

ABSTRACT

Drawing upon value change and self-determination theories, a cross-lagged panel survey study was conducted to examine the dynamic changes among different value dimensions (i.e., external compensation, intrinsic fulfillment, and work-life balance values), as well as the reciprocal relations between career values and professional ability development (PAD, the development of career-related knowledge, skills, ability, and experience). Results from a two-wave survey study across 1 year among 2446 Chinese university students show that students undergo significant value changes across one year with the test-retest correlations of the value dimensions ranging from .34 to .41. While value dimensions and PAD generally have positive concurrent correlations, the cross-lagged analyses show that external compensation value (T1) negatively predicts intrinsic fulfillment value (T2), work-life balance value (T2), and PAD (T2); work-life balance value (T1) negatively predicts intrinsic fulfillment value (T2); PAD (T1) positively predicts work-life balance value (T2). Theoretical and practical implications are discussed.

Keywords: Career value change; external compensation; intrinsic fulfillment; work-life balance; professional ability development

Self-consistency and Self-determination Perspectives of Career Value Changes:**A Cross-lagged Panel Study among Chinese University Students**

Defined as the desired end-states and ultimate goals of career development, career values constitute a central aspect of one's vocational identity (Dawis & Lofquist, 1984; Ginzberg et al., 1951; Super, 1957). Although career values are often treated as stable individual attributes that drive career choices and career management activities, much research has shown that individuals change their career values in order to reduce the discrepancy between career standards and achieved progress (Chow et al., 2014; Porfeli, 2008), meet the evolving work and life role expectations in different stages of development (Jin & Rounds, 2012; Lechner et al., 2017; Sortheix et al., 2015), and adapt to the changing economic and cultural environments (Guan, et al., 2020; Twenge et al., 2010).

From a lifespan perspective, university students are in a critical stage of career exploration and preparation (Super, 1980), which may entail significant changes in their career values. Consistently, meta-analytic findings show that the test-retest coefficients of career values are lowest during the university age (i.e., 18-22 years old, see Jin & Rounds, 2012). Given the importance of career values in guiding university students' career decision-making and career preparation activities (Hirschi, 2010; Sortheix et al., 2015; Zhou et al., 2016), research into the predictors of university students' career value changes can not only advance theories of career values, but also provide meaningful guidance for the vocational education and counseling practices in university settings.

Rokeach (1973) contends that human values undergo recurring changes to reduce inconsistencies or discrepancies among different aspects of the self-concept. In light of this

view, the current research focuses on two reasons that may explain university students' career value changes. First, the coexistence of multiple value types requires university students to prioritize and balance the pursuit of these values. When certain values are prioritized in a given period of time, other values, especially those inconsistent or incompatible ones, are often downgraded. Since self-determination theory (Deci & Ryan, 1985, 2010) provides an insightful account for the incompatibility and dynamics between intrinsic and extrinsic motives, we adopt this perspective to develop hypotheses on how a value dimension (e.g., an extrinsic value) may predict the change of another one (e.g., an intrinsic value).

In addition to the competitive dynamics among value dimensions, Rokeach (1973) also argues that the inconsistency between one's value standards and actual states of performance often leads to self-dissatisfaction, which may motivate individuals to put more effort on performance improvement, or modify the value standards to reduce the inconsistency (Rokeach, 1968, 1971). These analyses suggest that university students' career values and perceived career development progress may reciprocally influence each other. Given that developing professional ability represents a central task for university students (Arnett, 2000; Super, 1980), this study focuses on the role of professional ability development (PAD), which refers to the extent to which university students acquire career-related knowledge, expertise, or ability (Weng & McElroy, 2012), in their career value changes. Following Rokeach's model (1973), we propose that while career values serve as important motivational basis for university students' PAD, the progress of PAD also leads to the changes of relevant career values. On the other hand, self-determination theory provides a more refined view on these relations by emphasizing the distinct associations between PAD

and the intrinsic vs. extrinsic value dimensions. We thus use both theories to develop competing hypotheses for examination.

