**Supplemental Materials**

**Cross-Cultural Similarities and Differences in the Experience of Awe**

**by P. Razavi et al., 2016, *Emotion***

**http://dx.doi.org/10.1037/emo0000225**

Online Supplement 1

*Items Measuring Awe, Amusement, and Pride (in English) With Their Polish and Persian Translation*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Dimension | English | Polish | Persian |
| 1 | Awe | **I often feel awe.** | Często odczuwam podziw. | زیاد پیش میاید که من احساس شگفتی کنم. |
| 2 | Awe | **I see beauty all around me.** | Dostrzegam piękno wokół mnie. | من دائما زیبایی در اطرافم می بینم. |
| 3 | Awe | **I feel wonder almost every day.** | Prawie każdego dnia odczuwam podziw. | من تقریبا هر روز احساس شگفتی می کنم.  |
| 4 | Awe | **I often look for patterns in the objects around me.** | Zazwyczaj szukam wzorca w obiektach znajdujących się dookoła mnie. | من اغلب در اشباء اطرافم به دنبال یک الگو می گردم. |
| 5 | Awe | **I have many opportunities to see the beauty of nature.** | Mam wiele okazji, aby dostrzegać pi**ę**kno natury. | من موقیعیت های زیادی برای دیدن زیبایی های طبیعت دارم. |
| 6 | Awe | I seek out experiences that challenge my understanding of the world. | Szukam doświadczeń, które poddają w wątpliwość moje rozumienie świata. | من به دنبال موقعیت هایی می گردم که درکم از جهان را به چالش بکشند. |
| 7 | Amuse | **I find humor in almost everything.** | Prawie we wszystkim odnajduję humor. | من تقریبا در هرچیزی یک طنز پیدا می کنم. |
| 8 | Amuse | **I really enjoy teasing people I care about.** | Naprawdę lubię droczyć się z ludźmi, na których mi zależy. | من از اینکه سر به سر دوستانم بگذارم لذت می برم.  |
| 9 | Amuse | I am very easily amused. | Bardzo łatwo mnie rozśmieszyć. | من خیلی راحت سرگرم می شوم. |
| 10 | Amuse | **The people around me make a lot of jokes.** | Mam wokół siebie ludzi, którzy często żartują. | اطرافیان من زیاد اهل جوک هستند. |
| 11 | Amuse | **I make jokes about everything.** | Robię sobie żarty ze wszystkiego. | من در مورد همه چیز لطیفه می سازم. |
| 12 | Pride | **I feel good about myself.** | Czuję się ze sobą dobrze. | من در مورد خودم احساس خوبی دارم. |
| 13 | Pride | **I am proud of myself and my accomplishments.** | Jestem dumny(a) z siebie i moich dokonań. | من نسبت به خودم و موفقیت هایم احساس غرور دارم. |
| 14 | Pride | **Many people respect me.** | Wielu ludzi mnie szanuje. | خیلی ها به من احترام می گذارند. |
| 15 | Pride | I always stand up for what I believe. | Zawsze obstaję za tym, w co wierzę. | من همیشه بر سر آنچه اعتقاد داشته باشم پافشاری می کنم. |
| 16 | Pride | **People usually recognize my authority.** | Ludzie zazwyczaj uznają mój autorytet. | مردم معمولا قدرت و اختیار من را می پذیرند. |

*Note.* Items that met the simple structure criteria are in boldface. All items were translated by the authors into the target language, and independently back-translated into English by translators who had not seen the original English items. These three emotions possess different appraisals (Shiota, Keltner, & John, 2006). One experiences awe in response to a “vast” stimulus that surpasses the observer’s boundaries of ordinary experiences. Pride is elicited as a result of an accomplishment that has positive consequences for one’s social status. Amusement is experienced when one replaces their thought structure with another to understand a stimulus (e.g., a rhetorical joke).

