Electronic Supplementary Materials

The following Electronic Supplementary Materials provide information about additional analyses (specifically, invariance tests) that, for the sake of brevity, were not reported in detail in the main article text.

Invariance across Regions

As mentioned previously, an international sample was used for this study. The most represented nations in the study samples were the USA (51%) and New Zealand (28%). Two other countries that also contributed a moderate number of participants were Canada (3%) and Australia (2%). This meant that a total of 85% of participants were from either North America or Australasia. Despite the fact that these two regions are both predominantly English-speaking, there are cultural and linguistic differences between the two that might affect responses to questionnaires such as the brief SQ. At the suggestion of a reviewer, we chose to examine the invariance of the psychometric properties of the brief SQ across these two regions (Australasia and North America) in this electronic supplementary materials section.

The participants studied in this test of invariance were 340 North Americans (mean age = 41, *SD* = 14, males = 76%) and 191 Australasians (mean age = 33, *SD* = 13, males = 36%). The first model subjected to invariance testing was the equivalent of the final model used in the manuscript: a one-factor model with a correlated error term between items 1 and 6. The model also used the same estimator and missing data handling procedure. The results of this invariance test are provided in ESM Table 1.

ESM Table 1

Invariance Testing: Australasian vs. North American Respondents, One-Factor Model with Single Correlated Error Term

Model	Model fit statistics							Change in comparison to unconstrained model		
	χ^2	*df*	*p*	CFI	RMSEA	SRMR	BIC	$\Delta\chi^2$	Δdf	*p*
Unconstrained (configural invariance)	92.6	38	<.001	.914	0.074	0.047	17,147	-	-	-
Factor loadings equal (weak invariance)	99.3	45	<.001	.914	0.067	0.055	17,110	6.6	7	.472
Loadings and intercepts equal	127.2	52	<.001	.881	0.074	0.063	17,095	34.6	14	<.002
Loadings, intercepts & latent means equal	137.6	53	<.001	.866	0.078	0.069	17,100	45.2	15	<.001

Note. North American n = 340, Australasian n = 191.

The first row of ESM Table 1 indicates reasonable fit for a configural invariance model. The root mean square error of approximation (RMSEA) value of 0.074 falling within the 0.05-0.08 range described as indicating “reasonable” fit by Browne and Cudeck (1992, p. 239), while the standardized root mean square residual of 0.047 fell below the 0.08 cutoff for good fit suggested by Hu and Bentler (1999). This said, the significant chi-square value indicated an absence of perfect fit, and the comparative fit index (CFI) of .914 falls just beneath the .95 cutoff suggested by Hu and Bentler. Overall, the one-factor model with a correlated error term between items 1 and 6 seemed to fit reasonably well (but not perfectly) in both the Australasian and North American groups.

The second row of ESM Table 1 indicates further that there was no evidence of differing factor loadings across the two regions, with no statistically significant loss of fit

when loadings were held equal. Holding loadings equal also resulted in improvements to the parsimony-adjusted BIC and RMSEA statistics. In other words, the relationship between the latent systemizing factor and observed item responses was similar for Australasian and North American respondents.

Holding the item intercepts equal these two regions resulted in a statistically significant loss of fit, as shown in the third row of Table 1. This lack of invariance of intercepts across regions would probably be of limited practical importance, unless researchers wanted to compare the means of brief SQ scores across these two regions. In such a case, differing intercepts across regions suggests that a difference in simple summed brief SQ might not necessarily reflect a true difference in latent means.

It was nevertheless of interest to try and determine the reasons for the apparent lack of invariance. Inspection of modification indices suggested that two items in particular contributed substantially to this lack of invariance: Item 3 (programming video recorders), and item 7 (fascination with machines). In the model without intercepts constrained to equality across groups, item 3 had a lower intercept (4.109) in the North American group than in the Australasian group (4.454). On the other hand, item 7 had a higher intercept of 3.671 in the North American group as compared to just 2.751 in the Australasian group. In other words, the two groups had differing mean responses to these items, when systemizing level was controlled. These might reflect differences in the mean ages of the two groups, perhaps resulting in differences in the types of technologies of most interest to the two groups.

