SN Soc Sci (2023) 3:126
https://doi.org/10.1007/s43545-023-00718-3

ORIGINAL PAPER

Do university academics' thinking styles account for their job satisfaction? A cross-sectional study

Samson John Mgaiwa[1]

Received: 27 December 2022 / Accepted: 14 July 2023 / Published online: 24 July 2023

Abstract

The present research was pioneered to examine the predictive power of academics' thinking styles for their job satisfaction. A convenient sample of university faculty from four universities (N = 411), of which 310 (75.4%) and 101 (24.5%) were males and females respectively recruited from two public and two private universities in the Republic of Tanzania. On one hand, the thinking styles for academics were measured by the Thinking Styles Inventory-Revised II (TSI-R2) grounded on Sternberg's theory of mental self-government. On the other hand, the academics' job satisfaction was measured using Minnesota Satisfaction Questionnaire (MSQ-short), derived from Herzberg's (1987) Two Factor Theory. Using the hierarchical regression model, the predictive power of academics' thinking styles on their job satisfaction was examined. The hierarchical regression model showed that academics' thinking styles significantly predicted academics' job satisfaction irrespective of academic rank, age, university type, work experience, marital status, and gender, mainly in the expected directions. Theoretical implications for research on intellectual styles and job satisfaction are discussed along with some practical implications for university managers and leaders.

Keywords Academics · Higher education · Job satisfaction · Thinking styles · Tanzania

Introduction

For effective organisations, warranting employees' job satisfaction is vital to fostering creativity, innovation, performance, and productivity (Ayala et al. 2017; Mgaiwa 2021; Otache and Inekwe 2021). With the increasing interest in global university rankings and internationalization (Crowley et al. 2022; Darwin and Barahona 2023; Yudkevich et al. 2015), universities must have a competitive workforce of faculty

✉ Samson John Mgaiwa
mgaiwa12@gmail.com

[1] Tanzania Institute of Education, Dar Es Salaam, United Republic of Tanzania

members who are well seasoned in their core university activities—i.e., teaching, research and community service (Mgaiwa and Kapinga 2021) who are satisfied and remain satisfied with their job (Mgaiwa 2023; Zhang et al. 2020) so they can effectively work and help the university to compete in the league table. Extant research (see e.g., Ko and Choi 2019; Mgaiwa 2021; Zhang et al. 2020) indicates that there are certainly several factors such as workers' attitudes toward a job, work conditions, communication, pay, leadership and co-workers that account for employees' job satisfaction. As such, in the context of Tanzania higher education job satisfaction has been studied in the context of leadership styles (see e.g., Mgaiwa 2023), and academics' work environment (see e.g., Mgaiwa 2021). Both leadership styles and work environment accounted for academics' job satisfaction. Other existing empirical studies (e.g., Mgaiwa and Hamis 2022) examined the influence of leadership styles on job satisfaction, but were conducted in sub sectors other than higher education. However, the present research focuses on academics' thinking styles (i.e., one specific psychological construct under the umbrella term 'intellectual style' which refers to a preferred way of using our abilities that we have). While many studies exist on both intellectual styles and job satisfaction in relation to other variables, only a few studies exhibit an association between intellectual styles and perceived job satisfaction, especially among academics. For example, Abraham (1997) studied, among other things, the relationship between thinking styles and employees' job satisfaction among participants in entertainment, telecommunications, food service, and sartorial retail firms in south Florida, USA; specifically, the study examined thinking styles' moderating effect on role ambiguity, role overload, role conflict, and job satisfaction (Abraham 1997, p. 240), finding that using specific styles reduced the deleterious influences of role stress on job satisfaction.

More interestingly, employing the Gregorc Style Delineator scale (1985) and Mohrman-Cooke-Mohrman Job Satisfaction Scale (1978) to assess principals' learning styles and teachers' job satisfaction, respectively, Smith (2006) examined the relationship between principals' learning styles and beginning teachers' job satisfaction in North Carolina. Findings from this study showed that school principals with a concrete sequential learning style tended to be more satisfactory to beginning teachers than did principals with other learning styles (e.g., concrete random, concrete sequential, abstract random, and abstract sequential).

Although research results from countless studies conducted in a diverse research context have advanced knowledge regarding employees' job satisfaction including that of faculty (see e.g., Albert et al. 2018; Mgaiwa 2021; Nesamvuni 2021; Zhang et al. 2020), to the best of my understanding, none of these studies has particularly explored the role of academics' thinking styles in their job satisfaction. Research evidence shows the existence of very little research with a focus on other intellectual styles (e.g., teaching styles and personality traits) and job satisfaction. As such, the few existing research all studied school teachers. For instance, a thorough search in the Psych Info database revealed only two research articles on the relationship between intellectual styles and job satisfaction. These include the work of Wen (2007) who examined the relationship between 153 middle school teachers' teaching styles and their job satisfaction. Results revealed that teachers higher on liberal, legislative, judicial, and global styles (i.e., Type I styles) had higher job satisfaction

levels. At the same time, teachers who were more passive coupled with conservative teaching styles (i.e., Type II styles) had lower job satisfaction levels. In the same vein, Li, Yao, Liu, and Zhang (2021) among others, investigated whether teachers' Big Five Personality traits relate to job satisfaction in addition to examining the mediating role of teachers' teaching styles among 1887 Chinese teachers. Results from structural equation modelling (SEM) showed a significant positive influence of teachers' personalities on their job satisfaction. As such, teachers' teaching styles mediated the relationship between four personality traits (except extraversion) and work engagement and job satisfaction. Overall, these findings highlight the contribution of personality and teachers' teaching styles to their job satisfaction (Li et al. 2021).

Of particular interest is the work of Glaveli et al. (2013), who also examined the relationships among three facets of a supportive work environment, work–family conflict, and job satisfaction in Greece. Their findings revealed that the three facets of a supportive work environment could predict job satisfaction.

Unlike countless other influences that have been extensively studied in terms of their effect on employees' job satisfaction across age and work experience and in diverse research contexts, studies on the influence of intellectual styles (i.e., thinking styles) on job satisfaction and particularly among Tanzanian academics do not exist. Therefore, the current study aimed to advance further the existing research on the association between intellectual styles, explicitly thinking styles (i.e., one specific construct under the umbrella term 'intellectual style') and academics' job satisfaction. Theoretically, the present research is critical for advancing our understanding of the relationship between academics' thinking styles and job satisfaction. Practically, the results of this study may have implications for guiding university managers and leaders on what styles should be promoted for fostering academics' job satisfaction.

Theoretical framework

To better understand the relationship between academics' thinking styles, the present study is confined to Sternberg's (1998) theory of mental self-government. Therefore, in Sect. "Sternberg's theory of mental self-government", I discuss the theory of mental self-government and its research in the present study.

