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Time Stability of Acquiescence as Estimated by Manifest and Latent Approaches

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Acquiescence is the consistent tendency toward a shift of responses in the direction of agreement rather than disagreement regardless of the content, and it is usually measured by manifest approach based on a deviation from the median of the response scale and by latent approach using confirmatory factor analysis. Our goal was to investigate whether acquiescence, as measured by both approaches, was stable over time. We explored the relationship of acquiescence with variables that are usually considered to be validating criteria for acquiescence. The research was conducted on a general sample of 443 Slovak adult participants, while using the BFI-2 as the tool to identify acquiescence. Data were collected twice with an interval of almost two years. The results showed that both approaches showed relative stability over time, with correlation coefficients r = .50 for the manifest and r = .55 for the latent approach. The time stability of acquiescence suggests that acquiescence is more of a participant-related than a situation-related construct. Both approaches positively correlated with counts of agreements used as validating variables. For future research, we recommend using CFA to identify acquiescence because of the low reliability of the manifest approach and counts of agreements from another time point as a validity criterion whenever possible.

Key words: acquiescence, time stability, structural equation modeling

Introduction

Response style is considered to be a tendency to systematically provide responses to items in a way that does not correspond to the construct being measured. It is important to investigate response styles as they bias the measurement and threaten the validity of findings achieved using measuring methods (e.g., Bäckström & Björklund, 2013; Wetzel et al., 2013). Acquiescence is one of the response styles (e.g., Bentler et al., 1971; Lechner & Rammstedt, 2015) and can be defined

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as a) a participant's consistent tendency toward a shift of responses in the direction of agreement with all items regardless of the content (for example, if participants should respond with response 1 – disagree strongly according to the level of participant's acquiescence, the responses will be 2, 3, 4, or 5; e.g., Biderman et al., 2019; Danner & Rammstedt, 2016); b) a participant's consistent tendency toward a shift of responses in the direction of agreement or disagreement with all items regardless of the content (Rammstedt & Farmer, 2013; Soto & John, 2017). In our study, we use the first definition, as identification of acquiescence in our research will be based on non-content agreement.

There is a discussion about the time stability of acquiescence, which is an important question related to a better understanding of the nature of acquiescence. If acquiescence is stable over time, it could be considered a participant's trait, but if it is not, it could be a situational construct, and generalization of the measured acquiescence would thus be greatly limited. Several studies found moderately to high time stability of acquiescence. Billiet and Davidov (2008) investigated the time stability of acquiescence throughout the period of 4 years and found strong correlations between them (r = .56). Similar results were reported by Weijters et al. (2010) (one year period, 60% variance of acquiescence are the same), Danner et al. (2015) (moderate time stability), and Wetzel et al. (2016) (numerous data collection from 2002 to 2010 – correlations from r = .53 to r = .71). From a theoretical perspective, Plieninger and Heck (2018) claimed that acquiescence was a consistent and trait-like construct, which supports the possibility of time stability of acquiescence. However, we believe that current research in our cultural setting of an Eastern European country is still missing, and our study aims to contribute to this topic in the aforementioned specific cultural setting. For example, Johnson et al. (2005) found that acquiescence differs according to individualism, and Rammstedt et al. (2013) found that the relationship between acquiescence and education differs among different nations (for example negative relationship in German and US samples and positive relationship in a Czech sample). This could be caused by quality of education that is often criticized in Slovakia, for example in the context of developing critical thinking as one of the cognitive abilities (e.g., Čavojová & Jurkovič, 2017; Kosturková, 2017).

