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Convergence and Psychometric Properties of Character Strengths Measures: The VIA-IS and the VIA-IS-R

Valentina Vylobkova¹ , Sonja Heintz^{1,2} , Fabian Gander¹ , Lisa Wagner¹ , and Willibald Ruch¹ 

¹Department of Psychology, University of Zurich, Zurich, Switzerland; ²School of Psychology, Faculty of Health, University of Plymouth, Plymouth, UK

ABSTRACT

This study compares the German versions of the original measure of character strengths (VIA-IS) with its latest revision (VIA-IS-R) regarding reliability and convergent, discriminant, and criterion-related validity. A sample of 499 German-speaking adults (79% women, mean age: 33.3 years) provided self-reports of character strengths (VIA-IS, VIA-IS-R) and several criteria: Core virtues, thriving, and moral behaviors. Results suggested that both measures showed satisfactory internal consistency and converged well in a multitrait-multimethod analysis. Further, both measures were comparable regarding their relationships with the criteria. Overall, the results of the current study suggest that both questionnaires are reliable and valid, and that findings based on these instruments can be considered highly comparable.

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The VIA Classification of Character Strengths and Virtues (CSV; Peterson & Seligman, 2004) proposes a multidimensional conceptualization of character and is considered a cornerstone of positive psychology. To assess the classification's 24 character strengths in adults, a self-report questionnaire, the VIA Inventory of Strengths (VIA-IS; Peterson et al., 2005) was developed and used in numerous studies. The recent revision of this original character strengths measure (VIA-IS-R; McGrath, 2019) demonstrated an acceptable convergence to a shortened form of the VIA-IS (VIA-120; Littman-Ovadia, 2015). While several short forms the VIA-IS were developed (e.g., Littman-Ovadia, 2015; for an overview see McGrath, 2019), using full-length questionnaires allows a detailed and psychometrically sound assessment of an individual's character strengths. The present study hence compares the original, most widely used assessment instrument for character strengths (VIA-IS with 240 items) and its recent revision (VIA-IS-R with 192 items). The German-language versions of both instruments are statistically compared in the terms of their (a) reliability, (b) convergent and discriminant validity, and (c) criterion-related validity.



VIA classification of character strengths and virtues

The CSV (Peterson & Seligman, 2004) resulted from a large-scale cooperation aimed at developing a common framework to describe individual qualities that can contribute to a

“good life.” The CSV spans three levels. At the most abstract level, there are six core virtues that are assumed to be universal across time and cultures (Dahlsgaard et al., 2005): Wisdom and knowledge, courage, humanity, justice, temperance, and transcendence. At the second level, 24 character strengths are described as different ways to enact those virtues in everyday life (see [Supplementary material, Table S1](#)). Finally, at the most concrete level, situational themes depict behavioral patterns of displaying character strengths in a certain context. In the CSV classification, character strengths are conceptually assigned to the six core virtues, and therefore this hierarchy cannot be directly compared with hierarchies known from personality psychology, such as the Five-Factor Model's facets and domains (Costa & McCrae, 1995). Following Peterson and Seligman's (2004) suggestion that strengths strike an ideal balance between abstraction and specificity, and as they are easily measurable, research has primarily focused on the level of character strengths.

Research on the VIA-Inventory of Strengths (VIA-IS)

The VIA-IS (Peterson et al., 2005) is a self-report measure consisting of 10 items for the assessment of each character strength, resulting in a total of 240 positively-keyed items. While the reliability and validity of the VIA-IS have generally been described as adequate (Khumalo et al., 2008; Ruch et al., 2010; Singh & Choubisa, 2010), several points of

CONTACT Valentina Vylobkova  valentina.vylobkova@uzh.ch  Section on Personality and Assessment, Department of Psychology, University of Zurich, 14 Box 7, Binzmühlestrasse, Zurich 8050, Switzerland.

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criticism have also been raised. For instance, McGrath (2019) considered the VIA-IS to be too lengthy for certain applications. Second, he suggested that the exclusive use of positively-keyed items might cause “an acquiescent response bias to result in very high scores, and also potentially contribute to the emergence of the positive manifold” (McGrath, 2019, p. 2). Third, some VIA-IS items can be construed as too narrowly describing behaviors or as potentially sensitive information (e.g., practicing one’s religion). Finally, the content of some scales was perceived as being too heterogeneous, and the construction process was not clearly documented (McGrath, 2019).

