2$, ns , $CFI = 1.00$, $RMSEA = .00$, $SRMR = .01$) show satisfactory model fit.

Control variables. To rule out the potential bias effect of demographic variables on the relationships (Cai et al., 2015; Guan et al., 2014; Strauss et al., 2012), we incorporated age, gender (0 = male, 1 = female) and year of undergraduate study (1 = first year, 2 = second year, 3 = third year, 4 = fourth year, 5 = fifth year) as control variables in our model.

Results

Descriptive statistics

We present descriptive statistics and inter-correlations among variables in Table 1. The data show that Time 2 career exploration is significantly correlated with Time 1 future work self ($r [133] = .38$, $p < .01$) and Time 2 future work self is significantly correlated with Time 1 career exploration ($r [133] = .35$, $p < .01$). These results provide preliminary support for a positive relationship between future work self and career exploration.

 Insert Table 1 here

Measurement invariance analyses

Since we collected data at two different time points, it is essential to examine the measurement invariance between Time 1 and Time 2 variables to ensure that the observed relationships originate from the covariance in constructs rather than measurement differences (Golembiewski, Billingsley, & Yeager, 1976). Following the procedure proposed by Vandenberg and Lance (2000), we examined factor structure (configural), loading (metric), intercept (scalar), and error term (residual) invariances (e.g., Maynard, Luciano, D’Innocenzo, Mathieu, & Dean, 2014; Wu, 2016; Wu, Griffin, & Parker, 2015). We performed all analyses using Mplus 7.0 (Muthén & Muthén, 2012). Since career exploration has two sub-dimensions, we examined the invariance of this construct using a two-factor model.¹

Since a chi-square test is easily biased by sample size, we adopted Chen’s (2007) suggestions to use ΔCFI , $\Delta RMSEA$ and $\Delta SRMR$ as criteria for our invariance test. According to Chen (2007), when a sample size is smaller than 300, $\Delta CFI \leq -.005$ supplemented by $\Delta RMSEA \geq .010$ or $\Delta SRMR \geq .025$ indicates variance in loadings (metric variance), and $\Delta CFI \geq -.005$ supplemented by $\Delta RMSEA \geq .010$ or $\Delta SRMR \geq .005$ indicates variance in intercepts and error terms (scalar and residual variance). The results in Table 2 reveal that the invariance models for career exploration show good fit with data. For future work self, all invariance models show good fit except for the residual invariance model. The residual invariance of future work self is partially supported when the variances of two items are relaxed.

 Insert Table 2 Here

¹ Results remain similar with a second-order factor model. However, in the second-order model, since career exploration only contains two sub-dimensions, to make the model identifiable we need to fix second-order loadings at a value of 1, which poses unnecessary constraints on the measurement model. Thus, we report the results of the two-factor model.

Testing reciprocal effects

We adopted the procedure proposed by Martens and Haase (2006) to examine the reciprocal effects between career exploration and future work self. We examined four models in sequence: the autoregressive model, the model with only career exploration to future work self, the model with only future work self to career exploration, and the fully cross-lagged model. We used Mplus 7.0 (Muthén & Muthén, 2012) to perform all analyses.

Before running the structural equation models, we decided to create parcels for latent variables due to the low ratio of the sample to the estimated parameters (Bentler & Chou, 1987). Following previous studies (e.g., Ginevra, Pallini, Vecchio, Nota, & Soresi, 2016), we used the internal-consistency approach to create parcels (Kishton & Widaman, 1994). Since we measured future work self using only four items, we created two parcels. For career exploration, we created two parcels based on the two dimensions of environmental and self-exploration. Since Time 2 future work self does not have a normal distribution (Shapiro-Wilk test $p < .05$), we used the MLR estimator for all analyses. In all models, as suggested by Martens and Haase (2006), we specified the latent variables at each time point as being correlated with each other, as well as the disturbances of the same parcels at both time points. As shown in the model comparison results in Table 3, the fully cross-lagged model has the best model fit, which means that a reciprocal model can be established.