Appropriate research designs are critical to test the complicated relations mentioned above. To better understand how the dynamics among career values and PAD unfold over time and whether one construct can predict significant changes of another, we conducted a cross-lagged panel study among a sample of Chinese university students. Specifically, we gathered data on their career values and PAD at two time points over a year. This design not only controls the concurrent correlations among variables, but also controls the stability of variables by assigning autoregressive relationships. The cross-lagged regression parameters are used to represent their reciprocal relations, which provide a rigorous test for the hypothesized dynamic effects (Rogosa, 1980).

Hypothesis Development

Competitive dynamics among career values

Career values have been conceptualized by the multiple desired end-states that guide individuals' career development, such as the external compensation (e.g., promotions, income, status), intrinsic fulfillment (e.g., pleasure and enjoyment from work activities and career experience), as well as the desired level of work-life balance (Ginzberg et al., 1951; Kasser & Ryan, 1996; Mortimer & Lorence, 1979; Super, 1980; Twenge et al., 2010; Zhou et al., 2013). According to Rokeach (1973), values are organized in a systematic way and a value's position depends on its relative importance in the system and its consistency or compatibility with other values (see also Schwartz, 1992). Accordingly, it has been found that the prioritization of certain values often leads to the decreased endorsement of those

inconsistent ones (Grube et al., 1994; Rokeach, 1986, 1971). In this study we adopted a three-factor model established in the Chinese context (Zhou et al., 2013), and focus on the dynamic changes of external compensation, intrinsic fulfillment, and work-life balance values.

From a self-determination perspective (Deci & Ryan, 1985, 2010; Kasser, 2002, 2016; Kasser & Ryan, 1996), the external compensation and work-life balance values can be categorized as extrinsic career motives as both values represent the tendency of pursuing instrumental outcomes from career development. In contrast, the intrinsic fulfillment value reflects people's intrinsic motives as it emphasizes seeking pleasure from career tasks. Self-determination theory (Deci & Ryan, 1985, 2010) posits that although both extrinsic and intrinsic motives provide important guidance for people's goal setting and goal-pursuing activities, their relations are often considered as contradictory. In support of this view, empirical research adopting circular stochastic modeling analyses shows that individuals' extrinsic and materialistic goals are in a relatively opposite position to intrinsic goals (Burroughs & Rindfleisch, 2002; Grouzet et al., 2005).

Considering the potential incompatibility between extrinsic and intrinsic types of career values, we argue that there may exist competitive dynamics underlying their changes. Specifically, since materialistic and hedonic values may give rise to the feeling that one's activities are externally controlled, the increases of these values may harm the intrinsic values (Deci & Ryan, 1985, 2010; Kasser, 2002, 2016). In addition, given the constraints of time, resources and opportunities, the increased engagement in extrinsic goal pursuit also makes it less feasible to pursue intrinsic goals. In support of this view, research has shown the detrimental effects of extrinsic goal pursuit on intrinsic goals (Ryan & Deci, 2008; Pinder,

2011). In addition, students having strong materialistic values are found to have lower mastery goals for their coursework, indicating low endorsement of intrinsic values (Ku et al., 2012, 2014). Following these arguments, we hypothesize:

Hypothesis 1. Both external compensation value (H1a) and work-life balance value (H1b) predict the decrease of intrinsic fulfillment value.

We also propose that the endorsement of intrinsic value may make university students find it less necessary to pursue external rewards (Ryan & Deci, 2008; Pinder, 2011), thereby producing suppression effects on external compensation and work-life balance values. That is, when one prioritizes pursuing pleasure from career development tasks, he/she may downgrade the pursuit of extrinsic rewards. Findings from intervention experiments also show that the activation of intrinsic values leads to deeper engagement with activities that are more aligned with intrinsic and away from extrinsic goals (Lekes et al., 2012). We thus hypothesize that:

Hypothesis 2. Intrinsic fulfillment value is related to the decreases of external compensation value (H2a) and work-life balance value (H2b).

While both extrinsic and work-life balance values may decrease intrinsic work values, these two values may also have competitive dynamics across time. Although the pursuit of materialistic possessions helps to improve one's life conditions, it often requires individuals to put more investment in their work roles, thereby making it less likely to achieve work-life balance (Promislo et al. 2010). In addition, findings of a meta-analysis show that external values positively predict risky health behaviors and impulsive consuming behaviors (Dittmar et al., 2014), which may endanger one's work-life balance. On the other hand, the increased

emphasis of work-life balance motivates individuals to build clearer boundaries between work and life roles, which may block individuals' pursuit of work goals, including external compensation (Rothbard, 2001).

