



Development of a measure of receptivity to instructional feedback and examination of its links to personality[☆]

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ARTICLE INFO

Keywords
 the Big Five
 feedback
 receptivity
 engagement with feedback
 validity evidence

ABSTRACT

The purpose of this study was to report on the construction of an instrument to measure receptivity to instructional feedback (RIF) and provide initial validity evidence for its use. We also explored the degree to which students' receptivity to instructional feedback was associated with their Big Five personality traits of Conscientiousness, Agreeableness, Neuroticism, Openness, and Extraversion. Confirmatory Factor Analysis suggested that the 4-factor initially hypothesized model that comprised experiential attitudes, instrumental attitudes, cognitive engagement with feedback, and behavioural engagement with feedback components had good model fit. Out of the five personality dimensions, Conscientiousness and Openness were the strongest predictors of the receptivity components, especially of students' behavioural engagement with feedback. This study presents initial validity evidence of the utility of the RIF scale.

1. Introduction

There is a general consensus in the field of educational psychology that instructional feedback matters. A substantial body of research has demonstrated that feedback is a key variable that can promote student engagement, help students maintain motivation, and achieve key instructional goals (Hattie & Timperley, 2007; Lipnevich & Smith, 2009). Studies also consistently conclude that feedback is a gentle beast in that it functions best under specific conditions, and requires a great deal of work for all involved in order to be utilized most effectively. One of the main conditions for the effective use of feedback is whether students want to and are capable of incorporating the feedback provided to them. After all, if instructors prepare the best kind of feedback and students do not utilize it, the effort will be wasted and no benefit will be obtained (Lipnevich, Berg, & Smith, 2016). There is initial evidence to suggest that people may be more or less receptive to feedback across domains (Murano, Martin, Burrus, & Roberts, 2018). In other words, some of us are more eager than others to hear about our performance in general, irrespective of the particular area under consideration. Our goal in this research is to develop and examine a measure of individuals' general receptivity to getting feedback.

The purpose of the study is twofold. First, we report on the construction of an instrument to measure receptivity to instructional

feedback and provide initial validity evidence for its use. Specifically, we examine the internal structure of the instrument to provide evidence of construct validity (American Educational Research Association et al., 2014; ITC, 2016; Wu, Tam, & Jen, 2016). Second, we explore the degree to which students' receptivity to instructional feedback is associated with personality traits. Personality characteristics, represented by broad dimensions of the Big Five personality inventory often subsume newer concepts. We examine the degree to which personality factors relate to, and explain, dimensions of receptivity to feedback. Specifically, this study attempted to answer the following research questions:

1. To what extent is there evidence to support structural validity of the Receptivity to Instructional Feedback (RIF) scale?
2. Are personality factors (as measured by Big Five) related to and explain variability in receptivity to instructional feedback?

2. Method

2.1. Participants

Participants in this study were $N = 319$ undergraduate students from the United States ($n = 147$) and New Zealand ($n = 172$) enrolled in public universities. Among the United States participants,

[☆] This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.
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<https://doi.org/10.1016/j.paid.2020.110086>
 Received 15 January 2020; Received in revised form 17 April 2020; Accepted 22 April 2020
 Available online xxx
 0191-8869/© 2018.

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81.6% ($n = 120$) were female and 18.4% ($n = 27$) were male. The gender composition of New Zealand participants was very similar with 82.6% ($n = 142$) females and 16.9% ($n = 29$) males. Students' age ranged from 19 to 46 and 18 to 49 with modes 20 and 18 for the U.S. and N.Z. samples, respectively.

2.2. Instrumentation

2.2.1. Receptivity to Instructional Feedback (RIF)

The Receptivity to Instructional Feedback (RIF) scale is a self-report instrument designed to measure students' acceptance of instructional feedback. The process of item generation began by reviewing the related literature and studies that discussed potential indicators of receptivity. Measures exist to gauge internal and external feedback propensity and feedback seeking behaviours, but these have been developed in the industrial/organizational context (Anseel, Beatty, Shen, Lievens, & Sackett, 2015; Herold & Fedor, 2003) and describe individuals' tendency to actively request feedback. Our measure is intended to assess factors that describe students' receptivity and responses to instructional feedback. A total of 36 Likert-type items measured on a 5-point scale (1 = strongly disagree and 5 = strongly agree) were generated under four receptivity components: (1) experiential attitudes towards feedback (i.e., affect; e.g., I look forward to receiving the instructor's comments on my work); (2) instrumental attitudes towards feedback (i.e., value for feedback; e.g., I find the comments I get on my assignment to be very helpful); (3) cognitive engagement with feedback (e.g., I know how to use feedback comments to improve my work); and (4) behavioural engagement (e.g., When I receive feedback, I carefully read every comment).