Online Supplement 2

*Factor Loadings for Four Exploratory Factor Analyses With Direct Oblimin Rotation of Three DPES Subscales*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | Factors(US sample) | Factors(Iranian sample) | Factors(Malaysian sample) | Factors(Polish sample) |
|   | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| **Awe** |  |  |  |  |  |  |  |  |  |  |  |  |
| I often feel awe. | **.75** | .07 | -.03 | **.44** | .03 | -.14 | **.48** | .05 | -.01 | **.51** | .04 | -.11 |
| I see beauty all around me. | **.72** | .01 | .07 | **.76** | -.06 | .14 | **.61** | .03 | .07 | **.70** | -.08 | .04 |
| I feel wonder almost every day. | **.84** | -.02 | -.03 | **.81** | -.09 | .10 | **.71** | .05 | -.06 | **.61** | .06 | -.11 |
| I often look for patterns in the objects around me. | **.50** | -.01 | -.02 | **.45** | -.02 | .03 | **.51** | -.01 | -.02 | **.55** | -.10 | .15 |
| I have many opportunities to see the beauty of nature. | **.62** | -.05 | .02 | **.57** | -.02 | .29 | **.52** | -.04 | .19 | **.60** | -.06 | .10 |
| I seek out experiences that challenge my understanding of the world. | **.51** | .05 | .14 | .32 | .14 | .18 | **.54** | -.02 | .07 | .19 | .02 | -.09 |
| **Amusement** |  |  |  |  |  |  |  |  |  |  |  |  |
| I find humor in almost everything. | .24 | **.61** | .09 | -.06 | **.74** | -.05 | .19 | **.58** | -.01 | .12 | **.58** | -.16 |
| I really enjoy teasing people I care about. | -.11 | **.59** | .01 | -.09 | **.75** | .03 | -.07 | **.60** | .03 | -.11 | **.60** | -.03 |
| I am very easily amused. | .27 | **.57** | .01 | **.40** | .35 | .07 | .16 | **.56** | -.07 | .16 | **.63** | .08 |
| The people around me make a lot of jokes. | -.06 | **.69** | .05 | .16 | **.48** | -.01 | .16 | **.53** | .09 | .04 | **.70** | -.10 |
| I make jokes about everything. | .01 | **.84** | -.07 | -.11 | **.90** | .03 | -.19 | **.85** | .06 | -.02 | **.67** | -.01 |
| **Pride** |  |  |  |  |  |  |  |  |  |  |  |  |
| I feel good about myself. | .11 | .10 | **.62** | .22 | .06 | **.62** | -.05 | .06 | **.81** | .06 | -.04 | **.62** |
| I am proud of myself and my accomplishments. | .04 | .01 | **.74** | .20 | .03 | **.64** | .01 | -.07 | **.85** | .10 | .03 | **.72** |
| Many people respect me. | -.09 | .01 | **.74** | .17 | .01 | **.63** | .02 | .02 | **.73** | .03 | -.05 | **.77** |
| I always stand up for what I believe. | .10 | .06 | .39 | -.15 | -.05 | **.59** | .14 | .05 | **.51** | .01 | -.12 | **.40** |
| People usually recognize my authority. | -.04 | -.08 | **.72** | -.03 | .06 | **.69** | .01 | .02 | **.69** | -.12 | .01 | **.78** |

*Note.* Factor loadings > .40 are in boldface. Factor 1 = Awe; Factor 2 = Amusement; Factor 3 = Pride.

*Note.* Thurstone (1947) proposes the strictest criteria for a simple structure as: (a) there should be at least one near-zero loading (i.e., loadings between -.10 and +.10) for each item on some factor; (b) the number of zero loadings for each factor should be equal or more than the total number of factors; (c) for each of the two factors, there should be items with a significant loading (i.e., loadings with absolute values above .30) on one factor and a zero loading on another; (d) if there are more than two factors, there should be several items with zero loadings on two factors; (e) each factor should only contain a few complex items (with significant loadings on more than one factor). The results of the principal axis factoring with three factors explained 50.97%, 50.04%, 47.41%, and 45.73% of the total variance for the US, Iranian, Malaysian, and Polish sample, respectively.

Online Supplement 3

Justification for the Standardization of Data

Following the multi-group CFA, since the model that constrained the intercepts to be equal (i.e., scalar invariance) did not have an acceptable fit (chi-square likelihood ratio = 4.648, CFI = 0.801, TLI = 0.777, and RMSEA = 0.057), we investigated the data further for the possibility of cultural response biases. After calculating the overall means and overall standard deviations for each individual, we observed that there are cross-country differences in the pattern of means, *F*(3,1171) = 38.74, *p* < .001, ηp2 = .09, and standard deviations, *F*(3,1171) = 24.95, *p* < .001, ηp2 = .06, suggesting that there is a possibility of cultural response biases. Most noticeably, the data revealed that the Iranian participants, among our four samples, have the lowest overall mean (suggesting a pattern of nay-saying) and the highest standard deviation (suggesting a tendency to extreme responding). These findings warrant the need for standardization of data before any comparisons of the country-level means.