Acquiescence cannot be measured directly; however, it can be estimated by two basic approaches. In both approaches, a method with balanced numbers of pro-trait and con-trait items is optimal (e.g., Baumgartner & Steenkamp, 2001; Olson & Bilgen, 2011). When such a method is not available, a method with pairs of opposite items could be used as well (e.g., Rammstedt & Kemper, 2011; Soto et al., 2008). A simpler way to identify acquiescence is at the manifest level. An indicator of acquiescence can be computed as a deviation from the median of the response scale. This indicator can be computed by counting all items with non-recoded reverse items and then dividing them by the number of items. For clearer results, the median of the response scale can be subtracted from this variable. If acquiescence is not present, this value should be close to zero (Hinz et al., 2007; Lechner & Rammstedt, 2015). There is a discussion about whether negative values in this indicator should be allowed, or if the choice to fix the lowest level to zero would be more appropriate. If the result is below zero, it is still biased, but the bias is caused by disaquiescence (Lechner et al., 2019). Fixing the lowest level of acquiescence to zero is currently not a common practice. In addition, there may be a possible disadvantage of this approach, and that is if a researcher wants to clear the data by ipsative transfor-

mation. Ipsative transformation is a method for controlling acquiescence and clearing data from bias. The level of manifest indicator of acquiescence is subtracted from every item (e.g., Rammstedt & Farmer, 2013). If the lowest level is fixed to zero, it would clear bias of acquiescence, but no other response styles, e.g., disacquiescence.

Secondly, a more complex approach for identifying acquiescence is by structural equation modeling (SEM) with confirmatory factor analysis (CFA) (e.g., Danner & Rammstedt, 2016; Welkenhuysen-Gybels et al., 2003). In this latent approach, acquiescence is identified with non-recoded reverse items as well. In the CFA approach, along with facet (substantive) factors, the factor of response style is suggested, which loads all items, however, with different item loadings (loadings of items caused by response style should be non-zero). According to Danner and Rammstedt (2016), CFA is the better approach for identifying acquiescence because of the possible low reliability of the manifest approach, even though there have been apparent difficulties in identifying acquiescence through this approach (see Chylíková, 2020). Danner et al. (2015) used the example of correlations of acquiescence in personality items and acquiescence in attitude items identified by both manifest and latent approaches. Correlations were higher for the latent approach, and the authors concluded that correlations computed by this method were less affected by errors and biases.

However, besides non-zero loadings of response style to items, other conditions have to be met to confirm that the identified response style factor is truly acquiescence (e.g., Billiet & McClendon, 2000; Chylíková, 2020). The first condition is that the model fit must be improved after the response style factor is included in the model with facet factors. The second condition is that the variances of the response style factor should be non-zero but must be lower than for facet factors. The third condition is that the factor loadings for items should be non-zero, but lower than loadings from facet factors. The fourth condition is that the response style factor should correlate positively with the counts of agreements. Chylíková (2020) divided the counts of agreements into two separate variables: a count of all total agreements (only responses indicating 5 when using a 5-point Likert scale) and a count of all inclinations to the agreement (responses indicating 4 and 5 when using a 5-point Likert scale) in the whole method. According to the above-mentioned authors, there is also a condition regarding the negative correlation between acquiescence and proxy of cognitive abilities – education and age. However, this condition is questionable due to the problematic proxy of cognitive abilities. Findings concerning the relationship between acquiescence and age are inconsistent, e.g., Davis et al. (2020) or Hinz et al. (2007) found a positive relationship between both these variables, but Soto et al. (2008) found the opposite. Lechner et al. (2019) also suggested that this relationship could not be linear based on their results. The relationship between acquiescence and education is more promising but still problematic. Several studies found a negative relationship between education and acquiescence (e.g., Billiet & McClendon, 2000; Rammstedt et al., 2017; Schaeffer & Presser, 2003); however, only in Western Europe and US culture settings. Rammstedt et al. (2013) used multi-cultural data, including the Czech Republic, and found a positive relationship between acquiescence and education. The study by Danner et al. (2015) also supported the inconsistency in the relationship between education and acquiescence as they found no significant relationship between these two variables. Therefore, we decided not to include condition regarding the negative relationship between