Sternberg's theory of mental self-government

Sternberg's theory of mental self-government is a theory of thinking styles which in the first place categorised styles into five categories (i.e., function, forms, scopes, levels, and learnings), hence resulting in 13 thinking styles. After re-conceptualization and generating so much empirical evidence, Zhang (2002a, b, c) re-grouped these 13 thinking styles into three major typologies of thinking styles: Type I (i.e., judicial, legislative, liberal hierarchical, and global), Type II (i.e., local, conservative, monarchic, executive) and Type III (i.e., anarchic oligarchic, external, and

internal). Metaphorically, the major premise of this theory is that there are numerous strategies/ways of governing any society, comparable to the way individuals utilise their abilities. The assorted ways of using the individual's abilities are what Sternberg's (1998) theory names as thinking styles. Unremarkably, when individuals employ their abilities, they select one of the styles they are comfortable with. Of particular interest, owing to the stylistic needs of a certain context, an individual may incline to use various thinking styles. More importantly, one of the critical characteristics of thinking styles is modifiability (i.e., malleability) and that, thinking styles are at least reasonably socialized. This means that thinking styles can be taught/cultured to individuals.

The theory of mental self-government is one of many types of style constructs in existence for some decades (e.g., conceptual tempo, modes of thinking, learning approach, thinking styles, decision-making styles, mind style, and perceptual style). Existing studies (see e.g., Fan 2020; Fan and Zhang 2014; Ramzan et al. 2014; Zhang 2000) indicate that, of all the intellectual style constructs, thinking styles are regarded to be both most superior and generic, due to their ability to include all three fundamental methods to learning styles as proposed by Grigorenko and Sternberg (1997) i.e.,—personality-, cognition-, and activity-centred. As such, the generic nature of thinking styles can be abridged to explain some contradictions and disagreements in the field of intellectual styles, such as the style overlap, value of styles and malleability of styles. Against this background, in the current study, the theory of mental self-government is adopted as a theoretical framework for exploring the association between academics' thinking styles and their job satisfaction.

Sternberg's theory of mental-self-government has broadly been employed and its inventories have been also confirmed its validity in several research and cultural contexts. As such, this theory has been confirmed to have practical implications in both multifaceted organisational and educational research contexts. Although numerous research studies have established the relationship between styles and job satisfaction, most of such research, particularly those on thinking styles have been centred on areas other than university academics and job satisfaction. For example, whether or not students' thinking styles make a difference in their academic performance (see e.g., Bernardo et al. 2002; Grigorenko and Sternberg 1997; Kim and Michael 1995) are some of a few existing studies in areas other than HE. Other studies (see e.g., Zhang 2002c), explored the association between thinking styles and modes of thinking (i.e., analytic, Integrative, and holistic) students' academic performance and between thinking styles and emotional intelligence (Murphy and Janeke 2009). Similarly, other studies (see e.g., Zhang 2002b, 2006) have focused exclusively on the association between university students' thinking styles and the Big Five personality traits (i.e., Extroversion, Neuroticism, Openness to Experience, Agreeableness, and Conscientiousness).

Several other studies on the association between thinking styles and other research variables have been carried out in numerous research cultures and contexts. For instance, the relationship between university students' thinking styles and cognitive development (Zhang 2002a); the association among students' self-efficacy for learning, thinking styles, and academic performance (e.g., Al-Thani et al. 2014); thinking styles and university students' course satisfaction (e.g., Betoret 2007);

the association among university students' learning styles (LS) and thinking styles (TS), and if the two could predict academic achievement (see e.g., Cano-García and Hughes 2000). Likewise, other scholars (see e.g., L. F Zhang and Sternberg 2000) explored the association between learning approaches and thinking styles and Park et al. (2005) examined the relationships between students' thinking styles of gifted students and scientific giftedness. While Zhang (2002c) explored the influence of students' thinking styles on students' preferred teaching styles and their perceptions of teachers' effectiveness, a year later, Zhang and Postiglione (2001) in their study, explored the association among thinking styles, self-esteem, and socio-economic status of university students in Hong Kong. Their findings showed that regardless of age, students who employed thinking styles that are creativity-generating and more complex, and those who reported higher self-esteem tended to be students from higher social economic status families. Of particular interest, is the study by Zhang et al. (2019), who examined the role of doctoral students' thinking styles in their program satisfaction and perceived intellectual competence. Results, as measured by the Thinking Styles Inventory—Revised II, indicated that doctoral students' thinking styles statistically significantly predicted their program satisfaction and perceived intellectual competence. Another study (see e.g., Sun et al. 2013) examined the influence of students' thinking styles on design strategies.

Additionally, Zhang et al. (2022) examined the relationships between university students' thinking styles and their vocational identity in China. Results revealed that in-depth (i.e., specific), in-breadth (i.e., diverse) career exploration, commitment identification, commitment making, and to some extent, career flexibility, called for both creativity-generating thinking styles and norm-favouring styles, particularly the former. As such, Liliweri (2017) explored the correlation among the thinking style, communication style, and learning style of postgraduate (graduates and postgraduates) students. More importantly, Santos, Horta, and Zhang (2020) studied the association between social sciences academics' thinking styles and research agendas in Hong Kong. Despite all these studies, only a few extant research examined the relationships between thinking styles and job satisfaction, and both were among school teachers (see e.g., Wen 2007), Li et al. (2021). However, research on the association between academics' thinking styles and academics' job satisfaction in higher education (HE) organisations do not exist, therefore signalling the necessity for a study that interrogates the two variables together.

Methods

Participants

University faculty with work experience of at least one year serving as university teachers from Tanzanian public and private universities (N = 411) were recruited through convenience sampling technique. Of the 411 respondents, 310 (75.4%) were males and 101 (24.5%) were females aged between 24- and 67 years; (M = 1.24, SD = 0.43). According to scholars (see e.g., Bornstein, Jager, & Putnick, 2013; Bornstein, 2017) convenient sampling is the least time-intensive, easiest, and less

costly sampling technique to implement. Notwithstanding these reasons, the sample of the current research was representative of both male and female Tanzanian academics because it reflected the skewness towards male academics more than females. For example, according to available recent data, female academics in Tanzania constitute only 24.6% while males constitute 75.3% of the total population of academics in the country (TCU, 2019). Discipline-wise, of the 411 respondents, 122(29.9%) were in mathematics and natural sciences while 286 (70.1%) were in humanities and social sciences. Of particular interest, the overall academic profiles of participants were more skewed towards the lower academic ranks because the research sample constituted 2(0.5%) full professors, 4 (0.9%) associate professors, 14 (3.4%) senior lecturers, 97 lecturers (23.8%), 223 assistant lecturers (54.7%) and 68 (16. 7%) tutorial assistants. Overall, the sample for the present study reflected the academic profiles of Tanzanian university faculty which appear to be more skewed towards the lower academic ranks with fewer numbers for those in senior academics rank particularly at the professoriate.

