

# *Are satisfied students simply happy people in the first place? The role of trait affect in student satisfaction*

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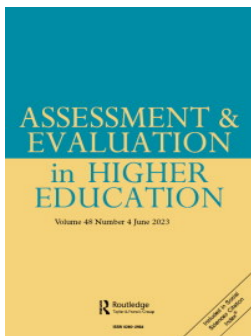
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# Are satisfied students simply happy people in the first place? The role of trait affect in student satisfaction

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## ABSTRACT


We propose and test the proposition that innate personality differences in trait affect explain significant variance in student satisfaction. Using three standard measures of trait affect and data from a student sample ( $n=409$ ) of PhD candidates across science, social science and humanities in 63 universities from 20 countries, we find that 24% of variance in student satisfaction is accounted for by trait affect. We also find that both discipline studied and research orientation of university have moderating effects on the relationship between trait affect and student satisfaction. Our findings suggest student satisfaction scores need to be viewed with caution because, in part, they merely reflect individual-level trait affect that - like all innate personality traits - academics, university administrators and education ministers alike are powerless to alter. Our findings indicate that governments, universities and other organisations gathering student satisfaction data could usefully adopt measures to control for trait affect. Our findings also raise the possibility that universities might strategically incorporate innate affect in their student selection criteria to game satisfaction ratings.

## KEYWORDS

Student satisfaction; trait affect; happiness; university rankings; PhD students

## Introduction

Student satisfaction has become both an enduring focus of scholarly research (Turner 2023) and 'a primary focus of many universities and colleges' (Wong and Chapman 2023, 958), with its assessment now 'both a component of external accountability and an internal driver of university policy' (Muijs and Bokhove 2017, 907). Scores from such assessments increasingly influence a growing number of facets of higher education, from performative pressures affecting individual academics' career progression (Thiel 2019) and professionalism (Arthur 2020) to institutional rankings (Gibbons, Neumayer, and Perkins 2015). With ever 'greater weight being ascribed to student satisfaction' (Winstone et al. 2022, 1524), growing scholarly attention has sought to assess its determinants (Lenton 2015; Santini et al. 2017; Dericks et al. 2019; Gruzdev, Terentev, and Dzhafarova 2020; Cunningham-Nelson, Laundon, and Cathcart 2021; Whelan and McGuinness 2021; Donia et al. 2022). Notwithstanding insights so far revealed, fundamental assumptions regarding student satisfaction and its determinants remain open to question and as yet unexamined.

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Two seemingly axiomatic, but flawed, premises underlie student satisfaction assessment: (i) that student satisfaction is mutable; and (ii) that it directly reflects the objective quality of higher education experienced. Following the logic of these premises, if, for example, facets of a degree programme are changed for better or worse, then student satisfaction with that degree programme will likewise change for better or worse. Hence, if student satisfaction with, say, a teacher is high, it is because that teacher is doing something right. Conversely, if students are not satisfied with a teacher, it is because that teacher is doing something wrong: the teacher's own failings have rendered students dissatisfied. Thus, student satisfaction assessment is based on the presumption that it is, first, an alterable individual-level affective state, and second, that it is directly determined by institutional factors and agents wholly extrinsic to students themselves but intrinsic to the higher education they experience.

However, the presumption that student satisfaction is a mutable affective state directly reflecting objective qualities intrinsic to experienced higher education contradicts established research on satisfaction in numerous non-education domains that suggests individuals' levels of satisfaction with most things, regardless of their objective qualities, are substantially unsusceptible to alteration even when those objective qualities change. For example, scholars have for decades found that individuals' levels of satisfaction in domains such as job and consumer satisfaction are largely immutable, remaining relatively constant despite variability in facets of jobs or consumed products (Staw and Ross 1985; Watson and Walker 1996). Research has consistently found that satisfaction in job, consumer, financial circumstance, spousal relationship and other domains is significantly the product not of objective extrinsic factors, but of innate and immutable individual personality traits, such as those comprising the five-factor model of personality and, most particularly, innate levels of trait affect (Staw, Bell, and Clausen 1986; Watson and Slack 1993; Ilies and Judge 2003; Malouff et al. 2010; Siddiqui 2012). Hence, because individuals' intrinsic, innate personalities are broadly constant, their fundamental satisfaction levels in any particular domain are likewise broadly constant and largely impervious to change regardless of any objective alteration in aspects of the extrinsic domain in question, be it a job, a product, or, as we here propose, higher education.

### ***Individual-level determinants of student satisfaction***

Institutional variables are predominantly found to account for much less variance in student satisfaction than intrinsic individual-level variables (Cheng and Marsh 2010). Arambewela and Hall (2009) find that individual differences like national background influence post-graduate student satisfaction, as do individual values such as, for example, hedonism. Muijs and Bokhove (2017, 928) find that at least 90% of variance in student satisfaction is explained by individual student-level, as opposed to institutional-level, factors, and conclude that overall student satisfaction 'may have a greater affective and psychological component than often supposed in the HE literature'.