2.2.2. Big Five Personality Inventory (BFI)

The BFI is a 44-item inventory that measures an individual on the Big Five dimensions of personality (Goldberg, 1993). The Big Five Factors are extraversion, agreeableness, conscientiousness, neuroticism, and openness. Responses to each personality indicator ranged from 1 = strongly disagree to 5 = strongly agree. Composite scores were derived by summing up the responses corresponding to each of the five personality factors.

2.3. Analytic plan

Data were analysed by means of Structural Equation Modelling (SEM) using Mplus version 8.3 (Muthén & Muthén, 2012) with weighted least squares mean and the variance adjusted (WLSMV) estimator, which is a robust estimation method specifically designed for categorical data (Sass, Schmitt, & Marsch, 2014). For the first research question, initially, an Exploratory Factor Analysis (EFA) was run on a randomly selected ½ of the sample to determine the factor structure of the RIF scale. Subsequently, Confirmatory Factor Analyses (CFA) were applied to examine the factorial structure of the RIF scale by employing a series of 4-factor models representing the initially hypothesized structure of the measure. The overall model fit for measurement analyses was evaluated using a number of different indices (Cheung & Rensvold, 2002; Fan & Sivo, 2005, 2007). We used the following indices and their cut-offs for 'acceptable' or 'good' fit (Brown, 2006; Browne & Cudeck, 1992; Hair, Jr., Black, Babin, & Anderson, 2010; Hu & Bentler, 1998; MacCallum, Browne, & Sugawara, 1996; Yu, 2002): (1) the Root Mean Square Error of Approximation (RMSEA) with values <0.08 being indicative of reasonable fit and values <0.05 indicating a good fit; (2) the Comparative Fit Index (CFI) and Tucker-Lewis index (TLI) with values >0.90 indicating an acceptable fit and values >0.95 indicating a good fit; and (3) the standardized root mean square resid-

ual (SRMR) with values <0.05 being indicative of good fit. Indicators that had a factor loading $\lambda \geq 0.5$ were included as items in the factor. Modification indices were also run to detect any possible improvements to the fit of the CFA solutions. Model alterations at the indicator level (i.e., removal, cross-loading, specifying correlations) were conducted to improve model fit across model iterations. For the second research question, bivariate correlation matrices were first conducted, followed by OLS (ordinary least squares) regressions using personality factors as predictors of receptivity to feedback constructs.

3. Results

3.1. Measurement of receptivity to feedback

As suggested in the literature (Noar, 2003; Strauss & Smith, 2009), to examine research question 1, we evaluated the goodness-of-fit of alternative models to understand and provide validity evidence for the factor structure of the RIF scale. The initial EFA models suggested that the 7-factor model was the best fitting model, with the 1-factor model suggesting poor fit: RMSEA = 0.127 (90% CI: 0.124, 0.131), CFI = 0.872, TLI = 0.864, and SRMR = 0.101. Results across the 5-factor, 6-factor, and 7-factor models suggested that the models were overfitting such that items were cross-loading or negatively loading on more than one factor. All of the CFA models contained 4 latent factors, each representing the initially hypothesized theory-based 4-factor structure of the measure. Across CFA model iterations (e.g., Models 1–3), items were excluded based on modification indices. The first CFA model, Model 1, included all original 36 items whilst Model 3 (i.e., the final measurement model) included a reduced set of 24 items. CFA analyses suggested that the 4-factor initially hypothesized model (Model 3), with 24 items had good model fit: RMSEA = 0.069 (90% CI: 0.063, 0.076), CFI = 0.975, TLI = 0.972, and SRMR = 0.041. The internal consistency reliability statistics across the 4 scales ranged from 0.82 < α < 0.92. All original items of the scale are presented in Table 1 (Supplementary Material). Table 2 (Supplementary Material) provides details the model fit indices of the measurement model iterations. Finally, CFA Model 3 was used to extract factor scores for each of the RIF factors to be examined in the subsequent research question.