Measures

In the current study, academics completed a paper-based self-report questionnaire consisting of three sections to elicit information about their thinking styles and job satisfaction. The first section collected participants' demographic information such as gender, marital status, age, academic rank, university type, work experience, and primary discipline. Section two consisted of a 7-point Likert scale questionnaire to measure academics' thinking styles. Lastly, Section three consisted of 7-point Likert scale statements for measuring job satisfaction among respondents. Participants rated themselves on a 7-point scale ranging from 1, indicating that the statement does not represent them at all, and 7, which shows that the statement represents them exceedingly well. Previous studies have demonstrated adequate reliability and validity data for both TSI-R2 and MSQ-short.

Procedures

Before the commencement of data collection, research ethics approval for the current study was sought from the University of Hong Kong where the first author was a research postgraduate student and the four participating universities in Tanzania. All participants were briefed about the research aims and that taking part in the study had no negative effects or risks, and they were requested to take part in this study. Those who willingly accepted the request were served with the self-report questionnaire in hard copy to fill out. Academics were further informed that their participation in this research was voluntary, and an information sheet instead of a consent form was conditional for all academics who accepted to take part in this study. To further protect participants, anonymity was guaranteed through the researcher refraining from using any identifiable information on the questionnaires in addition to analysing data on a group basis. Only participants with at least one year of work experience were allowed to take part in this study. To complete the

self-report questionnaire, it took participants about 20 to 30 min based on field pilot findings carried out before actual fieldwork.

Analysis

The Statistical Package for the Social Sciences (SPSS), version 25, was employed for data entry, storage and analysis. The reliability of the research Inventory for this research was examined through estimations of internal consistency, calculated by computing Cronbach's alphas. The fact that until conducting the present research, thinking styles and Minnesota Satisfaction Questionnaire (MSQ) were being used among academics in Tanzania for the first time, the factor structures (i.e., validity) of the two research inventories (MLQ-5 × short and MSQ-short) were examined using exploratory factor analysis (EFA). I also conducted correlation analyses to establish whether or not there was a significant relationship between academics' thinking styles and job satisfaction. To examine the significant predictors of academics' job satisfaction from their thinking styles, data were analysed using hierarchical multiple regression, in which for all analyses, where $p < 0.05$, was considered statistically significant.

Results

Psychometric properties of the inventories

To achieve the stated study objectives, in this study I employed two research inventories (i.e., TSI-R2 and MSQ-short). Therefore, in this section, I report the psychometric properties of the two research inventories. Given that all two inventories employed, (i.e., TSI-R2, and MSQ) were not commonly used in Tanzania, both factor structure and reliability tests were performed. Whilst exploratory factor analysis (EFA) was used to examine the factor structure of the two research inventories, Cronbach's alpha coefficients were used to estimate the reliability of the inventories.

Thinking Styles Inventory-Revised II (TSI-R2)

Even though there have been some improvements in the reliabilities for oligarchic and anarchic scales, especially in the Chinese and Lithuanian research contexts (see e.g., Gaiduk 2015; Zhang 2009; Zhang 2010; Zhu 2013), in the present study, the two scales (i.e., oligarchic and the anarchic) were excluded due to their comparatively low reliabilities reported in some earlier research (see e.g., Fjell & Walhovd 2004; Lee 2002; Murphy and Janeke 2009; Tse 2003; Zhang 2004a, 2004b, 2005, 2008). Consequently, the theoretical model for TSI-R2 in the present study could be the 11-factor solution.

Scale factor structure The results from an exploratory factor analysis (EFA) for the TSI-R2 for item-level supported the 11-factor model (see Table 1). EFA was

Table 1 Factor structure of the Thinking Styles Inventory-Revised II (TSI-R2)

	Component										
	1	2	3	4	5	6	7	8	9	10	11
TSI-25	.69										
TSI-33	.68										
TSI-19	.63										
TSI-56	.63										
TSI-38		.80									
TSI-48		.81									
TSI-61		.79									
TSI-7		.76									
TSI-18		.75									
TSI-34			.85								
TSI-17			.78								
TSI-46			.77								
TSI-41			.73								
TSI-32				− .86							
TSI-10				− .86							
TSI-49				− .68							
TSI-14				− .56							
TSI-63					.79						
TSI-37					.78						
TSI-15					.77						
TSI-55					.70						
TSI-8						.93					
TSI-39						.93					
TSI-11						.91					
TSI-12						.48					
TSI-20							.78				
TSI-42							.77				
TSI-57							.75				
TSI-23							.72				
TSI-51							.66				
TSI-2								.77			
TSI-60								.76			
TSI-43								.74			
TSI-54								.48	− .40		
TSI-50	.36							.40			
TSI-62									.80		
TSI-24									.72		
TSI-44									.63		
Local-1								.36	.49		
TSI-13										− .72	
TSI-26										− .66	

Table 1 (continued)

	Component										
	1	2	3	4	5	6	7	8	9	10	11
TSI -36	.32									− .65	
TSI-31										−.50	
TSI-28										− .46	
TSI-65											− .72
TSI-64											− .68
TSI-45											− .65
TSI-53											− .56
TSI-9											

conducted using principal axis factoring with direct rotation. The process forcibly extracted 11 components. The 11 components explained 65.6% of the total variance in the data set. The EFA indicated that the Kaiser–Meyer–Olkin measure of sampling adequacy (KMO) was 0.85 suggesting that the factor analysis was suitable for this data set (Tabachnick and Fidell 2007). Except for seven (7) items, most of them loaded on their theoretically expected factors. However, one item loaded in factors other than their theoretically expected factors. Specifically, item 31 (i.e., executive), a Type II style loaded on the conservative scale (i.e., a Type II style). This item was excluded in all the subsequent analyses due to this weakness. Additionally, six items had loadings lower than the cut-off point of 0.32 as suggested by Worthington and Whittaker (2006). These items include items 9 (internal) and 3 (external) both a Type III style. Others were items 4 (hierarchical), 5 (legislative), and 58 (liberal), all Type I styles as well as item 6 (local), a Type II style. These items were also excluded from all subsequent analyses because of this weakness. Four other items had cross-loading problems. Specifically, items 1 (local), 36 (conservative), 50 and 54 (both monarchic) had a cross-loading problem. Worthington and Whittaker (2006) argued that items with cross-loadings only be deleted if cross-loadings are less than 0.15 difference from an item's highest factor loading (p.823). Therefore, because for item 36, the difference between the actual loading value and cross-loading item was above 0.15, this item was retained. However, items 1, 50, and 54 had a loading difference from the cross-loading items below 0.15. with reference to Worthington and Whittaker (2006), items 1,50, and 54 were excluded from the rest of the analyses. After excluding items with anomalies, the remaining 46 items were included in the remaining analyses. Tables 1 and 2 summarises the results of the exploratory factor analysis for Thinking Style Invetory-Revised II (TSI-R2) and Minnesota Satisfaction Questionnaire (MSQ-Short) respectively.