This conclusion is consonant with research on satisfaction with a wide range of non-education experiences that suggests student satisfaction, too, will be determined, at least in part, by individual students' innate and unalterable personality traits. For example, Ilies and Judge (2003) find that around 24% of variance in job satisfaction is determined by the fundamental five-factor personality model's inherited traits of extraversion, neuroticism, conscientiousness, agreeableness and openness (Thompson 2007). Malouff et al. (2010) find in a meta-analysis that a similar proportion of spousal relationship satisfaction is accounted for by five-factor personality traits; and Siddiqui (2012) finds comparable effect sizes in relation to consumer satisfaction and certain five-factor personality traits.

In relation to higher education, students' innate personality has long been suggested and found to relate to student satisfaction (Kovacs and Kapel 1976; Hart and Driver 1978). Lounsbury

et al. (2005) find significant relationships between each of the five-factor personality traits and college satisfaction. McCann and Gardner (2014) and Wach et al. (2016) likewise find significant relationships between trait personality and student satisfaction, reinforcing Lounsbury et al.'s (2005, 707) suggestion that 'how satisfied [students] are with different aspects of collegiate experience may be primarily determined by who they are when they enter college' rather than by how good or bad the higher education they experience is.

### **Trait affect**

A fundamental aspect of innate personality making individuals who they are, and that is also generally found to influence satisfaction across numerous domains to an even greater extent than the five-factor personality model, is *trait* affect. Trait affect is the innate psychological predisposition to experience positive and negative emotion and mood across time, circumstances, stimuli and settings in a stable and predictable manner (Watson, Clark, and Tellegen 1988; Watson and Walker 1996), with its inborn nature demonstrated to account for over 50% of variance in mood and happiness in twin studies (Lykken and Tellegen 1996). Levels of intrinsic *trait* affect are broadly constant and also discrete from more ephemeral *state* affect, fluctuations of which are generally fleeting responses to transient external circumstances and stimuli (Headey 2008). Even extreme fluctuations in state affect caused by, for example, colossal lottery wins or paralysis-causing spinal injuries are found to have only a passing temporal effect on overall life satisfaction, with satisfaction returning back broadly to that determined by individuals' innate set-points of trait affect (Brickman, Coates, and Janoff-Bulman 1978; Fujita and Diener 2005; Anusic, Yap, and Lucas 2014). Meta analyses of more mundane life events like marriage, divorce, childbirth and bereavement support the tendency of positive and negative *state* affect levels to revert to set-point levels determined by innate levels of *trait* affect (Luhmann et al. 2012), with set-point satisfaction research finding that trait affect is a fundamentally stable personality characteristic (Schimmack, Diener, and Oishi 2002).

Trait affect is found to influence experienced satisfaction across multiple domains. Some 45% of variance in job satisfaction is found by Ilies and Judge (2003) to be accounted for by intrinsic trait affect; Tharp et al. (2020) find trait affect accounts for more variance in financial satisfaction than the five-factor model of personality traits; Molero et al. (2017) find significant correlations between relationship satisfaction and trait affect; and both consumer satisfaction (Meirovich, Jeon, and Coleman 2020) and pay satisfaction (Shaw et al. 1999) are likewise found to be significantly predicted by levels of intrinsic trait affect.

Trait affect can be treated as both a unidimensional construct (Bradburn 1969) or a bidimensional construct comprising discrete positive and negative dimensions (Almagor and Ben-Porath 1989). Positive trait affect tends to manifest itself in individuals' enthusiasm, energy and pleasurable engagement with their external environment, whereas negative affect tends to manifest itself in anxiety, distress and unenjoyable engagement with external environments (Watson, Clark, and Tellegen 1988). Negative trait affect influences individuals' satisfaction across multiple domains similarly because those with higher levels of negative affect tend subjectively to perceive their wider environment as threatening, hostile and malign regardless of its objective qualities (Watson and Clark 1984). Individuals with higher negative affect also give high salience to perceived bad experiences and evaluate such perceived experiences harshly (Levin and Stokes 1989). Higher levels of positive affect, on the other hand, dispose individuals to subjectively perceive and evaluate negative experiences more benignly and positive experiences more favourably, and also to ascribe greater salience to positive than to negative experiences (Judge 1993).

Trait affect, whether measured unidimensionally or bidimensionally, is found consistently to determine satisfaction in meta-analyses of job satisfaction (Bowling, Hendricks, and Wagner 2008), consumer satisfaction (Szymanski and Henard 2001), and overall life satisfaction (Busseri 2018).

Notwithstanding such well-established links between trait affect and satisfaction in these domains, direct research overtly on the relationship between trait affect and student satisfaction is limited. Indeed, we could find only two tangentially related published studies that hint at such a relationship (Munz and Munz 1997; Fortunato and Mincy 2003), although they are each limited by their use of dependent and/or independent measures that do not directly assess either student satisfaction or trait affect *per se*, and neither offers scope for generalizability, each being based on very small, single-discipline, single-university, single cohort, single-country homogeneous samples.

Given the consistent relationship between trait affect and satisfaction across multiple domains, we postulate that trait affect will significantly relate to student satisfaction and test this using a relatively large heterogeneous specimen student sample of PhD students at different stages of study, from different disciplines, studying at different institutions, and across different countries.