VIA-Inventory of Strengths-Revised (VIA-IS-R)

The main goals of the VIA-IS revision were to create a shorter version of the instrument that included negatively-keyed items and items of varying difficulty (i.e., items that are more or less strongly endorsed, resulting in a variation of item mean scores), to provide a clear differentiation between the constructs, and to document the development steps rigorously (McGrath, 2019). The construction process involved reviewing the existing items’ properties and generating new items, which resulted in a 192-item scale (91 original VIA-IS items and 101 revised or newly constructed items). The number of revised or newly constructed items per scale ranges from two (appreciation of beauty and excellence) to six (love, leadership, and self-regulation), and most of the new items are negatively keyed (see [Supplementary material, Table S1](#)). McGrath and Wallace (2021) provided an initial validation of the VIA-IS-R. They demonstrated a high convergence with the VIA-IS-120 (a short form of the VIA-IS consisting of 120 items; Littman-Ovadia, 2015), satisfactory internal consistencies, and criterion-related validity with an ad-hoc scale assessing strength-relevant behaviors. However, to our knowledge, no other criteria have been investigated yet.

Character strengths and important outcomes

The association of character strengths with well-being, thriving, and other desirable outcomes has received the most empirical attention (e.g., Hausler, Strecker et al., 2017). Thus, thriving represents an important outcome to assess the criterion-related validity of a character strengths measure. Furthermore, Peterson and Seligman (2004) emphasized that character strengths are assumed to contribute to the well-being of others and represent positively morally valued traits (Stahlmann & Ruch, 2020). Hence, moral behaviors pertaining to altruism, volunteering, and benefitting the larger public (Gander & Wagner, 2021; Ruch, Bruntsch, & Wagner, 2017) can also be considered relevant criteria. Therefore, we test and compare the criterion-related validity of character strengths measures regarding their associations with the six core virtues, thriving, and moral behaviors.

Aims of the present study

The present study has three main aims. We compare the psychometric properties of the German versions of the 240-item VIA-IS and the 192-item VIA-IS-R (i.e., the two full-version instruments for the assessment of character strengths) in terms of (1) internal consistency, (2) convergent and discriminant validity (i.e., correlations within and between both instruments’ scales), and (3) criterion-related validity (i.e., relationships with the six core virtues, thriving, and moral behaviors). By addressing these questions, the study provides evidence to fill several critical gaps regarding the validity of the VIA-IS-R. For the first time, convergence and comparability of psychometric criteria with the full 240-item VIA-IS is investigated in the same sample, which expands McGrath and Wallace’s (2021) study: It provides a fairer comparison by including the full-length original version, and also allows drawing conclusions on the majority of past research with character strengths, which predominantly employed the VIA-IS. Furthermore, the included criteria are different from those employed in the previous study (McGrath & Wallace, 2021) and capture highly relevant criteria for a measure of character strengths (i.e. virtues, thriving, and moral behaviors). Finally, all three study aims contribute to an initial validation of the German-language version of the VIA-IS-R, expanding McGrath’s (2019) findings from English-speaking countries to German-speaking countries.

Materials and methods

This study was preregistered prior to data collection with an analysis plan (<https://aspredicted.org/x3qn8.pdf>). Some parts of the preregistration were omitted from the present manuscript since they yielded highly similar results with other studied constructs (using fulfillment in life as an additional criterion provided similar results to the findings on thriving), delivered little additional insights (commonality analyses), were accompanied by estimation problems (latent modeling) or the reliabilities of the scales (social desirability) were unacceptable.

Participants and procedure

A sample of 573 participants completed an online survey. We recruited participants via different mailing lists, including university mailing lists in Switzerland and Germany, and via social media. The inclusion criteria were being at least 18 years old and having a good command of the German language. We excluded participants who completed the survey in less than 15 minutes, chose the same response option across >90% of the items of the VIA-IS or VIA-IS-R, or had missing scale values in either the VIA-IS or the VIA-IS-R. These exclusion criteria were determined prior to data collection. The final sample consisted of $N = 499$ ¹

¹We initially planned to collect data from approximately 300 participants, based on a power analysis for detecting a small to medium-sized effect when comparing correlations. Our recruitment was more successful than we anticipated, so we were able to exceed this sample size.