Hypothesis 3. External compensation value predicts the decrease of work-life balance value (H3a); work-life balance value also predicts the decrease of external compensation value (H3b).

Career Values as Predictors for Professional Ability Development

Career values provide strong motivational basis that drives people to behave in a way that helps to attain desired end-states (Rokeach, 1973). From a self-determination perspective (Deci & Ryan, 1985, 2010; Kasser, 2002, 2016), individuals with strong intrinsic values often find career tasks more enjoyable, therefore they are more likely to persist and devote effort. Consistently, researchers show that young people with stronger intrinsic values make more effort to career development activities (Hirschi, 2010) and achieve better fit with the environment (Sorthaix et al., 2015). In addition, intrinsic values are also positively related to career adaptability and decision-making self-efficacy (Zhou et al., 2016), as well as career achievements in the long run (Taylor et al., 2014). Accordingly, driven by intrinsic fulfillment value, university students may find their learning activities more interesting and enjoyable, therefore they are more likely to be engaged in these activities and make progress.

Students' extrinsic motives have been found to be related to higher emotional exhaustion (Vansteenkiste et al., 2007) and ill-being (Niemic et al., 2009), which will drain their energy and harm the progress of developing skills and capabilities (Gagné & Deci, 2005; Vansteenkiste et al., 2007). In addition, when students endorse the external

compensation value, they may use alternative ways rather than developing ability to attain those extrinsic rewards, which may decrease their effort for PAD. Consistently, external compensation value is shown to impede adolescents' career exploration and career decidedness (Hirschi, 2010). Given that work-life balance value reflects the tendency to reduce their work effort to have more leisure time (Rothbard, 2001), it may also negatively predict university students' PAD. We thus hypothesize that:

Hypothesis 4. Intrinsic fulfillment value predicts the increase of PAD (H4a); extrinsic compensation (H4b) and work-life balance (H4c) values predicts the decrease of PAD.

Professional Ability Development as a Predictor for Career Values

According to Rokeach (1973), individuals' perceptions of their behaviors and surrounding environments can also trigger changes in their values. Specifically, in order to maintain a consistent and coherent self-concept, people have the natural tendency of valuing what they are capable of obtaining. For example, Johnson (2001) demonstrated that during the transition to adulthood, workers who obtain greater intrinsic job rewards increase their intrinsic career value. Johnson et al. (2012) also found that extrinsic values are weakened when the possibility of obtaining extrinsic rewards is limited during unemployment. In line with this logic, the enhanced professional ability may reinforce university students to increase intrinsic career value. On the other hand, given that professional ability development reflects that individuals are more employable (Weng & McElroy, 2012), which may make students more optimistic about their employment and financial prospects and accordingly may lead to higher level of external compensation value as well (Johnson, 2002). The progress of professional ability development also suggests that it is possible to achieve a good work-life

balance in the future. Taken together, we hypothesize that:

Hypothesis 5. PAD positively predicts the increases of intrinsic fulfillment value (H5a), extrinsic compensation value (H5b) and work-life balance (H5c).

In contrast of above arguments, the self-determination perspective (Deci & Ryan, 1985, 2010; Kasser, 2002, 2016; Kasser & Ryan, 1996) stresses the distinct relations between PAD and different value dimensions. Specifically, since the intrinsic value can be increased through the fulfillment of needs for autonomy (e.g., choosing an occupation that fits personal interests), competence (e.g., developing career-related skills), and relatedness (e.g., building connections with other people), PAD should be positively related to this value dimension through these need-fulfillment mechanisms. First, PAD is a signal of self-competence (Weng & McElroy, 2012), which can fulfill young adults' psychological need for competence and contribute to higher intrinsic career value. In addition, the process of PAD also helps undergraduate students to develop a clearer understanding of their personal strengths, which may lead to a more salient future work self, thereby fulfilling their need for autonomy (Cai et al., 2015; Guan et al., 2017). Extant research also shows that school achievement positively predicts intrinsic motivation (e.g., Garon-CARRIER et al., 2016; Taylor et al., 2014). Thus, both theories predict that PAD should positively correlate to intrinsic fulfillment value.