## Methods

### *Sample and procedure*

We sought a disciplinarily, institutionally and internationally heterogeneous sample to obtain results minimally incorporating the sampling biases highlighted by student satisfaction scholars with respect to single-discipline, single cohort (Mai 2005), single-university (Maxwell-Stuart et al. 2018) and single-country populations (Arambewela and Hall 2013). Accordingly, we obtained data from PhD students across sciences, social sciences and humanities from 63 universities in 20 countries in the Asia-Pacific, Europe and North America.

After pilot-testing an online instrument on a sample of our own PhD students, we asked academic colleagues around the world to administer a finalised anonymous instrument to their PhD students. We thereby obtained a convenience sample of 409 reflecting a reasonably broad degree of diversity across disciplines, countries, type of university and student demographics (Table 1).

## Measures

### *Dependent variable*

Both assessment of, and research into, student satisfaction have used varying conceptualizations and measures of student satisfaction. Conceptually, student satisfaction is usually implicitly treated by both scholars and practitioners as a unitary construct encompassing students' overall attitudinal response to their educational experience (Athiyaman 1997; Elliot and Healy 2001; Helgesen and Nettet 2007; Weerasinghe and Fernando 2017).

However, despite student satisfaction generally being conceptualized as an overall affective attitude, it has often, as Dericks et al. (2019) highlight, been measured cognitively on the assumption that assessments of particular and specific aspects of educational experience or institutions can be summated to form a composite and valid measurement of overall student satisfaction. For example, Elliot and Shin (2002, 198) define student satisfaction as an overall 'affective student outcome' but opt not for an affective, but a cognitive, measurement approach comprising assessment of factors such as campus safety and class availability. Other scholars defining student satisfaction as an overall attitude to educational experience but operationalizing its measurement cognitively proxy it with varying composite measures of both internal and external facets of a university (Arambewela and Hall 2013), many having no affective element, like hours of teacher contact time (Barnes and Randall 2012), nor obvious educational relevance or readily alterable aspect, like geographical university location (Weerasinghe and Fernando 2017).

Assessing satisfaction with disparate cognitive facets of an educational experience may provide multiple rough, albeit non-comparable, proxies of overall student satisfaction, but, as Cheng

Table 1. Descriptive statistics.

	Mean		Pearson product moment correlations																
	(%)	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
1 PhD	4.55	1.04																	
2 Satisfaction																			
3 Age	31.84	8.24	-.04																
4 Male	(37)	-	.03	-.05															
5 British	(36)	-	.02	-.06	-.01														
6 American	(9)	-	-.09 <sup>†</sup>	.01	-.01	-.24 <sup>***</sup>													
7 Australian	(6)	-	.39 <sup>***</sup>	-.02	-.19 <sup>***</sup>	-.08													
8 European	(22)	-	.04	-.18 <sup>***</sup>	-.08 <sup>†</sup>	-.40 <sup>***</sup>	-.17 <sup>***</sup>	-.14 <sup>**</sup>											
9 Leading research university	(24)	-	-.17 <sup>***</sup>	-.03	.02	-.10 <sup>*</sup>	.02	-.09 <sup>†</sup>	.22 <sup>***</sup>										
10 Teaching oriented university	(14)	-	-.05	.02	-.03	-.10 <sup>*</sup>	.24 <sup>***</sup>	-.10 <sup>*</sup>	-.15 <sup>**</sup>	-.23 <sup>***</sup>									
11 Years of study	2.53	1.41	-.29 <sup>***</sup>	.14 <sup>***</sup>	.00	-.14 <sup>***</sup>	.13 <sup>**</sup>	.03	.03	.17 <sup>***</sup>	.08 <sup>†</sup>								
12 Full-time	(88)	-	.00	-.37 <sup>***</sup>	.05	-.04	.04	-.23 <sup>***</sup>	.05	-.02	-.07	-.11 <sup>*</sup>							
13 Social sciences	(52)	-	-.06	.19 <sup>***</sup>	-.01	-.13 <sup>**</sup>	-.05	-.05	.10 <sup>*</sup>	.27 <sup>***</sup>	-.11 <sup>*</sup>	.01	-.12 <sup>*</sup>						
14 Sciences	(33)	-	.05	-.25 <sup>***</sup>	.07	.21 <sup>***</sup>	.13 <sup>**</sup>	-.02	-.14 <sup>**</sup>	-.36 <sup>***</sup>	.08	-.04	.13 <sup>**</sup>	-.72 <sup>***</sup>					
15 Positive Affect	3.75	0.50	.26 <sup>***</sup>	.19 <sup>***</sup>	-.11 <sup>*</sup>	.00	.03	.12 <sup>*</sup>	.07	-.02	-.01	.01	-.07	.02	.05				
16 Negative Affect	2.54	0.63	-.31 <sup>***</sup>	-.04	-.09 <sup>†</sup>	-.05	-.08	-.01	.07	.08 <sup>†</sup>	-.07	.15 <sup>**</sup>	.01	.02	-.10 <sup>*</sup>	-.24 <sup>***</sup>			
17 Life Satisfaction	3.56	0.82	.49 <sup>***</sup>	.05	-.06	-.02	.00	.11 <sup>*</sup>	.06	-.08	-.09 <sup>†</sup>	-.15 <sup>**</sup>	-.03	-.01	.03	.28 <sup>***</sup>	-.30 <sup>***</sup>		
18 Trait Affect	3.59	0.47	.51 <sup>***</sup>	.11 <sup>*</sup>	-.03	.01	.05	.11 <sup>*</sup>	.03	-.09 <sup>†</sup>	-.02	-.15 <sup>**</sup>	-.04	-.01	.08	.62 <sup>***</sup>	-.70 <sup>***</sup>	.81 <sup>***</sup>	