3.2. Descriptive statistics

Descriptive statistics for the total sample and by country samples are provided in Table 3 (Supplementary Material) for the personality and receptivity measures. Descriptive statistics indicate that the highest mean on the personality constructs was agreeableness ($M = 4.026$, $SD = 0.516$) and the lowest was emotional stability (reversed neuroticism) ($M = 2.828$, $SD = 0.730$). Students from the U.S. sample indicated greater receptivity to feedback compared to students from the N.Z. sample, with the largest mean difference observed for cognitive engagement with instructional feedback.

3.3. Personality and receptivity to feedback

A correlation matrix was used to initially examine the relations among receptivity to feedback and personality traits (see Table 4). Results indicated that Conscientiousness was most strongly correlated with receptivity factors, with correlations ranging from $r = 0.362$ with the behavioural engagement component and $r = 0.310$ with the instrumental attitudes component (all p -values < 0.01). Statistically significant and positive correlations were also observed between Openness ($0.224 < r < 0.284$) as well as Agreeableness ($0.164 < r < 0.209$) with the receptivity factors. Neuroticism

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Table 4
 Correlation coefficients among receptivity to instructional feedback and personality traits.

	1	2	3	4	5	6	7	8	9
Receptivity to Feedback									
1. Experiential Attitudes	1								
2. Instrumental Attitudes	0.098	1							
3. Cognitive Engagement	0.755	0.815	1						
4. Behavioural Engagement	0.817	0.891	0.779	1					
Personality									
5. Extraversion	0.090	0.057	0.067	0.047	1				
6. Agreeableness	0.187	0.164	0.184	0.209	0.166	1			
7. Conscientiousness	0.341	0.310	0.353	0.362	0.144	0.378	1		
8. Neuroticism	-0.125	-0.107	-0.175	-0.080	-0.389	-0.341	-0.268	1	
9. Openness	0.224	0.261	0.284	0.274	0.176	0.086	0.127	-0.062	1

Note. * $p < 0.05$; ** $p < 0.01$.

was negatively related to cognitive engagement ($r = -0.175$, $p < 0.01$) and experiential attitudes towards receiving instructional feedback ($r = -0.125$, $p < 0.05$).

Multiple regression models (Table 5), controlling for country (Model 1; 1 = United States; reference category = New Zealand), examined the degree to which personality variables were predictive of receptivity beyond the variance explained by differences in the countries, given the cultural diversity of the sample. The results across the regressions for the four receptivity measures were highly consistent, such that Conscientiousness and Openness were predictive of increases in all four receptivity measures, and Neuroticism was predictive of a decrease in cognitive engagement. The ΔR^2 ranged between 0.10 and 0.14 across the four receptivity outcomes. Personality explained the most incremental variability in behavioural engagement, where $\Delta R^2 = 0.14$ and explained the most total variability in cognitive engagement, where Adjusted $R^2 = 0.257$ and $\Delta R^2 = 0.13$, $p < 0.00$. Conscientiousness was a stronger predictor than Openness for predicting all four components of RIF – standardized beta (β) values for Conscientiousness ranged from 0.22 < $\beta < 0.27$ whereas for Openness they ranged from 0.13 < $\beta < 0.18$. Neuroticism predicted cognitive engagement ($b = -0.15$, $p = 0.03$) but no other receptivity factor, suggesting evidence for discriminant validity among the receptivity factors.

4. Discussion

In the current study, we aimed to provide initial validity evidence on the internal structure of the RIF self-report instrument designed to measure the degree to which tertiary students were receptive to instructional feedback. We also investigated the association between receptivity and personality to ensure that the construct of receptivity is not subsumed under the Big Five personality dimensions (e.g., Lipnevich & Roberts, 2014).

The CFA results confirmed the existence of four separate factors of receptivity to feedback: experiential attitudes towards feedback, instrumental attitudes towards feedback, cognitive engagement with feedback, and behavioural engagement with feedback. Links between personality and receptivity were of the expected direction and magnitude, thus providing additional validity evidence and suggesting the construct's differentiation from the Big Five personality factors. Conscientiousness and Openness were the strongest predictors of receptivity, particularly for the behavioural engagement component.