participants (20% male, 79% female, 1% other or preferred not to disclose) with a mean age of 33.3 years (range 18–78 years, $SD = 13.9$). The majority (61%) of participants were German. The sample was well-educated; 69% of participants held a university degree or had a comparable education. Most participants (55%) were married or in a partnership. As the recruitment took place mostly via mailing lists of universities in Germany and Switzerland, about half of the participants were part-time students (54%). According to local regulations, a review by the ethics committee was not required for this study, and a self-declaration on ethics was sufficient. After providing informed consent and demographic information, participants completed the two character strengths measures in randomized order, followed by the criterion measures. The survey contained two additional questionnaires not included here due to unacceptable reliability (social desirability) or highly similar results with other studied constructs (fulfillment in life). After completing the survey (~50 min), participants received individual feedback on their character strengths and participation points (for psychology students). An additional incentive for participants was a small donation (CHF1) for a social or environmental project for every completed survey.

Instruments

The VIA-IS (Peterson et al., 2005; German version by Ruch et al., 2010) assesses 24 character strengths with ten items per strength. The VIA-IS uses a 5-point Likert scale from 5 = “very much like me” to 1 = “very much unlike me”. An example item for the character strength of creativity is “Being able to come up with new and different ideas is one of my strong points.”

The VIA-IS-R (McGrath, 2019) assesses 24 character strengths with eight items per character strength, containing positively and negatively keyed items. The VIA-IS-R uses the same 5-point Likert scale as the VIA-IS. An example item for forgiveness is “There are things I’ve resented for a long time” (reverse-coded). We translated the VIA-IS-R into German using a standardized back-translation procedure (International Test Commission, 2017). More details on the items of the two instruments are provided in Table S1 (Supplementary material).

We applied a planned missing data design (Synthetic Aperture Personality Assessment, SAPA; Revelle et al., 2017) to reduce the survey length and the number of overlapping items between the two instruments per participant with minimum impact on the psychometric properties. In the SAPA approach, participants receive a random subset of items. For example, for a six-item scale, participant A could receive a different subset of items (e.g., items 1, 3, 6) than participants B (e.g., items 1, 4, 5), or C (e.g., items 2, 3, 6).

We chose this approach as (a) the number of overlapping items between both instruments was relatively high (91 items) and (b) including all items would have put a high burden on participants in terms of survey length. SAPA allows for high reliability, validity, and coverage at the same time (Revelle et al., 2017) and has been successfully applied in previous research (e.g., Revelle et al., 2021; Stahlmann & Ruch, 2020).

For both instruments (VIA-IS and VIA-IS-R), participants completed a randomly selected half of the items of the scale (i.e., 120 of the 240 VIA-IS items, and 96 of the 192 VIA-IS-R items). For the present study, we did not provide every participant with a different subset of items, but randomized items in blocks: We built blocks containing 24 items each for both instruments (10 blocks of items for the VIA-IS, and 8 blocks of items for the VIA-IS-R). Participants then completed five randomly selected (out of 10) blocks for the VIA-IS and four randomly selected (out of 8) blocks for the VIA-IS-R. We did not remove overlapping items between the two questionnaires; thus, some participants completed the same item twice, which were then separately scored for the VIA-IS and the VIA-IS-R.

Results showed that all items of both instruments were answered in the study sample (but not by every participant); items received between 224 and 258 responses in the total sample. Therefore, following the recommendations by Revelle et al. (2017), we computed the scale scores separately for the VIA-IS and VIA-IS-R by computing the mean over all completed items of the respective scale with no imputation of missing values.

The six core virtues (wisdom, courage, humanity, justice, temperance, transcendence) were assessed by the Core Virtue Rating Form (CVRF; Ruch et al., 2020), with one item per virtue. Participants read a short description of each virtue derived from Peterson and Seligman’s (2004) description of the virtues and were asked to rate on a 9-point scale from 1 = “not at all” to 9 = “absolutely” how well these descriptions referred to their typical behaviors.

The Comprehensive Inventory of Thriving (CIT; Su et al., 2014; German version by Hausler, Huber, et al., 2017) assesses both psychological and subjective well-being (“thriving”) using 54 items. The CIT can be scored in seven higher-order scales (i.e., relationship, engagement, mastery, autonomy, meaning, optimism, and subjective well-being) and a total score. A sample item for meaning is “My life has a clear sense of purpose.” (for example items of all scales, see Su et al., 2014). The CIT adopts a 5-point Likert scale from 1 = “strongly disagree” to 5 = “strongly agree”. The internal consistencies ranged from $\alpha = .74$ (engagement) to $\alpha = .96$ (subjective well-being), with $\alpha = .96$ for the total score.