 Insert Table 3 Here

We present the standardized parameter estimates for this model in Figure 1. Since all of our hypotheses are directional and theory-driven, we report the results of one-tailed examinations (Jones, 1952). As shown, Time 1 career exploration has a significant effect on Time 2 future work self ($\beta = .19, p < .05$), and Time 1 future work self also has significant effect on Time 2 career exploration ($\beta = .18, p < .05$). Therefore, Hypotheses 1a, 2a, and 3a

are supported.

 Insert Figure 1 Here

Study 2

Participants and procedures

We collected data from Chinese undergraduates in 2016. We used a similar recruitment method to Study 1, except we invited participants to complete a three-wave survey. At Time 1, 276 participants completed online questionnaires related to demographics, future work self and career exploration. After 8 weeks (Time 2), we sent email reminders asking participants to complete the online questionnaires related to career adaptability. After 12 weeks (Time 3), we sent email reminders asking participants to complete the online questionnaires related to future work self and career exploration. During this period, there were no organized career-related activities that might have influenced the relationships of interest. In total, 228 participants (83%) from 35 universities provided complete responses, which we used for data analysis. Additional analyses show no significant differences on the key variables between students who dropped out of this study and those who remained. Among participants, the average age was 20.75 ($SD = 1.76$); 34% were male and 66% were female; 14% were first-year undergraduates, 19% were second-year undergraduates, 25% were third-year undergraduates, 32% were fourth-year undergraduates, and 10% were fifth-year undergraduates.

Measures

Career exploration. We used the same measure as in Study 1 for career exploration. The Cronbach's alpha coefficients for Times 1 and 3 are both .91. CFA analyses for both Time 1 ($\chi^2 = 133.75$, $df = 43$, $p < .001$, $CFI = .94$, $RMSEA = .10$, $SRMR = .06$) and Time 3 ($\chi^2 = 64.62$, $df = 43$, $p < .05$, $CFI = .98$, $RMSEA = .05$, $SRMR = .04$) show satisfactory fit.

Career adaptability. We used the Chinese version of the Career Adapt-Abilities Scale (Hou, Leung, Li, Li, & Xu, 2012) to measure participants' career adaptability. This scale contains 24 items, with 6 items measuring each of four sub-dimensions: concern, control, curiosity and confidence. We asked participants to indicate the strength of their abilities related to each item using a scale ranging from 1 (*not strong*) to 5 (*strongest*). Sample items include: "Realizing that today's choices shape my future" (career concern), "Making decisions by myself" (career control), "Exploring my surroundings" (career curiosity) and "Performing tasks efficiently" (career confidence). Because our focus is on the mediating effect of career adaptability and not its sub-dimensions, we treated career adaptability as a unitary variable (Savickas & Porfeli, 2012). The Cronbach's alpha coefficient for career adaptability is .94. Second-order CFA analyses show satisfactory measurement validity ($\chi^2 = 487.45$, $df = 248$, $p < .001$, $CFI = .91$, $RMSEA = .07$, $SRMR = .06$).

Future work self. We used the same measure as in Study 1 for future work self. The Cronbach's alpha coefficients are .89 for Time 1 and .91 for Time 3. CFA analyses for Time 1 future work self ($\chi^2 = 3.39$, $df = 2$, ns , $CFI = 1.00$, $RMSEA = .06$, $SRMR = .01$) show satisfactory model fit. Although the CFI (.98) and SRMR (.02) for the CFA for Time 3 are good, the RMSEA is not ideal ($\chi^2 = 17.27$, $df = 2$, $p < .001$, $RMSEA = .18$). Since high RMSEA can be attributed to low degrees of freedom (Kenny, Kaniskan, & McCoach, 2015), the model fit at Time 3 is acceptable.

Control variables. We controlled for the same demographic variables as in Study 1: age, gender (0 = male, 1 = female) and undergraduate year (1 = first year, 2 = second year, 3 = third year, 4 = fourth year, 5 = fifth year).

Results

Descriptive statistics

We present descriptive statistics and inter-correlations among variables in Table 1.

Time 2 career adaptability is significantly correlated with Time 3 career exploration ($r [228] = .55, p < .01$), Time 1 career exploration ($r [228] = .54, p < .01$), Time 3 future work self ($r [228] = .50, p < .01$) and Time 1 future work self ($r [228] = .46, p < .01$); Time 3 career exploration is significantly correlated with Time 1 future work self ($r [228] = .29, p < .01$); and Time 3 future work self is significantly correlated with Time 1 career exploration ($r [228] = .34, p < .01$). These results generally support the hypothesized positive relationships among variables.