However, self-determination theory (Deci & Ryan, 1985, 2010; Kasser, 2002, 2016; Kasser & Ryan, 1996) also suggests that the external compensation and work-life balance values may be reduced by the development of professional ability for the following reasons. First of all, social determination theory posits that people's intrinsic needs are fulfilled, they may reduce the endorsement of extrinsic goals. Deci (1971) found that when people receive

internal incentives such as positive feedback rather than external rewards, their internal motivation is promoted with extrinsic motivation decreasing. Kruglanski et.al. (1975) replicated this finding in three experiments, which show that in the high intrinsic reward condition, people exhibit lower extrinsic motivation. More directly, Taylor et al. (2014) found that prior school achievement was negatively related to extrinsic motivations such as external regulation and introjected regulation.

Hypothesis 6. PAD predicts the increase of intrinsic fulfillment value (H6a), but the decreases of extrinsic compensation (H6b) and work-life balance (H6c) values.

Method

Procedures and Participants

The data for this study were obtained from an ongoing longitudinal project that focuses on the career development of Chinese university students. The first wave of this dataset was collected in 2016 from 22 universities in different cities the second wave was collected one year later. Participants were recruited with the help of career centers in these universities, and their participation was voluntary and unpaid. Research assistants from these universities helped to organize the data collection process and participants signed the consent form before completing the questionnaires. In 2016 (T1), there were 6121 participants who completed the survey. Considering the purpose of this study is to examine value changes among undergraduates aging from 18 to 22 (Jin & Rounds, 2012), we dropped participants who: (a) were at the postgraduate stage, (b) could not complete the second wave of data collection (e.g., final-year undergraduate students), (c) were younger than 18 at T1 or older than 22 at T2. These steps resulted in 3315 valid cases at T1. After matching this sample with

students who provided valid data at T2, we obtained 2446 matched cases (attrition rate 26.21%), which were used to test the hypotheses.

We further examined whether there were systematic differences between the main sample and those who dropped out at T2. There were no significant differences in intrinsic fulfillment ($t(3313) = .28, p = ns$) and external compensation ($t(3313) = 1.41, p = ns$), but there are differences in work-life balance ($t(3313) = -2.63, p < .01$) and PAD ($t(3313) = -4.92, p < .01$). Specifically, the average work-life balance value (4.10 vs. 4.17) and PAD (3.75 vs. 3.88) scores were lower among dropouts than the matched sample. Although there are some differences in these two samples, the effect sizes are generally small. In addition, the average age (20.09 vs. 20, $t(3313) = 2.78, p < .01$) and grades (1.85 vs. 1.77, $t(3313) = 2.81, p < .01$) of dropouts are relatively higher than the matched sample. Results from the chi square tests show that males are less represented in the matched sample (22.2% vs. 28.7%, $\chi^2(1, N = 3315) = 14.89, p < .01$), and there are less students majored in human resource management (53.1% vs. 72.9%) and social policy (8.1% vs. 14.6%), more students from business management (25.9% vs. 5.8%), employment relations (9.2% vs. 5.6%), and public administration (3.7% vs. 1.1%) in dropouts.

Due to the imbalanced distributions of gender, grade and major, as well as the differences in the demographics between research sample and dropouts, we controlled the effects of gender, grade and major (dummy coded, with human resource management as the reference group) when testing the hypothesized model. We did not control the effects of age as it is highly correlated with grade ($r(2446) = .68$, see Table 1).

Measures

Career values. Career values were measured by a three-dimensional scale developed by Pan and Zhou (2015), which consists of external compensation (3 items, e.g., “career success means one has obtained power and can control or influence others”), work-life balance (3 items, e.g., “career success means one can take care of his/her family when developing his or her career”) values, and intrinsic fulfillment (4 items, e.g., “career success means one is being enthusiastic and passionate with his or her work”). Respondents were asked to indicate their agreement with the items using a scale ranging from 1 (strongly disagree) to 5 (strongly agree). This scale has been used to measure people’s career values in the Chinese context and its reliability and validity are supported by previous research (e.g., Guan et al., 2018; Pan & Zhou, 2015; Zhou et al., 2016). The Cronbach α coefficients were .77, .74, and .78 for external compensation, intrinsic fulfillment, and work-life balance respectively at T1, and .82, .76, and .80 for external compensation, intrinsic fulfillment, and work-life balance respectively at T2.