Much as for the test of invariance across gender, a difference in mean age is one plausible reason why the test of invariance across regions produced somewhat ambiguous results. Therefore, a second invariance model was estimated in which age was included as a predictor of observed responses to each of the eight items. The results for this test of

invariance are displayed in ESM Table 2. Given the control for age, there was no longer any evidence of a lack of invariance of item loadings or intercepts. This indicated that (with age controlled) simple summed systemizing scores could be compared across the two regions without differences in the psychometric properties of the scale across the two populations confounding the comparison, if such a comparison was required in a substantive project. This said, a lack of a significant deterioration in fit when latent means were held equal across the groups indicated a lack of evidence of a difference in latent mean systemizing levels across the two regions.

ESM Table 2

Invariance Testing: Australasian vs. North American Respondents, One-Factor ModelwWith Single Correlated Error Term and Age Controlled

Model	Model fit statistics							Change in comparison to unconstrained model		
	χ^2	*df*	*p*	CFI	RMSEA	SRMR	BIC	$\Delta\chi^2$	Δdf	*p*
Unconstrained (configural invariance)	88.5	38	<.001	.926	.071	.041	21,436	-	-	-
Factor loadings equal (weak invariance)	95.2	45	<.001	.927	.065	.047	21,399	6.5	7	.484
Loadings and intercepts equal	101.6	52	<.001	.928	.060	.050	21,361	12.5	14	.569
Loadings, intercepts & latent means equal	101.7	53	<.001	.929	.059	.050	21,354	12.5	15	.643

Note. North American *n* = 340, Australasian *n* = 191.

Invariance Across Age Groups

The main article text mentions a test of the measurement invariance of the brief SQ across older and younger participants. This analysis was completed in an attempt to identify the reasons for a lack of invariance of the scale across gender when age was uncontrolled. The analysis is only briefly described in the main text for brevity's sake, but is described in more detail here.

A median split was used to divide participants into younger and older groups. The median age in the sample was 36. There were 299 participants with ages above the median (the older group), and 320 with ages at or below the median (the younger group). 81% of the older group were male, but only 41% of the younger group were male. The model tested was

again a one-factor model with a single error correlation term (between the errors for items 1 and 6). The full results of the invariance test are displayed in ESM Table 2. Although there is no evidence of a lack of invariance of factor loadings, the fit statistics indicate a lack of invariance of intercepts across age groups (as mentioned in the article text). Constraining the intercepts to be equal across groups results in a statistically significant deterioration in fit per the chi-square statistic, as well as a large drop in the CFI, and the RMSEA increased to fall within the 0.08–0.10 "mediocre fit" range (MacCallum, Browne, & Sugawara, 1996, p. 134).

Inspection of modification indices suggested that this lack of invariance related especially to the intercepts for item 3 ("I find it difficult to learn how to programme video recorders"), 6 ("I can easily visualise how the motorways in my region link up"), and 7 ("I am fascinated by how machines work"). The modification indices for freeing the constraint that the intercept for younger participants be equal to the intercept for older participants was 12.1 for item 3, 4.1 for item 6, and 1.9 for item 7. In the model with intercepts free to vary across groups, younger participants had a higher intercept for item 3, but lower intercepts for items 6 and 7. In other words, independent of systemising level, younger participants tended to report finding programming video recorders easier than did older participants, but found visualising motorways harder, and were less fascinated by machines.

ESM Table 2

Invariance Testing: Older versus Younger Participants, One-Factor Model with Single Correlated Error Term

Model	Model fit statistics							Change in comparison to unconstrained model		
	χ^2	*df*	*p*	CFI	RMSEA	SRMR	BIC	$\Delta\chi^2$	Δdf	*p*
Unconstrained (configural invariance)	103.6	38	<.001	.910	.075		19,848	-	-	-
Factor loadings equal	109.0	45	<.001	.912	.068		19,809	4.8	7	.679
Loadings and intercepts equal	180.0	52	<.001	.824	.089		19,840	79.0	14	<.001
Loadings, intercepts & latent means equal	180.4	53	<.001	.825	.088		19,834	79.0	15	<.001

Note. Older participants (above median age) $n = 299$, younger participant (below or equal to median age) $n = 320$.

References for Electronic Supplementary Materials

Browne, M. W., & Cudeck, R. (1992). Alternative ways of assessing model fit. *Sociological Methods & Research, 21*(2), 230–258. doi:10.1177/0049124192021002005

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MacCallum, R. C., Browne, M. W., & Sugawara, H. M. (1996). Power analysis and determination of sample size for covariance structure modeling. *Psychological Methods, 1*(2), 130–149. doi:10.1037/1082-989X.1.2.130