Measurement invariance analyses

We conducted measurement invariance analyses with Time 1 and Time 3 variables, and the results are shown in Table 2. All the invariance models for career exploration show good fit with the data. After relaxing invariance constraints on two items, the invariance models for future work self also show good fit.

Testing reciprocal effects and meditation model

As in Study 1, we created parcels for career exploration and future work self and examined the mutual effects. As shown in Table 3, the model with a path from career exploration to future work self ($\beta = .13, p < .05$) has the best fit, and in the fully cross-lagged model the path from future work self to career exploration ($\beta = -.02, ns$) is not significant.

To examine the mediation effect of career adaptability, we followed the procedure proposed by Preacher and Hayes (2008). To demonstrate a mediation effect: (a) the independent variable should be significantly correlated with the mediation variable, (b) the mediation variable should be significantly correlated with the dependent variable when the effect of the independent variable is controlled, and (c) the indirect effect should be significant. Although Baron and Kenny (1986) proposed that the independent variable should be significantly correlated with the dependent variable, other scholars have argued that this is not necessary for mediation to occur (e.g., Edwards & Lambert, 2007). Thus, although Time

1 future work self does not have a significant direct effect on Time 3 career exploration, a mediation effect can still be established if the three criteria delineated by Preacher and Hayes (2008) are met. We used Mplus 7.0 (Muthén & Muthén, 2012) to perform all analyses. Since future work self does not have a normal distribution at Time 1 (Shapiro-Wilk test $p < .01$) and Time 3 (Shapiro-Wilk test $p < .001$) we used the MLR estimator. Moreover, we used bootstrapping to calculate the indirect effect (Preacher & Hayes, 2008). Prior to all analyses, we created four parcels for career adaptability based on the four subscales.

Using a fully cross-lagged model (with all possible paths), we found that Time 1 career exploration is significantly correlated with Time 2 career adaptability ($\beta = .57, p < .001$), which is significantly correlated with Time 3 future work self ($\beta = .38, p < .001$); moreover, the indirect effect is significant (Bootstrap 95% CI = [.09, .34]). In addition, we found that Time 1 future work self is significantly related to Time 2 career adaptability ($\beta = .28, p < .01$), which is significantly correlated with Time 3 career exploration ($\beta = .43, p < .01$); again, the indirect effect is significant (Bootstrap 95% CI = [.02, .22]). Thus, the mediating role of career adaptability in the reciprocal relationship between future work self and career exploration is established. As the last step, we compared the fully cross-lagged (partially mediated) model with the fully mediated model (Kelloway, 1998). The results show that the first model is not superior to the second. Therefore we selected the fully mediated model as the final model, which is shown in Figure 2. Hypotheses 1b, 2b, and 3b are supported.

 Insert Figure 2 Here

Discussion

Drawing on career construction theory (Savickas, 2002, 2005, 2013) and the proactive motivation model (Parker et al., 2010), we tested a reciprocal mediation model in which

future work self and career exploration have reciprocal effects on each other and career adaptability serves as a mediator. In Study 1, we measured both future work self and career exploration at two separate time points with an 8-week lag, and the results show that future work self and career exploration mutually influence each other. In Study 2, with a longer time lag (12 weeks), we found that career exploration leads to changes to future work self, but not vice versa. Moreover, the results reveal career adaptability as a mediator for the reciprocal relationship between future work self and career exploration.

Theoretical implications

First, the reciprocal mediation model discovered in this research advances current understandings of career construction theory (Savickas, 2013). Although the sequential model from adaptivity to adaptability, adapting behaviors and adaptive outcomes has been supported by copious research evidence (e.g. Rudolph et al., 2017), the reverse paths from adapting behaviors to adaptability and adaptivity have been largely neglected. This paper addresses this gap and the results of two studies show that adapting behaviors (e.g., career exploration) have significant effects on both career adaptability and future work self (an indicator of career adaptivity) over time. These findings suggest that individuals constantly reflect on their past experiences and re-construct their future aspirations (Savickas, 2002, 2005, 2013). Since the concept of career adaptivity has been operationalized in various ways (Rudolph et al., 2017), researchers should continue to develop a more comprehensive understanding of the dynamic relationships between different adapting behaviors and diverse indicators of adaptivity.