Professional ability development. Professional ability development was measured by 4 items from a Chinese version of career growth scale (Weng & Xi, 2011). A sample item is “My present learning experience encourages me to continuously gain new and career-related skills”. Respondents were invited to rate to what extent they agree with each item through a scale ranging from 1 (strongly disagree) to 5 (strongly agree). The validity of this measure in the Chinese context was supported by previous research (Weng & Mcelroy, 2012). The Cronbach’s alpha coefficients in this study were .88 for both T1 and T2.

Control variables. To rule out the potential bias of demographic variables (Johnson, 2001; Sortheix et al., 2013), we controlled gender (1 = female, 0 = male), grade (1 =

freshman, 2 = sophomore, 3 = junior, 4 = senior) and four major dummy variables (major dummy 1 = business management, major dummy 2 = public administration, major dummy 3 = employment relations, major dummy 4 = social security policy) with human resource management as the reference group in our analysis.

Results

Multi-level Issues

Since the data of participants from the same university may be nonindependent, we calculated the ICC (1) values for external compensation value (.01 and .02), intrinsic fulfillment value (.01 and .01), work-life balance value (.04 and .01), and PAD (.01 and .01) at T1 and T2. These values suggest that the between-university differences only account for a very small percentage of the variance of these individual-level variables, and it is appropriate to use individual-level cross-lagged panel analyses to test the hypotheses (LeBreton & Senter, 2008).

Descriptive Statistics

Table 1 shows the means, standard deviations, reliabilities, and correlations of all variables at T1 and T2. From T1 to T2, we find considerable changes in career values, as reflected by the moderate test-retest correlations across 1 year (External compensation $r(2446) = .41$, Intrinsic fulfillment $r(2446) = .35$, Work-life balance $r(2446) = .34$). The results also show that the concurrent correlations of the value dimensions and PAD are generally positive, which highlight the importance of controlling these effects when examining the cross-lagged relations these variables.

Insert Table 1 about here

Confirmatory Factor Analysis and Measurement Invariance

To examine the factor structure and discriminant validity of our focal measures, we first performed confirmatory factor analyses (CFA) using Mplus 7.0 (Muthén & Muthén, 2012). The CFA results suggested that the four-factor measurement model showed positive and significant factor loadings, as well as reasonable model fit indices for both T1 ($\chi^2[71] = 752.62$; $CFI = .95$; $TLI = .93$; $RMSEA = .06$; $SRMR = .04$) and T2 ($\chi^2[71] = 726.39$; $CFI = .96$; $TLI = .94$; $RMSEA = .06$; $SRMR = .04$). In the second step, we examined measurement invariance between variables of T1 and T2 to ensure that the observed relationships do not originate from changes in measurement of the constructs. Following the procedures recommended by Vandenberg and Lance (2000), we performed analyses of configural invariance, metric invariance, scalar invariance, and residual invariance. As the chi-square tests are sensitive to sample size, we followed Cheung and Rensvold (2002) and used a cutoff value of .01 to evaluate whether the changes of model fit indexes (e.g., CFI) are significant. As shown in Table 2, all invariance models showed satisfactory fit with the data and the changes in fit indices are within the acceptable range, which support the measurement invariance of the variables at T1 and T2.

Insert Table 2 about here

Testing Reciprocal Effects

We followed the procedure proposed by Martens and Haase (2006) to examine the cross-lagged relations among value dimension and PAD via Mplus7.0. Specifically, we

examined the autoregressive model and the full cross-lagged model in sequence. In autoregressive model, the concurrent relations among latent variables measured at the same time point are controlled, and a latent variable at T2 is predicted by the same variable at T1. In full cross-lagged model, we specified that the latent variables at T2 are predicted by the same variables and other latent variables at T1. By comparing the model results in Table 3, the full cross-lagged model showed the best model fit, showing that a reciprocal model was supported.