Finally, to assess moral behaviors, 21 self-constructed items assessing four aspects of morally valued behaviors (helpfulness, assertiveness and reasoning, donation and volunteering, and compliance) were used (items are given in Supplementary material, Table S2). Participants indicated the frequency of showing morally valued behaviors such as “to make a donation” or “to take care of somebody else” on a 7-point scale from 1 = “never” to 7 = “several times a day”. The internal consistencies of the four subscales ranged from $\alpha = .69$ (donation and volunteering) to $\alpha = .83$ (assertiveness and reasoning), with $\alpha = .84$ for the total score.

Statistical analyses

All statistical analyses were conducted using R Studio (Version 1.1.453, R Core Team, 2018). We report how we

determined our sample size, all data exclusions, all data exclusion criteria, whether exclusion criteria were established prior to data analysis, all measures in the study, and all analyses (see preregistration on <https://aspre-dicted.org/x3qn8.pdf> and Data Availability Statement for details).

To compare the reliability of the scales, we used Cronbach's α (as preregistered) as well as McDonald's ω total (explorative). First, internal consistencies (both Cronbach's α and McDonald's ω_t) of the scores for both character strengths instruments were calculated using the *psych* package (Revelle, 2020). Second, we compared the internal consistencies of the VIA-IS and VIA-IS-R scale scores using the *cocron* package (Diedenhofen, 2016). Further, we computed correlations to analyze the convergent and discriminant relationships between the VIA-IS and the VIA-IS-R scales and their relationships to the criteria. We expect convergent correlations of both instruments to be higher than the discriminant correlations both within and between instruments for all strengths. In addition to the preregistered analyses, we corrected all correlations for attenuation, unless indicated otherwise, based on internal consistency estimates (McDonald's ω_t). We compared correlation coefficients using the *cocor* package (Diedenhofen & Musch, 2015); significance tests of comparisons of correlation coefficients were conducted using the formula suggested by Meng et al. (1992). We report exact p values, effect sizes, and 95% confidence intervals (see [Supplementary material](#)). All analyses used an alpha level of $p < .001$ to correct for alpha-error accumulation due to multiple comparisons.

Results

For descriptive statistics of the study variables see Tables S3 and S4 ([Supplementary material](#)).

Comparison of internal consistencies

Table 1 shows the estimates of internal consistency for the VIA-IS and the VIA-IS-R².

Table 1 shows that both instruments yielded internal consistency coefficients close to or above .70 for all character strengths, in terms of both Cronbach's α and McDonald's ω_t . Overall, the VIA-IS-R yielded numerically higher internal consistency estimates than the VIA-IS. Comparisons of the McDonald's ω_t estimates between the VIA-IS and the VIA-IS-R were significant for 11 of the 24 scales; higher estimates were observed for 9 scales in the VIA-IS-R and for 2 scales in the VIA-IS. Cronbach's α coefficients differed for 10 of the 24 scales; higher estimates were observed in the VIA-IS-R for 8 scales and for 2 scales in the VIA-IS.

²An anonymous reviewer suggested correcting for measurement length using the Spearman-Brown correction. If applying this correction, the reliabilities of the VIA-IS-R scales would increase by .02, which would not alter our conclusions regarding the comparison of reliabilities between the VIA-IS and VIA-IS-R.

Table 1. Comparison of internal consistencies between the VIA-IS and the VIA-IS-R.

Character strengths	McDonald's ω total		Cronbach's α	
	VIA-IS	VIA-IS-R	VIA-IS	VIA-IS-R
Creativity	.90	.91	.89	.90
Curiosity	.81	.85	.79	.82
Judgment	.82	.82	.81	.81
Learning	.83	.87	.82	.85
Perspective	.79	.78	.78	.75
Bravery	.76	.81	.76	.80
Perseverance	.84	.88	.84	.88
Honesty	.70	.69	.67	.65
Zest	.80	.86	.79	.84
Love	.78	.91	.77	.90
Kindness	.78	.79	.73	.76
Social intelligence	.80	.79	.79	.78
Teamwork	.73	.84	.72	.83
Fairness	.69	.86	.67	.84
Leadership	.75	.89	.73	.88
Forgiveness	.79	.81	.78	.81
Humility	.83	.75	.82	.74
Prudence	.72	.81	.69	.81
Self-regulation	.72	.86	.72	.86
ABE	.78	.79	.77	.78
Gratitude	.82	.78	.82	.77
Hope	.82	.85	.81	.85
Humor	.87	.88	.87	.88
Spirituality	.92	.86	.91	.86
Median	.80	.85	.79	.83