In addition, our findings highlight the important role of career adaptability in linking the reciprocal relationship between future work self and career exploration. On one hand, future work self motivates individuals to actively develop their adaptive abilities (Negru-Subtirica et al., 2015; Savkcias, 2013; Strauss et al., 2012), which further facilitates

their career exploration activities (Li et al., 2015; van den Heuvel et al., 2013). On the other hand, career exploration activities can provide opportunities to promote career adaptability (Cai et al., 2015; Guan et al., 2015; Nilforooshan & Salimi, 2016), and a high level of career adaptability enables individuals to construct new future work selves. Such results demonstrate the central role of being able to adapt throughout career development (Savickas, 1997, 2005). Since researchers often use dispositional factors to predict career adaptivity and adaptability (Rudolph et al., 2017), the findings of this study suggest that more work should be done to examine behavioral antecedents (e.g., career exploration) of these constructs.

Our findings also have implications for the proactive motivation model (Parker et al., 2010). According to this model, “reason to” (e.g., intrinsic motives) and “can do” (e.g. abilities) factors serve as important antecedents of proactive career behaviors. By showing the significant effect of career exploration on career adaptability and future work self over time, our findings demonstrate a more complex view of the relationships among “reason to” factors (e.g., future work self), “can do” factors (e.g., career adaptability) and proactive behaviors (career exploration). By establishing a reciprocal model, this research serves as the first attempt to use a longitudinal design to test Strauss and Kelly’s (2017) dynamic model on future work self and proactivity. But, Strauss et al. (2012) showed that in addition to the salience of future work self, the content of future work self plays an important role in predicting behavioral outcomes. In the future, researchers should extend our findings by considering the content of future work self.

The findings of this research also suggest that time frame plays an important role in the reciprocal effects among future work self, career adaptability and career exploration. Specifically, the lagged effect of future work self on career exploration is not very stable; we only found the lagged effect of future work self on career exploration with an 8-week lag in Study 1, and not with a 12-week lag in Study 2. Interestingly, Strauss and Parker (2015) also

failed to find a significant effect of future work self-based interventions on behaviors with a 12-week lag. This unexpected finding may support Strauss and Kelly's (2017) view that a longer temporal distance may reduce the effects of future work self on behavioral outcomes. We call for more studies to examine relevant factors that affect the stability of this reciprocal relationship between future work self and career exploration. In addition, the results of Study 1 show that gender and undergraduate year are significantly correlated with career exploration at Time 2. These results suggest that male students might more actively pursue career exploration due to the centrality of career identity to male gender roles (Nelson & Brown, 2012), and senior students may feel increased pressure to engage in career exploration as they prepare for the transition from school to work (Li et al., 2015). However, these two demographic variables do not correlate with career exploration at Time 3 in Study 2. These findings suggest that demographic variables and temporal distance may interplay with each other in influencing university students' career exploration; this possibility should be examined in future work.

Practical implications

First, our findings suggest that a salient future work self has positive effects on both career adaptability and career exploration. Career educators and counselors may consider designing interventions to promote the development of future work selves and proactive behaviors among students (Strauss & Parker, 2015; Strauss & Kelly, 2017). During a vision-focused intervention, Strauss and Parker (2015) asked participants to reflect on positive work experiences and focus on their preferences and desired future working lives. Picture-drawing and story-sharing sessions can be used to strengthen the salience of future work self. More importantly, participants should be further guided to identify the discrepancies between their current states and future resource requirements, which will stimulate them to take steps to cope with these challenges. By contrasting a desired future

with current obstacles that block the realization of this future, educators and counselors can help individuals develop relevant self-regulation strengths such as career adaptability to overcome these challenges (Oettingen, Pak, & Schnetter, 2001; Strauss & Parker, 2015; Strauss & Kelly, 2017). Second, this research also highlights the beneficial effects of career exploration on career adaptability and future work self. When designing career interventions, practitioners may also consider encouraging and guiding clients' explorations of their personal characteristics and external opportunities in order to enhance their career abilities and clarify their career choices.