Scale reliability The reliability test was performed on the 46 remaining items of TSI-R2 which exhibited very good reliability. Based on the reliability test through Confirmatory Factor Analysis (CFA), overall, the TSI-R2 had satisfactory reliability, due to its calculated Alpha coefficient for all 11 components ranging between 0.64 and

Table 2 Factor structure for minnesota satisfaction questionnaire

S/N		Factors	
		Intrinsic 1	Extrinsic 2
1	Intrinsic-9	.83	
2	Intrinsic-3	.81	
3	Intrinsic-15	.81	
4	Intrinsic-2	.80	
5	Intrinsic-1	.80	
6	Intrinsic-8	.74	
7	Intrinsic-16	.71	
8	Intrinsic-10	.69	
9	Intrinsic-7	.69	
10	Intrinsic-11	.67	
11	Extrinsic-13		.90
12	Extrinsic-5		.89
13	Extrinsic-14		.77
14	Extrinsic-19		.68
15	General-18		.62
16	Extrinsic-12		.60
17	General-17		.58

0.88 which was very good based on criteria cited by George and Mallery (2003), but also similar to the results from earlier studies (see e.g., Higgins & Zhang 2009; Zhang 2009; Zhang, 2010).

Minnesota satisfaction questionnaire (MSQ-short)

Scale Factor Structure. After the pilot study, the Minnesota Satisfaction Questionnaire was modified hence remaining with only 17 out of 20 original items. Therefore, owing to the modifications made after the pilot study, it was still imperative to perform an Exploratory Factor Analysis (EFA) to further examine the factor structure during the main study. Based on the prior theoretical model and the scree plot as a standard for the selection of components, two factors (i.e., intrinsic and extrinsic components) were forcibly extracted using principal component analysis as an extraction method with Oblimin rotation. The two extracted factors accounted for 58.7% of the total variance in the Minnesota Satisfaction Questionnaire (MSQ-short). The EFA indicated that the Kaiser–Meyer–Olkin measure of sampling adequacy (KMO) was 0.82 suggesting that the sample was suitable for factorability.

Scale reliability Based on the reliability test through Confirmatory Factor Analysis (CFA), overall, the inventory had satisfactory reliability, due to its calculated Cronbach's Alpha value of 0.92 with retention of 17 question items (N = 411). According to George and Mallery (2003), both two scales had acceptable internal scale reliability (i.e., intrinsic satisfaction with an alpha value of 0.92 while extrinsic satisfaction had an alpha value of 0.86). The results of the two-factor model are comparable to

the results from previous studies carried out in diverse population samples (see e.g., Hirschfeld 2000; Martins and Proença, 2012; Negussie and Demissie 2013; Saner and Eyüpoğlu 2012; Sharp 2008).

Descriptive statistics on the key variables

Tabachnick and Fidell (2007) argued that conventional inference tests are not always appropriate for large samples. They further argued that, in large samples, if conventional p values are used (i.e., 0.01 or 0.001), it is likely to be regarded as non-normality with only slight variations. Therefore, to avoid such weakness, in the present research with a large sample size of above 400 academics, absolute values of skewness and kurtosis were employed to establish the data normality. To determine considerable data normality for a sample size larger than 300, Mishra et al. (2019) argued that an absolute skewness value ≤ 2 or an absolute kurtosis ≤ 4 may be used as a determinant of normality. Furthermore, Byrne (2013) argued that for a larger sample size, the skewness and kurtosis values less than 2.00 and 7.00 respectively would suggest that data are normally distributed. Therefore, using any of the standards stated above, suggests that all the data in this research were normally distributed. Table 3 presents the details of descriptive statistics for all four key research variables.

The relationships between academics' thinking styles and job satisfaction

The correlation between academics' thinking styles and academics' job satisfaction is presented in Table 4. Results showed that except for global (a Type I style), the rest of Type I thinking styles had statistically significant positive correlations with both intrinsic and extrinsic job satisfaction.

Table 3 Descriptive statistics of the key variables

Construct	Dimension	Range	Mean	SD	Skewness	Kurtosis
Thinking styles	Conservative	10.0	7.20	2.33	0.4	− 0.5
	Executive	10.3	7.83	2.76	0.1	− 0.8
	External	18.5	17.82	3.32	− 1.3	1.8
	Global	17.2	7.57	2.81	1.4	4.0
	Hierarchical	19.5	15.98	4.19	− 0.5	− 0.1
	Internal	18.3	17.60	2.84	− 1.3	3.5
	Liberal	19.5	16.17	3.86	− 0.6	0.2
	Local	9.75	7.68	2.24	0.1	− 1.1
	Monarchic	14.0	12.20	2.99	− 0.7	0.4
	Judicial	25.2	21.90	4.74	− 0.8	1.1
	Legislative	19.5	15.83	3.88	− 0.5	0.4
Job satisfaction	Intrinsic Satisfaction	54.6	47.40	9.51	− 0.8	1.5
	Extrinsic Satisfaction	38.0	31.29	6.62	− 0.5	0.6

Table 4 Partial correlation between thinking styles and job satisfaction

	Range	Mean	1	2	3	4	5	6	7	8	9	10	11	12	13
Judicial	21.4	17.8	–												
Conservative	12.8	10.3	.304**	–											
Executive	10.25	10.1	.390**	.235**	–										
External	18.5	17.8	.314**	.281**	.149**	–									
Global	13.0	9.0	− .114*	− .106*	− 0.06	0.075	–								
Hierarchical	19.5	16.0	.442**	.113*	.480**	.226**	− 0	–							
Internal	22.0	22.8	.315**	.178**	.282**	.191**	− 0	.336**	–						
Liberal	19.5	16.2	.426**	.231**	.325**	.190**	− 0	.455**	.358**	–					
Local	9.75	7.68	.291**	0.07	.378**	0.039	− 0	.412**	.138**	.201**	–				
Monarchic	26.2	20.3	.530**	.231**	.444**	.295**	− 0	.518**	.304**	.452**	.355**	–			
Legislative	16.25	12.7	.401**	.175**	.311**	.098*	− 0.1	.360**	.223**	.520**	.173**	.327**	–		
Intri-Satis	54.6	47.4	.837**	.287**	.396**	.327**	− 121*	.472**	.342**	.467**	.291**	.552**	.447**	–	
Extri-Satis	38.0	31.3	.493**	.206**	.363**	.149**	− 0.1	.443**	.301**	.603**	.256**	.419**	.711**	.537**	–