Note. <sup>†</sup> $p < .10$ ; \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$



and Marsh (2010) highlight, no cognitive proxy can directly or comprehensively capture overall affective student satisfaction. In consequence some scholars have developed direct measures of student satisfaction conceived explicitly as an overall affective attitude (Clemes, Gan, and Kao 2008; Dericks et al. 2019). We here use Dericks et al.'s (2019) conceptually and metrically robust 10-item measure that overtly construes and purposefully assesses student satisfaction as an overall affective construct. The measure asks: *Thinking about your overall experience of your PhD as a whole, how much do you agree that the following words accurately describe your overall PhD experience to date?: Good, Unhappy, Enjoyable, Satisfactory, Bad, Terrible, Excellent, Disappointing, Happy, Unsatisfactory*. The response format is a 6-point interval measure running from strongly disagree to strongly agree. Our scale Cronbach's alpha of internal consistency reliability is .94.

### **Independent variable**

**Trait affect.** We sought to assess the overall construct domain of trait affect parsimoniously and, to optimize generalizability, in both its bidimensional and unidimensional conceptualizations. We also sought extensively validated scales that have been empirically demonstrated to assess specifically and discretely trait affect, thereby eliminating potential confounding problems of partially capturing state affect (Kaczmarek, Bujacz, and Eid 2015).

In terms of a bidimensional conceptualization of affect, we looked to Watson, Clark, and Tellegen's (1988) Positive and Negative Affect Schedule (PANAS). This widely used scale of, respectively, positive and negative affect measures has question wording deliberately designed to distinguish and discriminate between trait and state affect (Merz and Roesch 2011). The exceptional validation of the PANAS is indicated by its *Scopus* cite count exceeding 26,000 in 2023. In view of our cross-national sample, we used the International Positive and Negative Affect Schedule Short Form (I-PANAS-SF, Thompson 2007). This is a time and space-efficient reduction of Watson, Clark, and Tellegen's (1988) measures expressly developed to have high cross-cultural validity in both native and non-native English-speaking samples (Barnett and Martinez 2015). With over 1200 *Scopus* cites in 2023, the I-PANAS-SF has an acceptable degree of validation and has additionally been used in numerous previous cross-national studies investigating satisfaction (e.g. Mueller, Hatstrup, and Hausmann 2009). The stem question we used to tap specifically trait as opposed to state affect asks the extent to which respondents habitually feel 10 single-word items: for negative affect, *Upset, Hostile, Ashamed, Nervous* and *Afraid*; for positive affect, *Alert, Inspired, Determined, Attentive* and *Active* (see Thompson 2007 for full details). Our Cronbach's alphas for internal consistency reliability are .71 for positive affect and .79 for negative affect.

For a unidimensional conceptualization of trait affect, we selected Diener et al.'s (1985) 5-item Satisfaction With Life Scale, that has been extensively validated in thousands of trait affect studies, many with international samples (e.g. Burns and Ma 2015). Life satisfaction has been found across several studies to constitute primarily trait as opposed to state affect. Kenny and Zautra (1995), for example, report that as little as 5% of variance in life satisfaction is accounted for by individuals' external environment, with around 80% and more of variance in life satisfaction reported by Eid and Diener (2004) and Lucas and Donnellan (2012) to constitute a stable and intrinsic affective trait as opposed to a state caused by extrinsic circumstance and situations. The scale's items include *In most ways my life is close to my ideal, The conditions of my life are excellent, I am satisfied with my life, So far I have gotten the important things I want in life, and If I could live my life over, I would change almost nothing*. Our Cronbach's alpha of internal consistency reliability for the measure is .86.

### **Control variables**

To account for potential state affect possibly arising from non-trait individual differences and transient circumstance and experience effects, and to allow reasonable generalization from our disciplinarily, institutionally and nationally heterogeneous sample, we controlled for discipline,

nature and nationality of institution, plus a parsimonious set of other situational and demographic variables demonstrated to influence student satisfaction.

**Age and sex.** Prior research indicates student satisfaction can be affected by age (Muijs and Bokhove 2017) and sex (Umbach and Porter 2002), both discretely and interactively (Yang, Hsu, and Chen 2016). Accordingly, we controlled for both.

**Full/part-time mode and years of study.** Moro-Egido and Panades (2010) report that student satisfaction is influenced by whether degrees are studied full- or part-time, and Ferguson and DeFelice (2010) find that length of study significantly affects student satisfaction, hence we controlled for both mode and years of PhD study.