Limitations and future research

Despite these contributions, this research has several limitations. First, the majority of our research sample was female, which might bias our findings. Since there are more female undergraduates (53.08%) than males in Chinese universities (Ministry of Education of the People's Republic of China, 2016b), the gender imbalance in our studies is to be expected. We also controlled for the effects of gender and other demographic variables in our research to reduce their confounding effects. Nevertheless, in the future, researchers should attempt to replicate our results with more representative samples. Second, in the two longitudinal studies, some unexpected events might have occurred during the time lags that could have influenced the causal structures of future work self, career adaptability and career exploration. To the best of our knowledge, the participants in these two studies did not receive systematic interventions or experience other events during the research period. Nevertheless, researchers should use other research designs, such as lab experiments, to replicate the findings of this study (Kenny, 1975). Third, since we collected data from a single source, our findings might be biased by common source variance (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Since future work self and career exploration are self-focused constructs, we believe that self-report is an appropriate assessment method. Finally, we only tested our model with two

university student samples; we encourage scholars to replicate our findings using samples from other populations.

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Table 1. Descriptive statistics, reliability coefficients, and inter-correlations among variables.

	<i>Mean</i>	<i>SD</i>	1	2	3	4	5	6	7	8
1.Age	20.41	1.52	NA							
2.Gender	NA	NA	-.03	NA						
3.University year	2.62	1.21	.80**	.06	NA					
4.Time 2 career exploration	3.14	.77	.14	-.25**	.22*	.90				
5.Time 1 career exploration	3.18	.82	-.13	-.13	-.02	.54**	.91			
6.Time 2 future work self	3.17	.87	.08	-.08	.11	.45**	.35**	.89		
7.Time 1 future work self	3.13	.91	.10	-.16	.11	.38**	.39**	.57**	.87	
<hr/>										
1.Age	20.75	1.76	NA							
2.Gender	NA	NA	-.10	NA						
3.University year	3.06	1.21	.76**	.10	NA					
4.Time 2 career adaptability	3.72	.53	.06	-.01	.04	.94				
5.Time 3 career exploration	3.28	.72	.05	.05	.08	.55**	.91			
6.Time 1 career exploration	3.16	.77	.03	.02	.06	.54**	.63**	.91		
7.Time 3 future work self	3.27	.82	-.05	.07	.00	.50**	.39**	.34**	.91	
8.Time 1 future work self	3.06	.88	.03	.10	.06	.46**	.29**	.40**	.60**	.89

Note. Matrix above dotted line is about Study 1, and that under dotted line is about Study 2. Study 1 $N = 133$. Study 2 $N = 228$. Reliability coefficients are shown in bold along the diagonal of the table. * $p < .05$. ** $p < .01$.

Table 2. Measurement invariance analyses.

Variable	Model	χ^2	df	CFI	RMSEA	SRMR
Career exploration (Study 1)	Configural invariance	325.837***	192	.922	.072	.069
	Metric invariance	341.269***	201	.918	.072	.078
	Scalar invariance	366.039***	210	.909	.076	.079
	Residual invariance	377.837***	221	.908	.073	.078
Future work self (Study 1)	Configural invariance	13.550	15	1.000	.000	.021
	Metric invariance	17.596	18	1.000	.000	.048
	Scalar invariance	20.209	21	1.000	.000	.051
	Partial residual invariance ⁽¹⁾	20.212	23	1.000	.000	.051
Career exploration (Study 2)	Configural invariance	324.164***	192	.957	.055	.053
	Metric invariance	344.634***	201	.953	.056	.060
	Scalar invariance	373.201***	210	.947	.059	.064
	Residual invariance	390.670***	221	.945	.058	.065
Future work self (Study 2)	Configural invariance	37.539	15	.983	.081	.024
	Metric invariance	41.526	18	.982	.076	.041
	Scalar invariance	46.085	21	.980	.073	.048
	Partial residual invariance ⁽²⁾	48.555	23	.980	.070	.054

Note. Study 1 $N = 133$. Study 2 $N = 228$. *** $p < .001$. df = degree of freedom. CFI is the comparative fit index. RMSEA is the root-mean-square error of approximation. SRMR is the standardized root-mean-square residual.