Very often, newly introduced constructs strongly relate to personality factors, and upon careful examination get subsumed under

large personality dimensions (MacCann, Lipnevich, Burrus, & Roberts, 2012; see also "jingle-jungle fallacy," Block, 1995). Hence, it was crucial to show that receptivity to instructional feedback could be differentiated from the Big Five factors. Our results revealed that we indeed were not simply reproducing facets of the Big Five personality dimensions. Conscientiousness and Openness were the strongest predictors of the four factors of receptivity, suggesting that students who were achievement-oriented and disciplined (high on C) as well as intellectually curious and open to new information (high on O) would tend to be more receptive to feedback. Agreeableness yielded significant albeit weak links with the RIF factors, indicating that being cooperative and trusting was not the key predictor of high feedback receptivity. This is an interesting finding which shows that one's proclivity to exhibit cooperative behaviours is less predictive of willingness to welcome feedback and engage with it compared to individuals' achievement striving and curiosity. These links have to be further disentangled with studies examining relations among the facets of Big Five, the four factors of the RIF scale, and achievement and well-being outcomes. Finally, we also found that Neuroticism negatively predicted one of the RIF factors – behavioural engagement with feedback – suggesting that individuals with a higher tendency to be self-conscious and impulsive would be less likely to engage in deep processing of feedback. Such differential links among personality and RIF factors offer evidence of discriminant validity of the scale. In sum, our initial exploration suggests a promising route for future studies, and establishing links among RIF and well-being and achievement outcomes will be of substantive theoretical and practical significance.

CRediT authorship contribution statement

Anastasiya A. Lipnevich: Conceptualization, Methodology, Writing – original draft, Kalina Gjicali: Formal analysis, Writing – review & editing, Mustafa Asil: Formal analysis, Jeffrey K. Smith: Conceptualization, Formal analysis, Writing – review & editing.

Declaration of competing interest

None.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.paid.2020.110086>.

Table 5
 Personality traits as predictors of receptivity to feedback constructs.

		Experiential Attitudes				Instrumental Attitudes				Cognitive Engagement				Behavioural Engagement				
		B	S.E.	Beta	p	B	S.E.	Beta	p	B	S.E.	Beta	p	B	S.E.	Beta	p	
Model 1	Intercept	-0.22	0.07		<0.01	-0.27	0.07		<0.01	-0.01	-0.33	0.07		<0.01	-0.28	0.07		<0.01
	Country (1 = U.S.)	0.46	0.10	0.25	<0.01	0.58	0.10	0.30	<0.01	0.70	0.10	0.38	<0.01	0.61	0.10	0.31	<0.01	
Model 2	Intercept	-2.86	0.66		<0.01	-2.73	0.68		<0.01	-2.38	0.63		<0.01	-3.60	0.66		<0.01	
	Country (1 = U.S.)	0.33	0.10	0.18	<0.01	0.43	0.11	0.22	<0.01	0.57	0.10	0.30	<0.01	0.43	0.10	0.22	<0.01	
	Extraversion	0.04	0.07	0.03	0.55	0.01	0.08	0.00	0.93	-0.01	0.07	0.00	0.94	0.00	0.07	0.00	1.00	
	Agreeableness	0.10	0.10	0.06	0.32	0.09	0.11	0.05	0.42	0.06	0.10	0.03	0.54	0.17	0.10	0.09	0.11	
	Conscientiousness	0.41	0.09	0.26	<0.01	0.26	0.09	0.22	<0.01	0.37	0.09	0.24	<0.01	0.09	0.27	<0.01		
	Neuroticism	-0.04	0.08	-0.03	0.61	-0.05	0.08	-0.04	0.50	-0.15	0.07	-0.12	0.03	0.02	0.08	0.02	0.79	
	Openness	0.22	0.09	0.13	<0.01	0.29	0.09	0.17	<0.01	0.28	0.08	0.17	<0.01	0.30	0.09	0.18	<0.01	
	Adjusted R ²		0.16				0.18				0.26				0.22			
	R ² change (Model 1 to Model 2)		0.12				0.10				0.13				0.14			
	F change (p-value)		0.00				0.00				0.00				0.00			

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