**Discipline.** Disciplinary differences in the nature and procedure of research training are related differentially to several aspects of PhD study (Egan et al. 2009), and as Watkins (1982, 155) suggests, 'different academic environments experienced by students in... various faculties may attract and satisfy students of different personality types'. Hence, we controlled for discipline, combining these into broad aggregations of social sciences, sciences and arts/humanities.

**Institutional nationality.** Notwithstanding some essential similarities in PhD programmes across countries, national differences in emphasis and elements of PhD training and practices based on varying conventions and pedagogic cultures produce nationally different PhD environments that, as Watkins' (1982) observations would imply, may attract different personality types and so differentially influence PhD satisfaction. Accordingly, we controlled for country of PhD institution by using dummy variables for each country in our sample that constituted over 5% of total responses. We thus created dummies for American, Australian, British and European (excluding Britain) universities, with universities from elsewhere combined to form a single reference category in analyses.

**University orientation.** Wachtel (1998) indicates that a university's leaning towards a teaching or research orientation will influence student satisfaction, perhaps most particularly at PhD level where student intellectual ability is higher and, evidence suggests, student satisfaction is harder to achieve (Griffioen, Doppenberg, and Oostdam 2018). Following Lenton (2015), we controlled for this with dummies categorizing, respectively, leading research universities, predominantly teaching-oriented universities, and a reference category of those neither primarily one nor the other. To create a demonstrably leading research university category, we included universities regarded both nationally and internationally as renowned for research and considered as globally elite centers of scholarship. In this category were such institutions as Australian National University, Cambridge, Harvard, Imperial College, London School of Economics, Oxford and Stanford. Our sample has 98 students studying PhDs in such leading research universities. Our category of teaching-oriented universities comprised universities either generally known to be such or that have not appeared in any international ranking incorporating assessment of research. Some 57 respondents were studying at universities in this category.

## Analyses and results

Table 2 presents hierarchical regressions against PhD student satisfaction. Model 1 is our baseline model incorporating solely controls. Model 2 enters the three trait affect variables, the significant betas for each of which indicate that facets of the overall trait affect domain individually and

collectively account for substantial variance in PhD student satisfaction. Collectively, the three trait affect variables explain an additional 23% of variance in PhD student satisfaction beyond that attributable to the controls alone.

For Model 3 we combined the three trait affect variables into a single variable we label *Trait Affect*, with a Cronbach's alpha of internal consistency reliability of .82. As a single variable this accounts for 24% of variance beyond that explained by the controls alone.

Having found that trait affect significantly influences PhD student satisfaction, following scholars who have found trait affect interacts with other trait variables to influence satisfaction (Judge 1993; Shaw 1999; Hochwarter et al. 2003), we sought exploratorily to examine if other variables that could arguably be determined in some part by underlying personality traits might moderate trait affect's influence on student satisfaction.

Discipline would seem reasonably to be, at root, a personal choice reflective, as Watkins (1982) suggests, partly of underlying personality traits. Hence, for simplicity we pooled non-science disciplines and, with the resulting dummy variable (Science versus Non-Science) created an interaction term Sciences X Trait Affect.

We also speculated that the institutional orientation of the university in which a PhD student is studying possibly reflects, to some extent, trait intelligence for the simple reason that leading research universities tend, generally, to accept PhD candidates with qualifications suggestive of high levels of cognitive ability. While qualification attainment in part reflects variables for which we control (and others, of course, that we do not), a proportion of qualification attainment is widely considered to reflect underlying trait intelligence. Hence, we considered another interaction term, Leading Research University X Trait Affect.

Model 4 enters interaction terms and shows that each term has a significant beta and that they together produce a modest and significant increase in variance of satisfaction explained. Trait affect interacts with study discipline such that scientists with low trait affect have significantly lower satisfaction than non-scientists (see interaction plot in Figure 1). Trait affect also interacts with institutional orientation such that those with low trait affect studying at leading research universities have significantly lower satisfaction (see interaction plot in Figure 2). Combined, these two significant interactions are commensurate with our proposition that trait affect interacts with other personality traits to influence student satisfaction.

## Discussion and conclusions

Our findings suggest that student satisfaction with higher education, like job, consumption, life and other domains of satisfaction, does indeed have a component that is directly reflective of trait affect. In accordance with research across those other domains of satisfaction, we find that trait affect accounts for a significant and non-trivial amount of variance in student satisfaction, roughly a quarter.