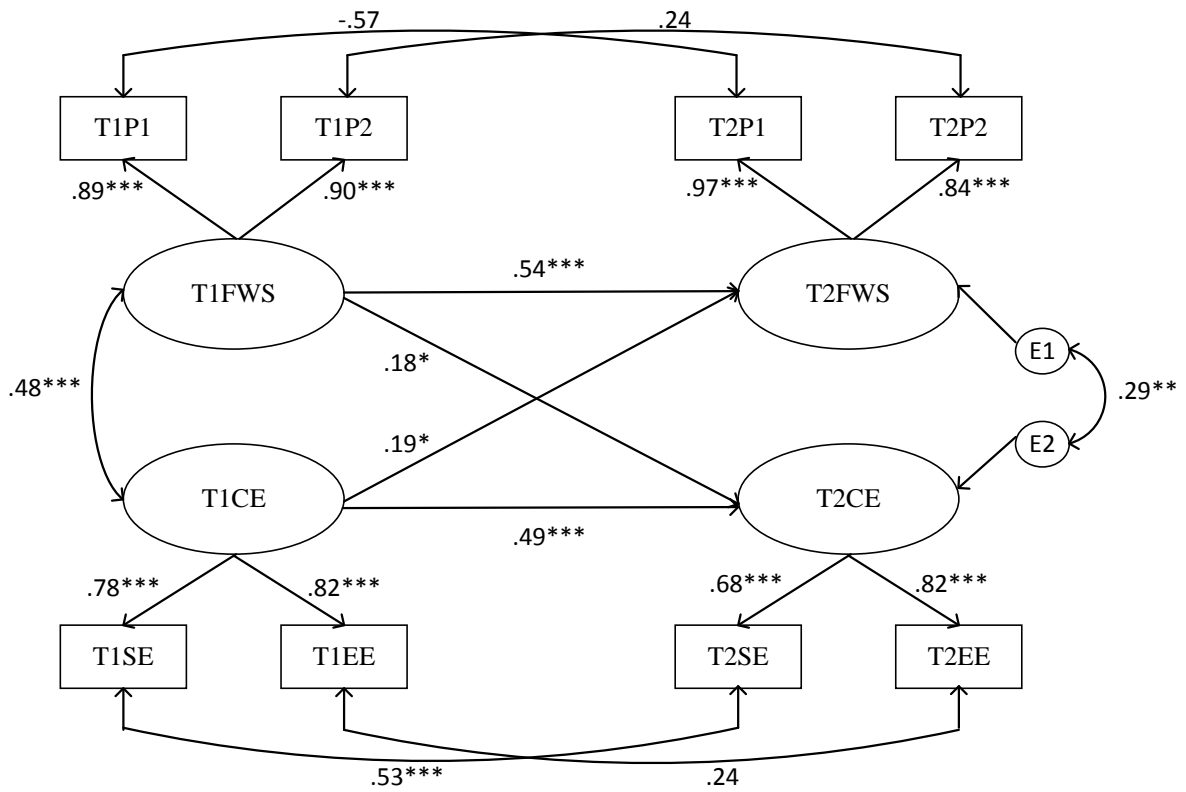
- (1) We freed the invariance constrain on the item "This future is very easy for me to imagine" and item "The mental picture of this future is very clear".
- (2) We freed the invariance constrain on the item "This future is very easy for me to imagine" and item "I can easily imagine my Future Work Self".

Table 3. Summary of reciprocal effects test.