Insert Table 3 about here

We present the standardized parameter estimates for the full cross-lagged model in Figure 2. External compensation value (T1) negatively predicts intrinsic fulfillment at T2 ($\beta = -.09, p < .01$), supporting Hypotheses 1a; work-life balance value (T1) negatively predicts intrinsic fulfillment at T2 ($\beta = -.19, p < .001$), supporting Hypotheses 1b. External compensation value is negatively related to work-life balance at T2 ($\beta = -.08, p < .01$), which supports Hypotheses 3a.

Insert Figure 2 about here

As for the reciprocal relationships between career values and PAD, results show that external compensation (T1) negatively predicts PAD at T2 ($\beta = -.05, p < .05$), supporting Hypothesis 4b. PAD (T1) positively predicts work-life balance value at T2 ($\beta = .06, p < .05$), which supports H5c.

Discussion

The current study investigates dynamic changes of career values and their reciprocal relationships with PAD. The test-retest correlations of career values range from 0.34 – 0.41, suggesting significant changes across a year. Results from the cross-lagged panel analyses provide partial support for the competitive dynamics among career values such that external compensation value negatively predicts the changes of intrinsic fulfillment value and work-life balance value, and work-life balance value negatively predicts the change of intrinsic fulfillment value. External compensation value is found to be negatively related to PAD, and PAD is positively related to work-life balance value. These findings have important theoretical and practical implications.

Theoretical Implications

Our study contributes to the literature on career value changes in several ways. First of all, the results show that both external compensation and work-life balance values predict the decrease of intrinsic fulfillment value, which yield support for both Rokeach's (1973) value change model and self-determination theory (Deci & Ryan, 1985, 2010; Kasser, 2002, 2016; Kasser & Ryan, 1996). It is possible that these extrinsic values may make university students attribute their learning activities to external reasons, thus decrease intrinsic fulfillment value. It is also possible that the pursuit of extrinsic values may reduce university students' engagement in activities that aim to fulfill intrinsic goals, which in turn reduces their relative importance. Future research should continue to examine the specific mechanisms underlying these relations.

Second, the prediction that intrinsic fulfillment value negatively predicts external compensation and work-life balance values is not supported. These findings suggest that

among university students, enjoying the pleasure of career tasks may not be viewed as contradictory to the goals of pursuing extrinsic or hedonic rewards. Although the prioritization of intrinsic goals may reduce the importance of extrinsic goals, the engagement in career tasks can also help university students to accumulate relevant skills and career resources for the pursuit of extrinsic rewards. Therefore, it is possible that intrinsic fulfillment value may have both positive and negative influence on external compensation and work-life balance values. These possibilities remain to be examined in future research.

Third, external compensation negatively predicts the change of work-life balance value, but not vice versa. Although these two types of values represent extrinsic values, they have different implications for individuals' well-being. Although external compensation helps to improve one's life quality, the pursuit of these rewards often leads to higher levels of stress and exhaustion (Promislo et al. 2010), as well as more risky health behaviors and impulsive consuming behaviors (Dittmar et al., 2014), which may endanger one's work-life balance. The insignificant relationship from work-life balance value to external compensation value is not consistent with our prediction. As suggested by Twenge et al. (2010), there are generational differences in career values and the millennials tend to emphasize work-life balance in their career development (see also Gallup, 2016). Consistent with this view, the ratings of work-life balance values are the highest among our research sample, followed by intrinsic fulfillment and external compensation values. The cross-lagged results suggest that students tend to downgrade intrinsic fulfillment value, but not external compensation value, in order to meet the work-life balance goals.

We also tested the reciprocal relations between career values and PAD. Most previous

work focuses on the unidirectional effects of career values on career developmental behaviors (e.g., Hirschi, 2010; Zhou et al., 2016), but does not empirically test the bidirectional relationships. Our study shows that external compensation value is negatively associated with students' PAD, which is in line with self-determination theory that extrinsic motivation produces more negative performance outcomes (Vallerand, 2000). However, the nonsignificant reciprocal relationship between intrinsic fulfillment value and PAD is not consistent with our predictions. As shown above, since the increase of intrinsic fulfillment value does not lead to the decreases of extrinsic values, it is possible that students who prioritize their intrinsic goals still have to put time and effort to pursue other goals. As a result, their workload will be increased, which may consume their energy and make it more difficult to increase PAD. On the other hand, although work-life balance value reflects a form of extrinsic motivation that may decrease PAD (Deci & Ryan, 1985, 2010), the pursuit of work-life balance is also beneficial for individuals' well-being, thereby potentially leading to increased PAD.