Notes. $N = 486$ – 488 . Learning = Love of learning, ABE = Appreciation of beauty and excellence. For estimates of internal consistency that significantly differ at $p < .001$ between the VIA-IS and the VIA-IS-R, the higher estimate is printed in boldface.

Convergence between VIA-IS and VIA-IS-R

Table 2 shows the correlations between the VIA-IS and the VIA-IS-R. Monotrait-heteromethod (MTHM) correlations are the correlations between the same character strengths across the two instruments. Heterotrait-heteromethod correlations (HTHM) are the correlations between one strength in one instrument (e.g., creativity in the VIA-IS) with the other scales in the other instrument (e.g., all scales except for creativity in the VIA-IS-R). Heterotrait-monomethod correlations (HTMM) are the correlations between one strength in one instrument (e.g., VIA-IS creativity) with the other scales in the same instrument (e.g., all scales except for creativity in the VIA-IS).

Table 2 shows that the corrected convergent correlations between the two instruments ranged from $r = .59$ (leadership) to $r = .91$ (spirituality) with a median of $r = .80$. Except for fairness and leadership, all convergent correlations were $> .70$. The discriminant correlations were substantially lower both between instruments (HTHM correlations; VIA-IS and VIA-IS-R: median = .23) and within instruments (HTMM correlations; VIA-IS: median = .30; VIA-IS-R: median = .22). Also, all convergent correlations were numerically higher than discriminant correlations with one exception: The character strength of leadership in the VIA-IS-R showed a numerically stronger relationship with bravery in the VIA-IS ($r = .61$) than with leadership in the VIA-IS ($r = .59$).

Comparison of criterion-related validity

Next, we examined the relationships between the VIA-IS and VIA-IS-R with the theoretically assigned core virtues

Table 2. Multitrait-Multimethod Matrix for the VIA-IS and the VIA-IS-R.

Character strengths	MTHM corrected (uncorrected)	HTHM		HTMM	
		VIA-IS median/min/max	VIA-IS-R median/min/max	VIA-IS median/min/max	VIA-IS-R median/min/max
Creativity	.89 (.81)	.23/.01/.47	.18/.00/.50	.27/.04/.51	.20/.02/.52
Curiosity	.86 (.71)	.31/.02/.61	.32/.05/.61	.34/.07/.62	.34/.05/.65
Judgment	.72 (.59)	.09/.00/.57	.12/.00/.62	.21/.00/.65	.10/.01/.71
Learning	.74 (.63)	.19/.08/.58	.17/.04/.61	.21/.05/.60	.22/.02/.65
Perspective	.82 (.65)	.29/.02/.47	.28/.01/.52	.34/.01/.57	.28/.02/.54
Bravery	.84 (.66)	.23/.00/.41	.33/.01/.60	.33/.03/.51	.26/.03/.61
Perseverance	.80 (.69)	.26/.02/.56	.24/.02/.63	.30/.03/.62	.23/.01/.60
Honesty	.73 (.51)	.24/.10/.46	.24/.03/.49	.31/.08/.48	.26/.04/.45
Zest	.87 (.72)	.30/.00/.68	.34/.03/.73	.41/.06/.78	.31/.08/.70
Love	.80 (.67)	.21/.00/.49	.29/.03/.51	.30/.05/.54	.22/.01/.47
Kindness	.77 (.61)	.26/.02/.49	.26/.06/.47	.32/.11/.56	.21/.02/.48
Social intelligence	.81 (.65)	.32/.01/.52	.28/.03/.47	.32/.00/.57	.27/.05/.54
Teamwork	.77 (.60)	.15/.00/.46	.19/.00/.57	.25/.00/.56	.09/.01/.39
Fairness	.69 (.53)	.21/.05/.57	.19/.00/.44	.30/.07/.62	.17/.04/.49
Leadership	.59 (.48)	.25/.00/.60	.28/.04/.55	.36/.10/.56	.30/.01/.61
Forgiveness	.72 (.58)	.13/.00/.37	.13/.00/.54	.16/.03/.62	.16/.02/.49
Humility	.87 (.68)	.12/.02/.37	.13/.00/.29	.11/.00/.43	.12/.01/.41
Prudence	.75 (.57)	.11/.02/.62	.09/.00/.57	.22/.04/.65	.08/.01/.71
Self-regulation	.74 (.58)	.22/.06/.63	.22/.02/.56	.25/.12/.62	.22/.01/.60
ABE	.86 (.68)	.21/.02/.45	.17/.02/.48	.26/.03/.55	.15/.03/.47
Gratitude	.78 (.63)	.36/.09/.48	.28/.03/.56	.35/.14/.59	.28/.11/.54
Hope	.85 (.71)	.34/.01/.73	.36/.02/.68	.35/.06/.78	.36/.04/.70
Humor	.86 (.75)	.17/.01/.38	.20/.03/.48	.28/.05/.51	.16/.01/.45
Spirituality	.91 (.81)	.14/.03/.41	.15/.01/.40	.15/.04/.46	.14/.01/.34
Median	.80 (.65)	.23/.02/.49	.23/.02/.55	.30/.05/.57	.22/.02/.54