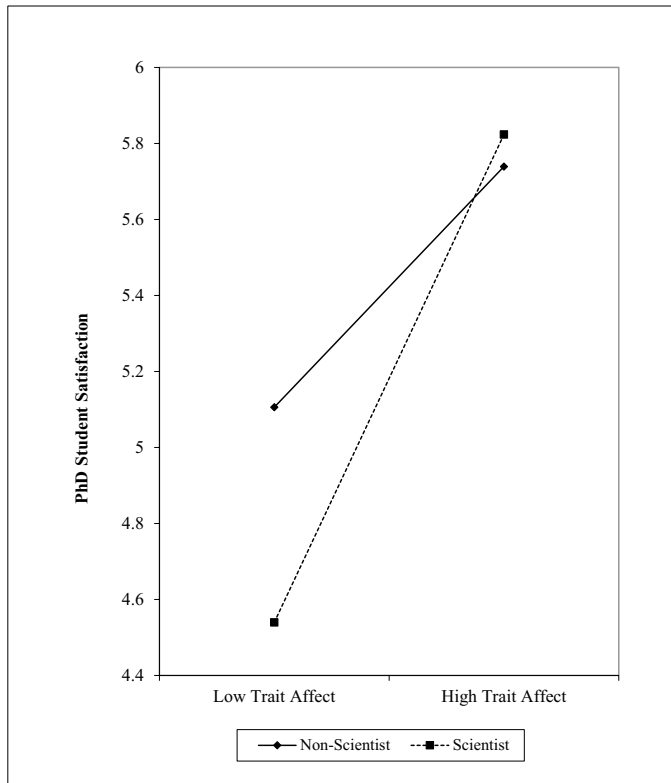
Moreover, our findings are also consonant with research across multiple domains demonstrating satisfaction levels for individuals are innately set at particular and substantially immutable points (Lykken and Tellegen 1996; Lucas et al. 2003; Diener, Lucas, and Scollon 2006). In this respect, our findings suggest that student satisfaction with higher education appears little different to satisfaction with jobs, consumption, life, relationships and other domains of experience: satisfaction in all these areas is in part determined by innate personality traits, one of which is trait affect.

Our findings here provide empirical support for some higher education scholars' suggestions over the past half century that student satisfaction is significantly influenced not simply by students' extrinsic educational circumstances and experiences, but by their intrinsic personality (Kovacs and Kapel 1976; Lounsbury et al. 2005; Muijs and Bokhove 2017). That we find student satisfaction is predicted by interactions of trait affect with both discipline

**Table 2.** Hierarchical regressions and interactions.

	Model 1		Model 2		Model 3		Model 4	
	SE	$\beta$	SE	$\beta$	SE	$\beta$	SE	$\beta$
<i>Controls</i>								
Age	.01	-.04	.01	-.10	.01	-.11*	.01	-.09
Gender	.10	.04	.09	.06	.09	.05	.09	.04
British	.13	.02	.11	.00	.11	-.01	.11	.02
American	.20	-.02	.17	-.06	.17	-.06	.17	-.05
Australian	.25	.12*	.21	.07	.22	.08	.21	.09
European	.15	.10	.13	.03	.13	.03	.13	.05
Years of study	.04	-.26***	.03	-.18***	.03	-.18***	.03	-.17***
Full-time	.17	-.03	.14	-.02	.14	-.02	.14	-.01
Social sciences	.14	-.04	.12	-.08	.12	-.09	.12	-.08
Sciences	.16	-.03	.14	-.09	.14	-.11	.14	-.11
Leading research university	.13	-.14**	.11	-.12*	.11	-.12*	.11	-.12*
Teaching oriented university	.15	-.03	.13	-.01	.13	-.02	.13	-.03
<i>Affect</i>								
Positive affect	-	-	.09	.14**	-	-	-	-
Negative affect	-	-	.07	-.14**	-	-	-	-
Life satisfaction	-	-	.06	.37***	-	-	-	-
<i>Affect compound</i>								
Trait affect	-	-	-	-	.04	.49***	.07	.31***
<i>Interactions</i>								
Sciences $\times$ trait affect	-	-	-	-	-	-	.10	.18***
Leading research university $\times$ trait affect	-	-	-	-	-	-	.11	.14***
<i>Statistics</i>								
$R^2$	.12	.35	.36	.37				
F statistic	4.67***	14.30***	15.88***	15.07***				
$\Delta R^2$		.23***	.24***	.25***				

Note. \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .  $\Delta R^2$  from Model 1.



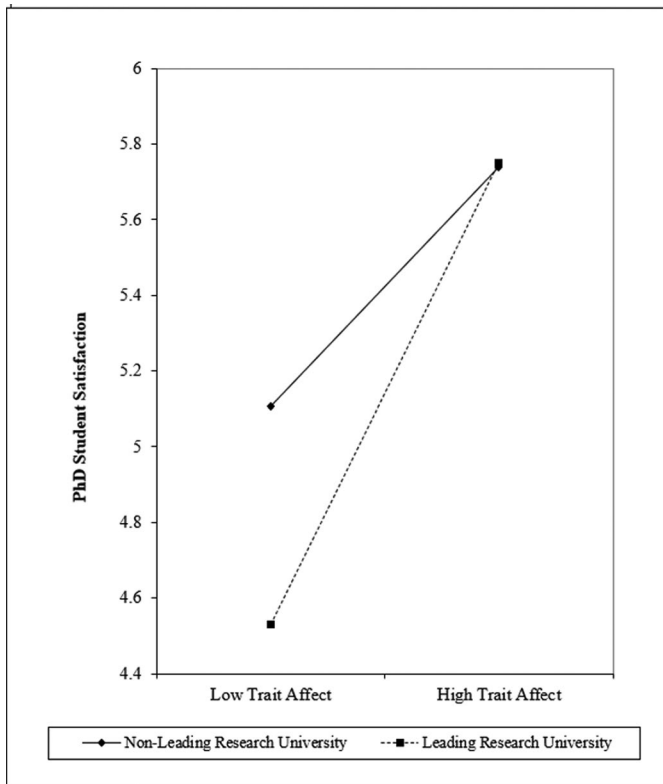
**Figure 1.** Effect of trait affect on PhD satisfaction moderated by discipline.

studied and research orientation of university attended – both of which are, as Watkins (1982) argues, manifestations of intrinsic individual personality traits – indicates different innate personality traits interactively play a significant role in student satisfaction. Hence, a broad range of intrinsic personality traits in combination potentially account for a larger proportion of variance in student satisfaction than just the quarter we find accounted for by trait affect alone.