Intr-Satis intrinsic job satisfaction; Extri-Extrinsic job satisfaction

*$p < .05$, **$p < .01$, ***$p < .001$

These results imply that academics who scored higher on Type I thinking styles had higher job satisfaction. Unexpectedly, all Type II thinking styles (i.e., executive, monarchic, conservative, and local) were statistically significantly positively correlated with all two dimensions of job satisfaction (i.e., intrinsic and extrinsic job satisfaction). Such results suggest that academics who scored higher on Type II styles also had higher job satisfaction. Additionally, Type III styles (i.e., internal and external styles) also had a statistically significant correlation with all dimensions of job satisfaction. It is important to note that, notwithstanding both Types I and II styles positively relating to job satisfaction, the magnitudes of the correlation coefficients for Type I styles were higher than those for Type II styles. Overall, the hypothesis was largely supported although with unexpected results of some dimensions not supporting the hypothesis.

Predicting academics' job satisfaction from thinking styles

To examine the predictive power of thinking styles on academics' job satisfaction, hierarchical multiple regression was performed while controlling for relevant demographic variables (i.e., age, academic rank, sex, university type, work experience, and primary discipline). The results (see Table 5) indicated that both intrinsic and

Table 5 Predicting academics' job satisfaction from thinking styles, controlling demographics

JS		Intrinsic Satisfaction	Extrinsic Satisfaction
R2		0.61	0.45
Total			
R2		0.01	0.01
demo			
R2		0.60	0.44
TS			
F		236.71***	166.24***
df		7, 407	7, 407
	βglobal		
Type I	βhierarchical		.05*
	βliberal		.11***
	βjudicial	.88***	.09***
	βlegislative	.06**	.79***
Type II	βconservative		
	βexecutive		
	βlocal		
	βmonarchic	.05*	.04*
Type III	βinternal		
	βexternal		

TS thinking styles; *JS* job satisfaction

*$p < .05$, **$p < .01$, ***$p < .001$

extrinsic job satisfaction were positively predicted by several scales of Type I and II thinking styles ranging from 1 to 60%. The Type I styles (legislative, hierarchical, judicial, and liberal) positively predicted intrinsic job satisfaction. For example, Type I thinking styles accounted for 59% and 43% of intrinsic and extrinsic job satisfaction respectively. At the same time, the Type II style also predicted both intrinsic and extrinsic job satisfaction. For example, Type II thinking styles explained 25% and 43% of intrinsic and extrinsic job satisfaction respectively. Moreover, Type I styles (legislative, and judicial) positively predicted academics' extrinsic job satisfaction while Type II style (the monarchical) also positively predicted extrinsic job satisfaction.

Specifically, the liberal style made a unique contribution of 22.6% to intrinsic job satisfaction. At the same time, the hierarchical style accounted for 22.5% while the legislative style explained 19.8% of the variance in intrinsic job satisfaction. Similarly, the monarchic (i.e., Type II style) accounted for 26.7% of the total variance in intrinsic job satisfaction. In the same vein, the legislative and judicial styles (i.e., Type I styles) respectively accounted for 34.1% and 24% of the total variance in extrinsic job satisfaction, and the monarchical (i.e., Type II style) explained 19% of the variance in extrinsic job satisfaction. Although both Type I and II thinking styles positively and uniquely contributed to job satisfaction, the effect size of Type I was relatively stronger than that of Type II thinking styles. These results may suggest that individuals with a propensity for the use of styles (i.e., successful intellectual styles) are more satisfied with their job. Overall, Type I styles uniquely predicted intrinsic job satisfaction more than did Type II styles. Table 5 summarises the results on the contribution of thinking styles to academics' job satisfaction.

Discussion

Academics' thinking styles and their job satisfaction

One of the ongoing debates in the field of intellectual styles in the last several decades is the effect of intellectual styles on human behaviour and performance across several spheres of an individual's daily activities (see e.g., Zhang & Sternberg, 2009). For example, how intellectual styles affect employees' job satisfaction (see e.g., Abraham 1997; Smith 2006) and how do thinking styles account for university students' course satisfaction (e.g., Betoret 2007) are some of the shreds of evidence on the role of intellectual styles in human behaviour and performance. To contribute to this ongoing conversation, this study also examined the relationship between academics' thinking styles and their job satisfaction. As can be noted in Table 5, although both Types I and II thinking styles predicted academics' job satisfaction, the regression model showed that, of the four components of Type II thinking styles, only one component (i.e., the monarchic) predicted academics' job satisfaction. On the contrary, of the five Type I styles, four (i.e., judicial, liberal, hierarchical, and legislative styles) were significantly related to external job satisfaction while two (i.e., judicial and legislative styles) were related to internal job satisfaction. More importantly, the effect size of the monarchic style (i.e., a Type II thinking style)

on job satisfaction was not as strong as the Type I thinking styles which were very strong for both intrinsic and extrinsic job satisfaction. Notwithstanding the relationships between Type I and II with dimensions of both internal and external job satisfaction, Type III thinking styles did not relate to any of the two dimensions of job satisfaction. Perhaps, this is because theoretically, Type III thinking are found in people who manifest the features of both Type I and II styles, depending on the stylistic need of the specific task (Zhang 2017; Zhang & Sternberg 2005).

Overall, the positive association between Type I thinking styles and job satisfaction showed that academics who tended to employ Type I thinking styles also tended to be more satisfied with their job than those who employed Type II thinking styles. For instance, the regression model indicated that academics who scored higher on the liberal style (i.e., Type I thinking style) also tended to score higher on extrinsic job satisfaction. Perhaps because people who like to try to do novel things (i.e., employing the liberal style) adapt to the work environments well and become more contented with their job. Similarly, the regression model also showed that those who scored higher on the legislative style (i.e., Type I style) also tended to score higher on both intrinsic and extrinsic job satisfaction.