Notes. $N = 486\text{--}488$. Learning = Love of learning, ABE = Appreciation of beauty and excellence. MTHM = monotrait-heteromethod correlations, HTHM = heterotrait-heteromethod correlations, HTMM = heterotrait-monomethod correlations.

All correlation coefficients were corrected for attenuation except for those in parentheses. For all correlation coefficients, absolute values are given.

All $r \geq .16$ are significant at $p < .001$. Exact p values and 95% confidence intervals are given in the Table S8.

(Peterson & Seligman, 2004; see [Supplementary material, Table S1](#)), the thriving total score, and the moral behaviors total score. The results are shown in [Table 3](#); the correlations with the six core virtues and all dimensions of thriving and moral behaviors are displayed in [Tables S5–S7 \(Supplementary material\)](#).

[Table 3](#) shows that most relationships of character strengths with the theoretically assigned core virtues were significant. For the VIA-IS-R, exceptions were teamwork, leadership, and humility, which showed non-significant relationships with the virtues of justice, and temperance. For both instruments, the strengths of forgiveness and humor showed non-significant correlations with the assigned virtues of temperance and transcendence, respectively. Further, for four of the strengths, the VIA-IS showed numerically stronger relationships with the assigned virtues than the VIA-IS-R, namely for judgment (wisdom and knowledge), perseverance (courage), and teamwork and leadership (justice).

All character strengths showed medium to large associations with thriving, except for judgment, humility, and prudence. For six character strengths (zest, love, kindness, humility, prudence, and humor), the VIA-IS yielded numerically higher positive correlations with thriving compared to the VIA-IS-R. For one character strength (love of learning), the VIA-IS-R correlated more strongly than the VIA-IS.

Most character strengths were positively related to moral behaviors. Exceptions were forgiveness, humility, and appreciation of beauty and excellence, which showed no significant relationships in both instruments, and judgment and prudence, which showed no significant relationships in the VIA-IS-R. The difference between the correlations only

reached significance for the character strengths of humility, judgment, and love. All these significant differences were in favor of the VIA-IS.

Overall, when considering the median relationships across all strengths, the VIA-IS and the VIA-IS-R showed very similar relationships with all three criteria. The pattern of non-attenuated correlations ([Supplementary material, Table S10](#)) was similar to the corrected correlations reported here. Further, when comparing the pattern of relationships of the VIA-IS and the VIA-IS-R with the outcomes by computing Spearman's rank correlations across the average correlation coefficients, the results were highly similar: Assigned core virtue: $r_s(22) = .83$, thriving: $r_s(22) = .89$, and moral behaviors: $r_s(22) = .87$.

Discussion

In this study, we compared the psychometric properties of the German versions of the original and revised VIA character strengths questionnaires. We examined (1) internal consistency, (2) convergent and discriminant validity (i.e., correlations within and between both instruments' scales), and (3) criterion-related validity (i.e., relationships with the six core virtues, thriving, and moral behaviors) of the two instruments.

Internal consistency

Both the VIA-IS-R and the VIA-IS showed acceptable levels (i.e., coefficients close to or above .70) of internal consistency for most scales. Hence, we conclude that the scale

Table 3. Correlations of the VIA-IS and the VIA-IS-R with the Assigned Six Core Virtues, Thriving total score, and Moral Behaviors total score.