PAD is found to positively predict the increase of work-life balance value, but not the other two. It is possible that the increase of PAD provides feedback that university students already achieve satisfactory progress in their skill development, which makes it more feasible to invest more time on other goals, such as work-life balance goal (Rokeach, 1973). These findings suggest that work-life balance value represents a central career goal among the millennial university students. Future research should continue to examine how university students reprioritize their value dimensions in their school-to-work transitions and other career stages.

Taken together, these results suggest that external compensation value is most likely to trigger changes of other values and PAD, but intrinsic fulfillment value is most likely to be affected by other value types, which present a more refined view on the competitive dynamics of value dimensions, as well as their reciprocal relations with PAD (Deci & Ryan, 1985, 2010; Kasser, 2002, 2016; Kasser & Ryan, 1996; Rokeach, 1973). Since existing studies on value changes were mainly conducted in western countries, such as UK (Ashby & Schoon, 2010), USA (Johnson & Monserud, 2012; Johnson, 2001), Finland (Sortheix et al., 2015), Canada (Chow et al., 2014), Switzerland (Hirschi, 2010), this study contributes to literature by providing new evidence on the dynamic changes of career values among a large sample of Chinese university students. On the other hand, it is possible that the collectivistic values and dialectical thinking styles may make the self-determination values such as intrinsic fulfillment more vulnerable in the Chinese culture (Guan et al., 2015; Guan et al., 2020), and future research should continue to examine whether these findings can be generalized to other cultures.

While the results provide important evidence on the career value changes, especially the cross-lagged effects among these constructs, these effects are not particularly strong. Given that the cross-lagged panel analyses provide a stringent test for the reciprocal relations of these variables by controlling their concurrent correlations and stability across time, it is normal to have smaller effect sizes (Rogosa, 1980). In addition, these findings also highlight the importance of detecting proximal predictors and mediating mechanisms that account for the changes of career values and PAD, such as the fulfillment of competence, autonomy, and related needs (Vansteenkiste et al., 2007). In addition, it is also important to examine value

changes in different career stages, and incorporate environmental factors, such as the change of work/life roles (Lechner et al., 2017), educational environment (Sheldon & Kasser, 2001), economic development level (Johnson et al., 2012) to develop a more comprehensive view on this important research question.

Practical Implications

University stage represents an important period of career development, during which young adults are involved in intense learning activities to integrate their career values with future career possibilities (Super, 1980). Our research suggests that nowadays university students tend to hold the “work to live” view about their career development and emphasize the importance of work-life balance value. In addition, intrinsic fulfillment value can be hampered by the increased emphasis of external compensation and work-life balance values. Although the pursuit of these extrinsic goals is important, career educators and counselors should be aware of their suppression effects on intrinsic goals.

In addition, the negative relationship between external compensation value and PAD further highlights the importance of guiding university students to have reasonable levels of extrinsic values, in order to prevent their negative consequences. According to Kasser (2016), there are a variety of ways to reduce people’s extrinsic motives, and some of them can be applied to the university setting. A useful intervention strategy is to reduce the exposure to social surroundings that emphasize the importance of money, status, and other external rewards. Therefore, universities should also work with parents and relevant social institutes to create a social environment that helps students to develop a more balanced and coherent value system.

Limitations and Future Directions

Despite the theoretical and practical implications discussed above, there are possible limitations associated with our research. First, we only tested the proposed model with self-rating data, which may suffer from the common method bias. However, as demonstrated in our confirmatory factor analysis, these constructs can be distinguished from each other, and the potential common method bias is effectively controlled by including the concurrent relations in the model. Nevertheless, future research should adopt a more rigorous design to further eliminate this weakness. For example, professional ability development can be measured by objective indicators, to improve its validity and avoid the common method bias.

The imbalanced ratio of gender, grades and disciplines may also endanger the representativeness of our research sample. In addition, the attrition of participants may also influence the generalizability of this study. To address these issues, we put gender, grades and dummy coded major as control variables, and supplementary analyses show that the key findings remain the same with and without these control variables. Despite these remedies, future research should consider using a more representative sample to test these relations. In addition, the potential moderation effects of gender, age and major should also be examined.