Three plausible explanations can be offered regarding why academics higher in Type I styles are more satisfied with their job than academics higher in Type II styles. First, perhaps because in academia, most of the core responsibilities of teaching, research, and public service require one to accomplish them using creative and innovative strategies (i.e., liberal style) which is a typical Type I style. Therefore, academics higher on liberal style are likely to enjoy or be contented with their job (i.e., job satisfaction). Second, maybe because most academic works require evaluation and judgement (i.e., judicial style) especially marking, classroom teaching, and review or evaluation of journal articles and student theses make those who are higher on judicial style enjoy their job. Third, the academic profession also is one of the professions whose responsibilities require one to be well organised, systematic, and perform it in an orderly manner in terms of following procedures (i.e., hierarchical style). For instance, this is evident particularly in research, carrying out experiments and even teaching. Therefore, academics who prefer such responsibilities that require academics to be organised, systematic, and perform their duties in an orderly manner are likely to be satisfied with their job. A study by Betoret (2007) on students' thinking styles and their course satisfaction provides a similar finding in which students who were higher on Type I styles also tended to be more satisfied with their course than Type II style students. Likewise, for the case of Type II styles, even though positive associations between some Type II styles (i.e., monarchic) and job satisfaction were found in the regression model, the effect size of such a relationship was not as strong as Type I styles. Based on the study hypothesis, such a result was not expected. Perhaps people who work on tasks that allow complete focus on one thing at a time (i.e., monarchic) may to a smaller extent be happy with their job. However, since the effect size for the association between the monarchic style (i.e., Type II style) and job satisfaction was not strong, this result cannot be conclusive of the existing relationship and further research with a diverse sample be employed.

Theoretically, these findings broadly lend support to some of the existing literature on the relationships between intellectual styles (i.e., thinking styles) and employees' job satisfaction (Abraham 1997; Smith 2006). While these findings may appear not to fully support the present research hypotheses because both Type I and II thinking styles predict academics' job satisfaction, these findings also may suggest that participants have attained successful intellectual styles. According to Zhang (2015), individuals with a propensity for employing a wide range of intellectual styles—always including Type I intellectual styles are considered to have successful intellectual styles. Based on the results of the present research and the concept of successful intellectual styles, academics' job satisfaction can be fostered by cultivating individuals' use of a wide range of intellectual styles but always including Type I styles. Therefore, these findings suggest two important implications for university managers in fostering academics' job satisfaction. First, fostering the use of successful intellectual styles among academics through training. Second, while university management trains their academics for successful intellectual styles, they should put more emphasis on nurturing Type I intellectual styles because it has a strong effect size on both types (i.e., intrinsic and extrinsic) of job satisfaction than Type II and III styles. Fostering successful intellectual styles among academics would mean fostering their job satisfaction.

Conclusions

The following research question was used as a roadmap for achieving the purpose of the present study. (1). "Do academics' thinking styles predict academics' job satisfaction? Based on the above research question that guided the present study, overall, the findings of this study warrant one major conclusion. Generally, both Type I and II styles were positively significantly related to job satisfaction albeit a weak relationship between Type II thinking styles and job satisfaction. Generally speaking, academics higher on Type I thinking styles scored relatively higher on both intrinsic and extrinsic job satisfaction than did Type II styles. It is also worth concluding that there was a statistically significant positive relationship between academics' Type I thinking styles and their job satisfaction. It is important however to note that, the magnitude of prediction to job satisfaction was relatively higher for academics' who scored higher on Type I styles than did Type II thinking styles.

Contributions

Based on the research questions which guided the present study, four major aspects of contributions can be discussed from this research:—(1) contributions to the relationship between academics' thinking styles and their job satisfaction; (2) empirical support to Sternberg's (1988, 1997) theory of mental self-government and (3) contributions to the understanding of what thinking styles should the top university leadership promote for academics' job satisfaction.

First, one of the key accomplishments of this study is that it offers a fresh understanding of the reliability and validity of two research inventories (i.e., TSI-R2

and MSQ-short) for examining the relevant research variables among Tanzanian university academics. Moreover, in the present research validation of some western and Asian inventories was made to suit the Tanzanian context. For example, the Thinking Styles Inventory-Revised II, and the Minnesota Satisfaction Questionnaire (MSQ-short) by Weiss, Dawis, & England, (1967) were used for the first time among academics in Tanzania higher education. The validation and subsequent amendment of the research inventories in this research offer additional psychometric evidence of their validity and reliability hence assisting the further adaption of these inventories among academics in Tanzania in particular and Africa in general.

Second, and most notably, notwithstanding its shortcomings, the present research examined the association between academics' thinking styles and their job satisfaction. Certainly, the present research offers a significant, valuable, and unique contribution to furthering our understanding regarding the influence of academics' thinking styles on job satisfaction. Specifically, the findings of the present research have extended our understanding of the importance of some dimensions of academics' thinking styles in fostering academics' job satisfaction. These findings, particularly the understanding of the existing relationships between academics' thinking styles and job satisfaction (i.e., intrinsic and extrinsic) can help academic leaders in HE to establish ways of improving faculty job satisfaction by training them in Type I styles.

Third, this study offers empirical support to the theories on which this research is based. For example, the present research established a combined function of academics' thinking styles, in fostering academics' job satisfaction, which supports Sternberg's (1988, 1997) theory of mental-self-government. The major argument of Sternberg's (1988, 1997) theory of mental-self-government is that "just like in governments where there are many ways of governing the society, there are many ways of governing or managing our activities". Therefore, based on the findings of the present research, academics' job satisfaction is a function of their thinking styles.

Fourth, the present research is important for the understanding of other theoretical ideas involved in the present research. For instance, this research advances support for the usefulness of Sternberg's (1988) theory of mental-self-government by offering an empirical suggestion on the useful contributions of several aspects of thinking styles to academics' job satisfaction. The function of academics' thinking styles on academics' satisfaction identified in this research lends empirical support to Sternberg's (1988, 1997) theory of mental self-government.

Implications for university management

The present study has several implications for university leadership and management practice. The present research largely offers insights into one key practical concern regarding what sort of thinking styles ought to be promoted among academics for their job satisfaction.

The findings of this study revealed that academics' thinking styles predicted their job satisfaction over and above demographic characteristics. While these findings on the influence of academics' thinking styles on their job satisfaction offer insights

into what type of thinking styles should be promoted among university faculty for their job satisfaction, the findings broadly imply that Type I styles can promote the levels of academics' job satisfaction through training of academics to Type I styles. Overall, it is perhaps certain that Type II styles also is essential in promoting academics' job satisfaction. While keeping this viewpoint in mind, university leadership and management practice should focus on training university faculty in Type I styles than Type II and III styles.

Limitations

Notwithstanding their important theoretical and research contributions, as well as practical university leadership and managerial implications, the findings of this research need to be understood and used in light of some shortcomings. Such shortcomings or limitations lie in four aspects: (1) the self-reported data; (2) the cross-sectional design with a single survey; (3) the research inventories that may require validation, and (4) the limitation based on the type of the participants sampled.