### **Limitations**

While our research sheds light on the hitherto unexamined influence of trait affect on student satisfaction, its methodological constraints need acknowledgement to set an appropriately cautionary context for setting out our findings' implications for higher education research and practice.

First, like all convenience samples, ours has limitations. Despite our sample equaling or exceeding sample sizes and diversity in prior studies using bespoke, non-government collected data, future research could achieve greater nuance and higher fidelity by obtaining still larger and broader heterogeneous samples. Second, our sample needs in future research to be expanded upon to include master, undergraduate and other students to test the broader generalizability of our findings. Third, while we employed several pertinent and frequently used controls to help attenuate possible limitations of a convenience sample, we acknowledge that additional controls would be useful in future research, including those suggested in the extensive research agenda we outline below. Fourth, in common with much research in the field, we have used a particular conceptualization and measure of student satisfaction. Although we have explicitly discussed the



**Figure 2.** Effect of trait affect on PhD satisfaction moderated by research orientation of university.

rationale underlying our decisions, we acknowledge that student satisfaction can be differently construed conceptually and metrically, and that, therefore, further research using different theorizations and assessments of student satisfaction at different levels of generalization and specificity could be useful.

### **Research implications**

That innate trait affect explains around a quarter of variance in student satisfaction suggests both that student satisfaction research should henceforth control for the influence of trait affect and that absolute levels of student satisfaction reflect something substantially more than simply how good or bad experienced higher education might be. That some 25% of student satisfaction is explained by trait affect begs the question of precisely what accounts for the remaining 75%. Answering this question will require a nuanced, systematic and extensive research agenda not yet fully evident in the literature: one that seeks to partial out the discrete, mediated and moderated influences on student satisfaction of factors in three distinct areas: (i) innate personality, (ii) individual differences other than innate personality, and (iii) extrinsic circumstances and experiences, both those linked and unlinked to higher education.

### **Innate personality**

While the volume of research into the influence on student satisfaction of teachers' own innate personality traits has been sufficient to make meta-analyses feasible (Mori and Tanabe 2015; Kim,

Jörg, and Klassen 2019), far less research attention has hitherto examined the impact of students' trait personality on student satisfaction. With twin studies finding life satisfaction is over 50% attributable to trait personality characteristics (Lykken and Tellegen 1996), it would not be unreasonable to suggest that considerably more than the 25% of variance in student satisfaction we find attributable to trait affect alone is ascribable to other personality traits. In addition to the five-factor model of trait personality, cognitive styles and a limited range of other traits have also been found to influence student satisfaction (Hart and Driver 1978; Lounsbury et al. 2005), hence future research might usefully test to what extent a full spectrum of other trait personality constructs explain variance in student satisfaction. Research in other domains of satisfaction already suggests that perhaps locus of control, narcissism and numerous other traits may potentially have not only direct effects on student satisfaction in isolation and combination (e.g. Wang and Lei 2023), but moderation and mediation effects with each other and, of course, non-personality individual differences and extrinsic circumstances (e.g. Bonfá-Araujo et al. 2023). That we find the two personality trait-reflective variables of study discipline and university research orientation each interact with trait affect to influence student satisfaction strongly hints that other personality traits may do likewise.

### ***Non-trait individual differences***

Non-trait individual differences found to influence satisfaction across several domains include, on one hand, demographic variables specific to an individual that are either intrinsic, such as sex (Casile, Gerard, and Soto-Ferrari 2021) and age (Bittmann 2021), or extrinsic, such as nationality (Douglass, Duffy, and Autin 2016) and socio-economic circumstances (Booth 2021). On the other hand, a very wide range of non-demographic individual difference variables like attitudes, towards, for example, money (Tang, Kim, and Tang 2000), and differences such as habits and experiences, are found to influence satisfaction across numerous domains, including student satisfaction (El Ansari 2002). Non-trait individual differences and personality traits have been shown in combination to influence student satisfaction, both discretely (Logue et al. 2007) and interactively with, respectively, each other (Yang, Hsu, and Chen 2016) and innate personality (Piumatti and Rabaglietti 2015). Therefore, it would seem reasonable to suggest that, as scholars uncover a fuller range of innate personality and non-trait individual differences that influence student satisfaction, their joint mediation and moderation effects might usefully be tested.