Consequently, we proceeded with ipsatization [y = (x – meanindividual) / *SD*individual], the most common form of standardization in the cross-cultural research (Fischer, 2004), and conducted the mean analyses using the ipsatized data. The overall pattern of means for awe remained almost the same, with the United States having the highest score and Iran having the lowest. Naturally, the between-country mean differences were reduced significantly, which is a property of this method of ipsatization—the effect size of the difference between the US and Iranian sample, which is *d* = 0.97 for the raw data, is reduced to *d* = 0.36 for the ipsatized data.

However, after an extensive review of the literature on standardization, as well as observing certain issues in the ipsatized data, we were concerned that this method of standardization might not be the best fit for our data. Here is the list of concerns that we had, which led us to use a different method of standardization that fits the current study better:

1. As stated by Hicks (1970), ipsatized scores “may be legitimately employed only for purposes of intra-individual comparisons” (p. 167). This is owing to the fact that within-subject mean-centering of the data [y = **(x – meanindividual)** / *SD*individual] creates a measurement for every individual within which variations of behavior occur. However, these measurements are “inappropriate for inter-individual comparisons, as two persons having an identical set of ipsative responses could be very different in terms of their overall amount of attitude or behavior” (Chan, 2003, p. 100).
2. To detect cultural response biases and apply ipsatization, it is important to have opposite constructs (here, e.g., both positive and negative emotions) and reverse-scored items (Fischer, 2004). In the absence of opposing constructs and reverse-scored items, it is difficult to conclude that the mean differences are owing to acquiescence bias, and, consequently, the use of ipsatization might not be justified, and may actually lead to unwanted consequences, as discussed in the next point.
3. One important concern regarding the use of ipsatization for this study stems from the internal consistency of the ipsatized data. As shown in Table 1, after ipsatization, internal consistency of the three variables drops drastically, a by-product of the removal of shared variance by ipsatization. This undermines the legitimacy of aggregating the ipsatized scores and comparing their means. Our proposed method of standardization (discussed later) does not have this problem—the standardized scores demonstrate excellent internal reliability (Table 1).
4. It is true that we see an overall pattern of mean differences across samples, with the Iranian sample having a lower mean than the other samples. However, this is not necessarily an indicator of a nay-saying for this sample. The three variables studied in this research are all positive emotions, and while they are structurally unique, they all have the same valence and are positively correlated. In fact, as all the three variables are positive emotions, the observed pattern of overall means could simply be an indicator that, for example, the participants in Iran experience positive emotions less frequently than the other three samples—a notion that is not conceptually surprising.

The observation that the Iranian participants have an overall lower score on all three positive emotions is consistent with the results of a Gallup poll (2014a) of 138 countries, which found Iranians to rank 93 in terms of experiencing positive emotions and events during a day (i.e., “experiencing lots of enjoyment,” “laughing or smiling a lot,” “feeling well-rested,” “being treated with respect,” and “learning or doing something interesting”). The same poll (Gallup, 2014b) found Iranians to rank second in the world in their daily experience of negative emotions (i.e., anger, stress, sadness, physical pain, and worry). Consistently, a comparison of the country-level happiness for our four samples as reported by the World Happiness Report (Helliwell, Layard, & Sachs, 2015) shows a consistent pattern with the findings of the present study, with Iran and the United States scoring lowest and highest, respectively. In light of these observations, we believe that it is likely that the overall lower score of the participants from Iran in the present study is a reflection of their daily experiences of these positive emotions, and should not be treated statistically as a response bias (Matsumoto & Juang, 2012).

Following these concerns, and consistent with Fischer’s (2004) suggestion, we decided to choose our standardization method based on the properties of our data and hypotheses. Most importantly, following the previous discussions, we chose a method that does not treat the overall mean differences as a response bias, but at the same time controls for the extreme-response patterns as indicated by the country-level differences in the overall standard deviation of scores. Therefore, we standardized the data by dividing each item’s score by the overall within-subject standard deviation [y = x / *SD*individual]. As demonstrated in Table 1, this method resulted in constructs that are highly internally consistent (αs ≥ .92). Furthermore, as opposed to the ipsatized scores, this method still allows for inter-individual comparisons of the constructs. As such, we used these standardized data in the analyses of the country-level differences in the Results section. However, for the benefit of the reader, we included all three types of means (raw, standardized, and ipsatized) in the Table 1 of the manuscript.