Character strengths	Six core virtues		Thriving total score		Moral behaviors total score	
	VIA-IS	VIA-IS-R	VIA-IS	VIA-IS-R	VIA-IS	VIA-IS-R
Creativity ^a	.24	.27	.24	.28	.36	.34
Curiosity ^a	.28	.29	.59	.60	.38	.33
Judgment ^a	.39	.26	.11	.03	.25	.13
Learning ^a	.27	.31	.28	.42	.28	.28
Perspective ^a	.45	.49	.36	.36	.30	.31
Bravery ^b	.57	.53	.40	.39	.42	.37
Perseverance ^b	.43	.30	.51	.54	.29	.23
Honesty ^b	.25	.24	.26	.30	.28	.19
Zest ^b	.40	.33	.77	.71	.39	.34
Love ^c	.32	.23	.60	.52	.31	.21
Kindness ^c	.39	.35	.37	.19	.36	.33
Social intelligence ^c	.28	.32	.41	.47	.29	.36
Teamwork ^d	.23	.11	.34	.33	.23	.20
Fairness ^d	.43	.33	.23	.28	.19	.27
Leadership ^d	.33	.13	.43	.47	.36	.40
Forgiveness ^e	.13	.12	.26	.33	.10	.08
Humility ^e	.22	.16	.01	-.11	-.03	-.13
Prudence ^e	.36	.31	.11	-.01	.18	.11
Self-regulation ^e	.53	.53	.45	.40	.19	.17
ABE ^f	.28	.23	.29	.25	.15	.09
Gratitude ^f	.31	.33	.56	.50	.34	.31
Hope ^f	.21	.22	.80	.81	.38	.34
Humor ^f	.03	-.02	.41	.32	.23	.22
Spirituality ^f	.71	.70	.33	.35	.21	.20
Median	.32	.30	.37	.36	.29	.25

Notes. $N = 442\text{--}444$. Learning = Love of learning, ABE = Appreciation of beauty and excellence. All correlation coefficients were corrected for attenuation. Only correlations with theoretically assigned virtues (Peterson & Seligman, 2004) are given: ^a = wisdom and knowledge, ^b = courage, ^c = humanity, ^d = justice, ^e = temperance, ^f = transcendence.

When correlations between the two instruments differ at $p < .001$, the significantly higher correlation is printed in boldface. All $r \geq |.17|$ are significant at $p < .001$. Exact p values and 95% confidence intervals are given in the Table S9 (Supplementary material).

scores obtained from both questionnaires reliably assess the 24 strengths. Overall, the VIA-IS-R scales showed higher estimates of internal consistency than the VIA-IS scales. Thus, there were minor improvements in the revised version, in line with McGrath's (2019) aims to increase internal consistency, especially for specific scales such as love, fairness, leadership, and self-regulation. In this aspect, our results on the internal consistencies of the VIA-IS-R scales are comparable with the previously reported findings (McGrath & Wallace, 2021). Of course, one should also consider whether increases in internal consistency might have reduced the breadth of the covered content and thereby limited the content validity of the scales (e.g., Cronbach & Gleser, 1957). However, this is beyond the scope of the present manuscript.

Validity

The results supported the convergent and discriminant validity of the two instruments. The convergent correlations of both instruments were high (close to or above .70) for all strengths, and higher than the discriminant correlations both within and between instruments. The only exception was the VIA-IS-R scale leadership, which showed a stronger relationship to VIA-IS bravery than VIA-IS leadership. Leadership was also one of the scales that did not reach the .60 correlation with the same scale from the VIA-IS-120 as reported by McGrath and Wallace (2021). This difference can be explained by the modified interpretation of leadership in the revision: McGrath (2019) removed items that

reflected fairness and emphasized leadership abilities. This might also explain why the correlation between leadership and bravery was higher for the VIA-IS-R compared to the VIA-IS, and at the same time the correlation between leadership and the virtue of justice was higher for the VIA-IS compared to the VIA-IS-R. Thus, both instruments can generally be considered highly comparable; however, for the strength of leadership, greater differences between the two instruments can be expected. Further, in the revised version, the average correlations with other scales in the instrument were slightly smaller than in the VIA-IS; the difference in the medians of the scale inter-correlations of VIA-IS and VIA-IS-R was .08. Thus, regarding McGrath's (2019) aim to more clearly differentiate between scales, the revision showed a small improvement, although there was still considerable overlap among some scales (e.g., the highest were $r = .70$ between zest and hope and $r = .71$ between prudence and judgment).