### ***Extrinsic circumstances and experiences – non-educational***

Both survey and experimental research have found that transient state affect induced by circumstances and experiences quite unrelated to any given specific domain of satisfaction and entirely ephemeral can influence satisfaction in that domain at a particular temporal juncture (Schwarz et al. 1987). For example, job satisfaction is elevated immediately following simple receipt of a cookie and mechanical toy monkey (Brief, Butcher, and Roberson 1995), and life satisfaction is temporarily lowered by brief episodes of back pain (Geisser, Cano, and Leonard 2005). Fortunato and Mincy (2003, 1951) find that positive mood induced merely by seeing 'a spring-loaded pop-up smiley face' correlates significantly with higher teaching evaluations from students, suggesting that ephemeral state affect caused by myriad of as-yet-unexamined circumstances and stimuli extrinsic to students and utterly unrelated to their productive education will have an effect on student satisfaction assessment at the time of its measurement. Discovering and overtly controlling for these non-education transient circumstances and ephemeral stimuli influencing student satisfaction would seem fundamental to its meaningful assessment and future research on its determinants.

### ***Extrinsic circumstances and experiences – educational***

Only after germane student innate personality traits, non-trait individual differences, and non-educational extrinsic circumstances and experiences, respectively, are more fully discovered - and appropriately controlled for - can scholars more clearly identify to what extent and how aspects of education-specific circumstances and experiences themselves might determine student satisfaction. Despite long-established calls for this to be done (Kovacs and Kapel 1976), to date, the overwhelming majority of research on education-specific factors influencing student satisfaction neither fully controls for personality, individual or extrinsic non-educational differences, nor does it test how these differences might moderate or mediate the effects of education-specific variables on student satisfaction.

### ***Practice implications***

With a quarter of variance in student satisfaction explained by trait affect, any student satisfaction data failing to control for trait affect need to be viewed by education institutions and ministries with considerable caution. Even when such data exhibit significant differences between classes, teachers, degree programmes, departments or institutions, it is entirely possible that these differences reflect limited meaningful variance in substantive quality of educational experience or achieved educational objectives. Instead, such data may merely discriminate in large part between universities, disciplines, courses, academics and classes that, for a range of non-educationally germane factors, attract individuals with systematically varying levels of trait affect (plus very probably other unalterable intrinsic personality traits).

More meaningful assessment of student satisfaction could be achieved if assessors controlled for trait affect as a standard procedure. In practical terms, assessors would need simply to add trait affect measures to, as Kovacs and Kapel (1976, 342) nearly half a century ago suggested, the 'major personality batteries [that] could be administered' when assessing student satisfaction to obtain scores with greater accuracy, meaning and, ultimately, utility in enhancing individually and societally useful education outcomes.

Our findings also carry the possible implication that some higher education institutions might adopt trait affect as a student entry criterion to help enhance their overall student satisfaction scores. Just as decades ago Staw and Ross (1985) proposed in relation to job satisfaction that 'it may be easier for organizations to improve job attitudes... by simply selecting individuals for membership who have positive dispositions' than to actively alter their organizations (478), it would be relatively easy for a higher education institution to inflate its student satisfaction scores by preferentially admitting students assessed high on innate trait affect.

Recruiting students based on innate and largely immutable individual personality characteristics would not be novel: such factors routinely come into play, for example, in applicant admission interviews where specific personality traits are either consciously (e.g. need for achievement) or subliminally (sociability) selected for. The only novelty in formally assessing trait affect during student recruitment would be its susceptibility to empirical systematization and the relatively objective comparable data thereby generated to discriminate between happily acceptable and miserably unacceptable applicants. Making trait affect an admission criterion, combined with what we know about 'how to improve... teaching evaluations without improving... teaching' (Neath 1996, 1363), could prove highly attractive to some in a higher education sector ever more dominated by student satisfaction scores.

Of course, had universities in the past followed a student-satisfaction-score-driven admissions' policy incorporating a trait affect entry criterion to manipulate results, it is doubtful Cambridge would have admitted notorious life-long curmudgeon Isaac Newton, and Copenhagen University may never have accepted infamous melancholic Søren Kierkegaard. Hence, student selection by trait affect could prove self-defeating for responsible institutions purposefully seeking to achieve



worthwhile longer-run student and social benefits through effective education instead of seeking merely to game student satisfaction rankings.

## Conclusions

Our findings support the proposition that trait affect partly explains variance in student satisfaction: around a quarter of such variance. Hence, in answering the question, are satisfied students innately happy people in the first place, we find that, yes, in part they are. Our finding here is consonant with satisfaction research in other domains that has demonstrated intrinsic and immutable trait affect significantly determines not only satisfaction levels, but also renders such satisfaction levels less susceptible to alteration by extrinsic factors than proponents of student satisfaction assessment would appear to suppose.

That a substantial proportion of student satisfaction stems not from extrinsic educational experience but from intrinsic individual-level factors which, especially in the case of personality traits like affect, cannot readily be altered by mighty education ministers or even august university administrators – never mind paltry professors and lowly lecturers – begs a key question that governments, universities and scholars alike must answer: why and to what quantifiably beneficial individual student or wider societal avail, is so much time, effort and money expended on student satisfaction assessment when it demonstrably captures immutable and educationally irrelevant personality traits while much less evidently capturing the true individual or social-level efficacy of professional, rigorous and worthwhile higher education?

## Disclosure statement

No potential conflict of interest was reported by the authors.

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## Data availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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