Conclusion

Drawing upon value change and self-determination theories, this cross-lagged panel study shows that university students undergo significant value changes across one year. The cross-lagged analyses show that external compensation value (T1) negatively predicts intrinsic fulfillment value (T2), PAD (T2), and work-life balance value (T2); work-life balance value (T1) negatively predicts intrinsic fulfillment value (T2); PAD (T1) positively

predicts work-life balance value (T2). These findings have important implications for career value theories and career education practices.

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

Variable	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1.Gender	NA	NA	NA	NA													
2.AgeT1	20.00	0.83	-0.05*	NA													
3.GradeT1	1.77	0.76	.03	.68**	NA												
4.Major dummy 1	NA	NA	-0.03	-0.08**	-.13**	NA											
5.Major dummy 2	NA	NA	-0.01	-0.04	-0.02	-0.03	NA										
6.Major dummy 3	NA	NA	-0.04	.05*	.04*	-0.06**	-0.03	NA									
7.Major dummy 4	NA	NA	.01	-0.01	.03	-.10**	-0.04*	-.10**	NA								
8.EXC T1	2.88	0.80	-0.03	.03	.02	-0.00	-0.01	.03	-0.03	.77							
9.INF T1	3.75	0.61	.10**	.00	.06**	-0.08**	.01	-0.04	.00	.20**	.74						
10.WLB T1	4.17	0.65	.08**	-0.01	.03	-.17**	.00	-0.03	.01	.11**	.53**	.78					
11.PAD T1	3.88	0.67	.06**	-0.04	-0.04*	-0.07**	-0.01	-0.05*	.00	.09**	.33**	.31**	.88				
12.EXC T2	2.97	0.83	-0.06**	.02	.00	.06**	.01	-0.01	-0.04*	.41**	.05*	-0.00	.03	.82			
13.INF T2	3.79	0.59	.10**	-0.01	.02	.01	-0.02	-0.04*	-0.01	.03	.35**	.17**	.17**	.21**	.76		
14.WLB T2	4.16	0.65	.11**	-0.03	-0.02	.01	-0.01	-0.04*	-0.00	-0.02	.20**	.34**	.16**	.08**	.55**	.80	
15.PAD T2	3.88	0.67	.08**	.00	.03	-0.03	-0.03	-0.03	-0.04*	.00	.15**	.11**	.34**	.16**	.38**	.34**	.88

Note. $N = 2446$. Reliability coefficients are shown in bold along the diagonal of the table. Gender (female = 1; male = 0). Major dummy 1 (business management = 1; human resource management = 0). Major dummy 2 (public administration = 1; human resource management = 0). Major dummy 3 (employment relations = 1; human resource management = 0). Major dummy 4 = (social security policy = 1; human resource management = 0). T1= Time 1; T2= Time 2. EXC = external compensation. INF = internal compensation. WLB= work-life balance. PAD = professional ability development.

* $p < .05$. ** $p < .01$.

Table 2*Measurement Invariance Analysis.*

Model	χ^2	<i>df</i>	<i>CFI</i>	<i>RMSEA</i>	<i>SRMR</i>
Configural invariance	2454.702	322	.928	.052	.038
Metric invariance	2482.432	332	.928	.051	.039
Scalar invariance	2512.679	342	.927	.051	.040
Residual invariance	2599.283	360	.925	.050	.045

Note. $N = 2446$. χ^2 is the chi-square value. *df* is the 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.

Table3*Summary of reciprocal effects test*

Model	χ^2	<i>df</i>	<i>AIC</i>	<i>BIC</i>	<i>CFI</i>	<i>TLI</i>	<i>RMSEA</i>	<i>SRMR</i>
Autoregressive	2896.457	478	139221.795	139941.269	0.919	0.908	0.045	0.040
Full cross-lagged	2840.110	466	139189.448	139978.548	0.921	0.907	0.046	0.037

Note. $N = 2446$. *AIC* is Akaike information criterion. *BIC* is Bayesian information criterion. *TLI* is Tucker-Lewis index.