Regarding criterion-related validity, in both instruments character strengths positively related to the theoretically assigned core virtues, with a few exceptions (e.g., forgiveness and humor), which were already demonstrated in previous studies (e.g., Ruch et al., 2020). Overall, the results suggested high comparability of both instruments in their relationships with core virtues. However, for some strengths (i.e., judgment, perseverance, teamwork, and leadership) the VIA-IS showed stronger relationships with the core six virtues than the VIA-IS-R. This suggests that the VIA-IS fits better to the theoretically assumed core virtues than the VIA-IS-R. Given that for some of these strengths, internal consistency

increased in the VIA-IS-R, one possible explanation is that these strengths became narrower in scope in the VIA-IS-R.

In relation to thriving and moral behaviors, the overall correlation patterns for the VIA-IS and VIA-IS-R were in line with previous findings (e.g., Hausler, Strecker et al., 2017). For seven strengths in relationship to thriving and three strengths in relationship to moral behaviors, differences in relationships with outcomes between the two instruments were found, mostly in favor of the VIA-IS. Again, the broader conceptualization of the constructs in the VIA-IS could explain some of these differences (e.g., for zest, love, and kindness). Another explanation could be the inclusion of reverse-scored items in the VIA-IS-R, which might have lowered the resulting criterion correlations by introducing method variance, in addition to the relevant content variance, into the scale (for a recent discussion, see Dueber et al., 2021). Overall, regarding the criterion-related validity the VIA-IS and the VIA-IS-R seemed to be widely comparable, with a weak tendency in favor of the VIA-IS.

Limitations and future directions

This study is limited by the non-representativeness of the sample (mostly women). Additionally, the present study relied on cross-sectional data, and longitudinal data would be useful to compare test-retest reliabilities or the prediction of future outcomes between the two instruments. While this study explored the criterion-related and construct validity of the VIA-IS and the VIA-IS-R, the content validity of the instruments was not investigated. Future research could focus on an examination of the character strengths constructs and their representation in each of the instruments.

To evaluate the potential impact of reverse-coded items on reliability and validity, the reverse-coded items in the VIA-IS-R could be scored separately and their validity be compared with the non-reverse coded items. Additionally, construct validity could be further tested by comparing self-reports and other-reports (e.g., peer-ratings, behavior ratings) of both the VIA-IS and VIA-IS-R scales in a MTMM analysis. Similarly, criterion-related validity could be investigated by employing external criteria (e.g., supervisor-rated leadership, peer-rated kindness, tested creativity or observed humor), rather than self-reports. Including separate data sources is especially suitable for trait constructs (Schimmack, 2010) and would show the generalizability of the present findings.

Conclusion

The present study extends existing research by comparing two character strengths measures using the same sample and is the first to validate the German version of the revised Inventory of Strengths (VIA-IS-R). The present results suggest that the VIA-IS-R has good psychometric properties. Also, the two character strengths measures are highly comparable, more so than the VIA-IS and the VIA-Youth (the instrument for assessing character strengths in children and adolescents; Kretschmar et al., 2022). Regarding criterion-

related validity, both measures showed similar correlation patterns with the six core virtues, thriving, and moral behaviors. The current study suggests that both instruments are reliable and valid measures suitable to assess the 24 VIA character strengths. Using the same sample for both instruments allowed us to more clearly compare the effects of the revision. Specifically, the revision increased homogeneity and somewhat lowered the inter-correlation between scales, but—perhaps inevitably—also slightly reduced criterion-related validity.

Open Scholarship



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ORCID

Valentina Vylobkova  <http://orcid.org/0000-0002-9355-9430>
 Sonja Heintz  <http://orcid.org/0000-0002-6229-7095>
 Fabian Gander  <http://orcid.org/0000-0002-2204-8828>
 Lisa Wagner  <http://orcid.org/0000-0002-1925-2676>
 Willibald Ruch  <http://orcid.org/0000-0001-5368-3616>

Data availability statement

The data that support the findings of this study are openly available online. Data, code, materials and codebook can be found in the online supplementary materials at https://osf.io/ftxd6/?view_only=73e76874c58440368ec7ea30b6df8221.

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