	χ^2	df	RMSEA	SRMR	CFI	TLI	AIC	BIC
Autoregressive	46.949*	30	.065	.069	.971	.950	2289.141	2278.776
FWS → T2CE	43.046*	29	.060	.060	.976	.957	2287.238	2276.600
CE → T2FWS	42.850*	29	.060	.062	.976	.958	2287.042	2276.404
Fully cross-lagged	39.749	28	.056	.055	.980	.963	2285.942	2275.031
Autoregressive	30.519	30	.009	.036	.999	.999	3571.546	3580.928
FWS → T3CE	30.483	29	.015	.036	.999	.997	3573.510	3583.139
CE → T3FWS	27.610	29	.000	.032	1.000	1.002	3570.636	3580.265
Fully cross-lagged	27.525	28	.000	.032	1.000	1.001	3572.552	3582.428

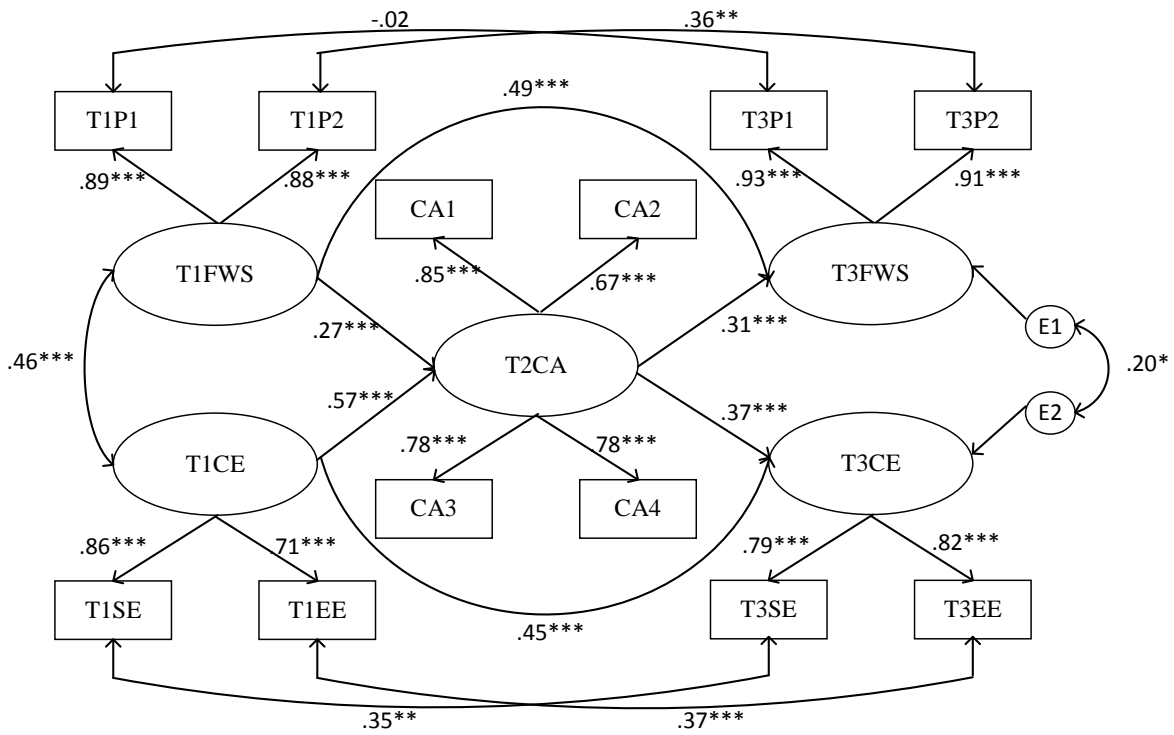
Note. Above dotted line is Study 1. Below dotted line is Study 2. Study 1 $N = 133$. Study 2 $N = 228$. * $p < .05$. *df* = degree of freedom. CFI is the comparative fit index. TLI is Tucker-Lewis index. RMSEA is the root-mean-square error of approximation. SRMR is the standardized root-mean-square residual. AIC = Akaike information criterion. BIC = Bayesian information criterion. FWS = future work self. CE = career exploration.

Figure 1. Reciprocal relationship model in Study 1



Note. $N = 133$. * $p < .05$ ** $p < .01$ *** $p < .001$, one-tail test. CE = career exploration, FWS = future work self, SE = self exploration, EE = environmental exploration, P1 = parcel 1, P2 = parcel 2.

Figure 2. Mediation model in Study 2



Note. $N = 228$. * $p < .05$ ** $p < .01$ *** $p < .001$, one-tail test. CE = career exploration, FWS = future work self, SE = self exploration, EE = environmental exploration, P1 = parcel 1, P2 = parcel 2.