Table 1.

*Descriptive Statistics and Internal Consistencies for Raw, Ipsatized, and Standardized Data*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   |   | US |   | Iran |   | Malaysia |   | Poland |
|   |   | Mean (*SE*) | Cronbach’s α |   | Mean (*SE*) | Cronbach’s α |   | Mean (*SE*) | Cronbach’s α |   | Mean (*SE*) | Cronbach’s α |
| ***Awe*** | Raw | 5.02a(*0.07*) | .80 |  | 3.90b(*0.07*) | .76 |  | 4.43c(*0.07*) | .72 |  | 4.72d(*0.07*) | .74 |
|  | Ipsatized | -0.002a(*0.028*) | .42 |  | -0.182b(*0.030*) | .40 |  | -0.055a(*0.030*) | .22 |  | -0.090ab(*0.031*) | .41 |
|  | Standardized | 4.335a(*0.110*) | .97 |  | 2.813b(*0.118*) | .92 |  | 3.883ac(*0.119*) | .95 |  | 3.590c(*0.123*) | .94 |
| ***Amuse-ment*** | Raw | 5.00a(*0.08*) | .79 |  | 3.94b(*0.08*) | .81 |  | 4.47c(*0.08*) | .75 |  | 4.95a(*0.08*) | .74 |
|  | Ipsatized | 0.046a(*0.036*) | .45 |  | -0.134b(*0.038*) | .64 |  | -0.006ab(*0.038*) | .42 |  | 0.088a(*0.040*) | .39 |
|  | Standardized | 4.383a(*0.116*) | .97 |  | 2.861b(*0.125*) | .93 |  | 3.931ac(*0.125*) | .94 |  | 3.768c(*0.130*) | .94 |
| ***Pride*** | Raw | 4.86a(*0.07*) | .81 |  |  4.76 a(*0.07*) | .81 |  |  4.62 a(*0.07*) | .85 |  |  4.86 a(*0.08*) | .84 |
|  | Ipsatized | -0.046a(*0.032*) | .53 |  | 0.364b(*0.035*) | .55 |  | 0.077a(*0.034*) | .58 |  | 0.026a(*0.035*) | .59 |
|  | Standardized | 4.292a(*0.110*) | .97 |  | 3.358b(*0.118*) | .94 |  | 4.014ac(*0.118*) | .97 |  | 3.706bc(*0.122*) | .95 |

*Note.* Means and standard errors are marginal (controlling for age). In each row, means that do not share a letter are significantly different at *p* < .01 (Bonferroni corrected). The three items that did not meet the simple structure criteria were not included in these analyses. “Ipsatizated” calculation method: [y = (x – meanindividual) / *SD*individual]. “Standardized” calculation method: [y = x / *SD*individual].

References

Chan, W. (2003). Analyzing ipsative data in psychological research. *Behaviormetrika*, *30*, 99–

121.

Fischer, R. (2004). Standardization to account for cross-cultural response bias; a classification of

score adjustment procedures and review of research in JCCP. *Journal of Cross-Cultural Psychology*, *35*, 263–282.

Gallup. (2014a). *People worldwide are reporting a lot of positive emotions.* Princeton, NJ:

Gallup. Retrieved from http://www.gallup.com/poll/169322/people-worldwide-reporting-lot-positive-emotions.aspx

Gallup. (2014b). *World is becoming slightly more negative.* Princeton, NJ: Gallup. Retrieved

from http://www.gallup.com/poll/171419/world-becoming-slightly-negative.aspx

Helliwell, J. F., Layard, R., & Sachs, J. (2015). *World Happiness Report.* New York, NY: Earth

Institute, Columbia University.

Hicks, L. E. (1970). Some properties of ipsative, normative and forced-choice normative

measures. *Psychological Bulletin, 74*, 167–184.

Matsumoto, D., & Juang, L. (2012). *Culture and psychology* (5th ed.). Wadsworth, CA: Cengage

Learning.

Shiota, M. N., Keltner, D., & John, O. P. (2006). Positive emotion dispositions differentially

associated with Big Five personality and attachment style. *The Journal of Positive Psychology*, *1*, 61–71.

Thurstone, L. L. (1947). *Multiple factor analysis: A development and expansion of vectors of the*

*mind.* Chicago: University of Chicago.