First, the findings of the current research were based on self-reported data. Scholars (see e.g., Meier and O'Toole Jr 2013) indicated that self-reported responses as the one employed in the present research could have common method bias (CMB). Besides, research data obtained from self-reported measures are deemed not to offer accurate data like behavioural measures. Furthermore, self-reported inventories have been said to easily introduce unfavourable common method variances which may be a result of the shared reporter and content overlap between unlike scales, hence heavily criticised by scholars, consequently slanting the associations between variables to a certain degree. Therefore, the data obtained through self-reported inventories unescapably provided some subjective research results. Additionally, self-reported data as is the case for quantitative research are not always reliable similar to data obtained across behavioural measures for the reason that the self-reported data may be inflated by socially favourite responses. Based on these arguments, the established effect of academics' thinking styles on academics' job satisfaction needs to be understood with caution.

Second, although cross-sectional design in the quantitative part is one of the most preferred research designs by researchers, it is not superior to longitudinal studies, especially in terms of inferring causal relationships. Therefore, the academics' thinking styles which were used as the predictor constructs and their job satisfaction as a predicted or criterion variable respectively, their statistically meaningful results found simply show a correlational association, rather than causative relationships. Additionally, although this research was not a longitudinal study, but rather a cross-sectional study, only a single survey for data collection was employed, suggesting that it could not overcome well the problem of random error.

Third, is the limitation of the nature and sampling strategy employed in the present research. The sample of the present study was limited to only university academics while excluding the administrative and support staff, and university management officials working in Tanzania's higher education. The study also involved a sample of academics from a developing country, sub–Saharan Africa which might

have a quite different academics' work environment from other countries in Europe, America, Asia, and Australia that subsequently affected their job satisfaction. Therefore, the findings reported in this research can hardly be generalized to the job satisfaction of all employees/academics in Tanzania's higher education sector and those of countries other than Tanzania. Moreover, this research employed a convenient sampling rather than a random sampling strategy to obtain the participants for this research. Therefore, the interpretation of the findings of the present research requires caution regarding the possible sampling bias inherent in the sampling procedures.

Acknowledgements I would like to express my special thanks to all the academics from Tanzanian universities who took part in this study.

Author contributions The main author of this paper, SJM designed the study, collected primary data, did the analysis and wrote the results, discussion, policy implications and conclusion sections.

Funding This study received no funding from any funding organisation.

Data availability Data on which this paper is based will be made available upon reasonable request to the corresponding author.

Declarations

Conflict of interest The author(s) declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Ethical approval This research obtained ethics approval (i.e., ethics approval number EA 1805028) from the Human Research Ethics Committee of the University of Hong Kong.

Informed consent I confirm that informed consent was obtained from all participants in the study and they were given an information sheet to read before consenting to take part in the study.

References

Abraham R (1997) Thinking styles as moderators of role stressor-job satisfaction relationships. Leadersh Org Dev J 18(5):236–243. https://doi.org/10.1108/01437739710182377

Albert C, Davia MA, Legazpe N (2018) Job satisfaction amongst academics: the role of research productivity. Stud High Educ 43(8):1362–1377

Al-Thani A, Al-Thani T, Semmar Y (2014) Investigation the relationship between students thinking styles, self-efficacy, for learning, and academic performance at Qatar University. Am Int J Soc Sci 3(2):172–179

Ayala Y, Peiro Silla JM, Tordera N, Lorente L, Yeves J (2017) Job satisfaction and innovative performance in young Spanish employees: testing new patterns in the happy-productive worker thesis—a discriminant study. J Happiness Stud 18(5):1377–1401

Bernardo AB, Zhang LF, Callueng CM (2002) Thinking styles and academic achievement among Filipino students. J Genet Psychol 163(2):149–163. https://doi.org/10.1080/00221320209598674

Betoret FD (2007) The influence of students' and teachers' thinking styles on student course satisfaction and on their learning process. Educ Psychol 27(2):219–234

Bornstein MH (2017) The specificity principle in acculturation science. Perspect Psychol Sci 12(1):3–45

Bornstein MH, Jager J, Putnick DL (2013). Sampling in developmental science: Situations, shortcomings, solutions, and standards. Develop Rev 33(4):357–370

Byrne BM (2013) Structural equation modeling with LISREL, PRELIS, and SIMPLIS: Basic concepts, applications, and programming. Psychology Press, London
Cano-García F, Hughes EH (2000) Learning and thinking styles: an analysis of their interrelationship and influence on academic achievement. Educ Psychol 20(4):413–430. https://doi.org/10.1080/713663755
Crowley-Vigneau A, Kalyuzhnova Y, Baykov A (2022) World-class universities in Russia: a contested norm and its implementation. J Stud Int Educ. https://doi.org/10.1177/10283153221105322
Darwin S, Barahona M (2023) Globalising or assimilating? Exploring the contemporary function of regionalised global university rankings in Latin America. Higher Educ. https://doi.org/10.1007/s10734-023-01007-x
Fan J (2020) Thinking styles: identity, value, and malleability. Cambridge Scholars Publishing
Fan J, Zhang L-F (2014) The role of learning environments in thinking styles. Educ Psychol 34(2):252–268
Fjell AM, Walhovd KB (2004) Thinking styles in relation to personality traits: an investigation of the thinking styles inventory and NEO-PI-R. Scand J Psychol 45(4):293–300
Gaiduk J (2015) Thinking styles and parental relationship as predictors of implicit theories of relationships. Regent University, Virginia Beach
George D, Mallery M (2003) Using SPSS for Windows step by step: a simple guide and reference. Allyn & Bacon, Boston, MA
Glaveli N, Karassavidou E, Zafiropoulos K (2013) Relationships among three facets of family-supportive work environments, work–family conflict and job satisfaction: a research in Greece. Int J Hum Resour Manag 24(20):3757–3771
Grigorenko EL, Sternberg RJ (1997) Styles of thinking, abilities, and academic performance. Except Child 63(3):295–312
Hirschfeld RR (2000) Does revising the intrinsic and extrinsic subscales of the Minnesota Satisfaction Questionnaire short form make a difference? Educ Psychol Measur 60(2):255–270
Kim J, Michael WB (1995) The relationship of creativity measures to school achievement and to preferred learning and thinking style in a sample of Korean high school students. Educ Psychol Measur 55(1):60–74
Ko YJ, Choi JN (2019) Overtime work as the antecedent of employee satisfaction, firm productivity, and innovation. J Organ Behav 40(3):282–295
Lee, K.-l. (2002). Thinking styles and approaches in teaching among Hong Kong kindergarten teachers. *HKU Theses Online (HKUTO)*.
Li J, Yao M, Liu H, Zhang L (2021) Influence of personality on work engagement and job satisfaction among young teachers: mediating role of teaching style. Curr Psychol. https://doi.org/10.1007/s12144-021-01565-2
Liliweri A (2017) An analysis on the relationship of thinking and learning styles with communication style. Intern J Sch Cogn Psychol. https://doi.org/10.4172/2469-9837.1000192
Martins H, Proença T (2012) Minnesota satisfaction questionnaire–psychometric properties and validation in a population of Portuguese hospital workers. FEP J–Econ Manag: Work Pap 471(1):1–23
Meier KJ, O'Toole LJ Jr (2013) I think (I am doing well), therefore I am: assessing the validity of administrators' self-assessments of performance. Int Public Manag J 16(1):1–27
Mgaiwa SJ (2021) Academics' job satisfaction in Tanzania's higher education: the role of perceived work environment. Soc Sci Humanit Open 4(1):100143
Mgaiwa SJ (2023) Predicting academics' job satisfaction from their perceived leadership styles: evidence from Tanzania. Cogent Psychol 10(1):2156839
Mgaiwa S, Kapinga O (2021) Mentorship of early career academics in Tanzania: issues and implications for the next generation of academics. Higher Educ Pedagog 6(1):114–134
Mgaiwa SJ, Hamis YJ (2022) School principals versus teachers' expectations: the interplay between school leadership and teachers' job satisfaction in rural Tanzania. SN Soc Sci 2(12):262
Mishra P, Pandey CM, Singh U, Gupta A, Sahu C, Keshri A (2019) Descriptive statistics and normality tests for statistical data. Ann Card Anaesth 22(1):67
Murphy A, Janeke H (2009) The relationship between thinking styles and emotional intelligence: an exploratory study. S Afr J Psychol 39(3):357–375
Negussie N, Demissie A (2013) Relationship between leadership styles of Nurese managers and nurses' job satisfaction in Jimma University Specialized Hospital. Ethiop J Health Sci 23(1):50–58

Nesamvuni E (2021) Assessment of job satisfaction of lecturers who received vocational teacher training in relation to the current learner centered methodology used at a university of technology. Master's thesis, Haaga-Helia University of Applied Sciences
Otache I, Inekwe E-OI (2021) The relationship between job satisfaction, turnover intentions and performance of Nigerian polytechnic lecturers with doctorate degrees. J Appl Res High Educ 14:762–783
Park S-K, Park K-H, Choe H-S (2005) The relationship between thinking styles and scientific giftedness in Korea. J Second Gift Educ 16(2–3):87–97
Ramzan M, Usmani NK, Arain AA (2014) Effect of thinking and learning styles on students' academic achievement. J Educ Res 17:102
Saner T, Eyüpoğlu ŞZ (2012) The age and job satisfaction relationship in higher education. Procedia Soc Behav Sci 55:1020–1026
Santos JM, Horta H, Zhang LF (2020) The association of thinking styles with research agendas among academics in the social sciences. High Educ Q 74(2):193–210
Sharp TP (2008) Job satisfaction among psychiatric registered nurses in New England. J Psychiatr Ment Health Nurs 15(5):374–378
Smith JT (2006) Effective leadership in schools: Learning styles of principals as they relate to teacher job satisfaction and teacher retention (Doctor of Education Dissertation). Western Carolina University, North Carolina, p 3244815
Sternberg RJ (1988) Mental self-government: a theory of intellectual styles and their development. Hum Dev 31(4):197–224
Sun C-T, Wang D-Y, Chang Y-Y (2013) Effects of thinking style on design strategies: using bridge construction simulation programs. J Educ Technol Soc 16(1):309–320
Tabachnick, B. G., & Fidell, L. S. (2007). *Experimental designs using ANOVA*: Thomson/Brooks/Cole Belmont, CA.
TCU (2019) The state of university education in Tanzania, Tanzania Commission for Universities. Dar es Salaam
Tse PSF (2003) The relationship among thinking styles, learning approaches, value attachment, and academic performance of junior secondary school students in Hong Kong. Unpublished manuscript. The City University of Hong Kong
Wen H (2007) A research on middle school teachers' teaching styles and job satisfaction. Psychol Sci-Shanghai- 30(3):596
Worthington RL, Whittaker TA (2006) Scale development research: a content analysis and recommendations for best practices. Couns Psychol 34(6):806–838
Yudkevich M, Altbach PG, Rumbley LE (2015) Global university rankings: the "Olympic Games" of higher education? Prospects 45(4):411–419
Zhang L-F (2000) Are thinking styles and personality types related? Educ Psychol 20(3):271–283
Zhang L-F (2002a) Thinking styles and cognitive development. J Genet Psychol 163(2):179–195
Zhang L-F (2002b) Thinking styles and the big five personality traits. Educ Psychol 22(1):17–31
Zhang L-F (2002c) Thinking styles: their relationships with modes of thinking and academic performance. Educ Psychol 22(3):331–348
Zhang L-F (2004a) Revisiting the predictive power of thinking styles for academic performance. J Psychol 138(4):351–370
Zhang L-F (2004b) Thinking styles: University students' preferred teaching styles and their conceptions of effective teachers. J Psychol 138(3):233–252
Zhang L-F (2005) Does teaching for a balanced use of thinking styles enhance students' achievement? Personality Individ Differ 38(5):1135–1147
Zhang L-F (2006) Thinking styles and the big five personality traits revisited. Personality Individ Differ 40(6):1177–1187
Zhang L-F (2008) Thinking styles and emotions. J Psychol 142(5):497–516
Zhang L-F (2009) Anxiety and thinking styles. Personality Individ Differ 47(4):347–351
Zhang LF (2010) Do thinking styles contribute to metacognition beyond self-rated abilities? Educ Psychol 30(4):481–494
Zhang LF (2017) The value of intellectual styles. Cambridge University Press
Zhang L-F, Postiglione GA (2001) Thinking styles, self-esteem, and socio-economic status. Personal Individ Differ 31(8):1333–1346
Zhang LF, Sternberg RJT (2000) Are learning approaches and thinking styles related? a study in two Chinese populations. J Psychol 134(5):469–489
Zhang LF, Sternberg RJ (2005) A threefold model of intellectual styles. Educ Psychol Rev 17:1–53

Zhang LF, Sternberg RJ (2009) Revisiting the value issue in intellectual styles. Perspect Nat Intellect Styles 63–85
Zhang L-F, Horta H, Jung J, Chen G, Postiglione GA (2019) The role of thinking styles in program satisfaction and perceived intellectual competence among STEM doctoral students. J Educ Psychol 111(4):573
Zhang L-F, Fu M, Li DT (2020) Hong Kong academics' perceived work environment and job dissatisfaction: the mediating role of academic self-efficacy. J Educ Psychol 112(7):1431
Zhang L-F, Li M, Fan W, Chang B, Postiglione GA (2022) Thinking styles and vocational identity among senior-year students in elite universities in mainland China. Think Skills Creat 45:101101
Zhu C (2013) Students' and teachers' thinking styles and preferred teacher interpersonal behavior. J Educ Res 106(5):399–407