acquiescence and cognitive abilities in our study, but only to explore these relationships. We decided that correlations of acquiescence with the count of agreements present a satisfactory validation of acquiescence, without further validation with education and age. To validate acquiescence, count of total agreements and count of inclination to agreements must correlate positively with the response style factor. A positive relationship between acquiescence and count of total agreements can confirm that the identified response style is not a mid-point response style. A relationship between acquiescence and count of inclination to agreements could confirm that the identified response style is not an extreme response style. Billiet, McClendon (2000), and Chylíková (2020) pointed out that using the counts of agreements from the same data/measure used by the authors to identify acquiescence could be imprecise. If acquiescence is stable over time, it is possible to use the counts of agreements from a different time point. Weijters et al. (2013) showed that agreement with items does not have to mean that the identified response style is acquiescence, but it could be a careless response style. These authors emphasized that inconsistency of responses to pro-trait and con-trait items did not have to be automatic agreement, but carelessness of participants who did not realize the items were reversed. The authors also claimed that the probability of a careless response style is greater when items of one domain follow one another. When the opposite is achieved and items for domains are mixed (e.g., in BFI-2, Soto & John, 2017), the probability of bias by careless response style is lower. Another option for eliminating the careless response style would be the inclusion of attention-check items (Shamon & Berning, 2020). Researchers can consider eliminating participants who have not passed these items.

Aim of the Study

As mentioned above, current research on the time stability of acquiescence is limited by specific cultural samples (Western Europe). In our study, we decided to contribute to the knowledge about the time stability of acquiescence by results on a sample from Eastern Europe and with a time interval of almost two years. This topic is important for a better understanding of acquiescence (e.g., Wetzel et al., 2016), especially for the question of whether acquiescence is a participant-related or situation-related variable. As there is a question as to whether the two approaches to acquiescence converge or not (Danner et al., 2015), we decided to use both manifest and latent approaches and to investigate time stability for both approaches.

The second goal of this study was to investigate how manifest and latent approaches correlated with counts of agreements for the validation purpose of acquiescence and to explore the relationship between acquiescence and education, and age. As we have mentioned above, the main conditions that acquiescence should meet are positive correlations of acquiescence with count of total agreements and count of inclination to agreements.

Method

Sample[1]

The sample consisted of 443 participants from Slovak general adult population, 212 men (47.9%) and 231 women (52.1%). Range of age is from 19 to 77 years (M = 46.82;

[1] Data were obtained thanks to VEGA n. 1/0363/18 project *Adaptation of the Big Five Inventory BFI-2 and its sociodemographic and psychological connections in Slovak context*.

Table 1 *The highest level of education attained by participants*

The highest level of education	*N* (%)
Elementary education	22 (5%)
High school education without graduation	117 (26.4%)
High school education with graduation	211 (47.6%)
Bachelor's degree in university education	15 (3.4%)
Master's degree in university education	72 (16.3%)
Doctoral degree in university education	6 (1.4%)

SD = 14.99; *Mdn* = 46; *IQR* = 27). Participants provided responses to attention-check items (participants were instructed to select specific responses) and approximately 10% of participants failed. Their responses were checked and if they responded incorrectly, they were excluded from the sample. All participants provided informed consent and agreed to participate in the research. Data were collected twice, in November 2018 and in October 2020, and 358 participants were dropped. Participants were recruited through an online panel of a research agency. The highest level of education attained by the participants is presented in Table 1. The data set is available at https://osf.io/cj2sy/?view_only=f6f80b46feac4faeba97335978418b71.

Measures

The Slovak version of the Big Five Inventory 2 (BFI-2; Halama et al., 2020, original Soto & John, 2017) was selected as a tool for the identification of acquiescence. The advantage of this inventory when identifying acquiescence is equality of pro-trait and con-trait items (e.g., Rammstedt & Farmer, 2013; Soto et al., 2008). Another advantage is that the items for one domain do not follow one another; this could reduce the chance to identify a careless response style instead of acquiescence (Weijters et al., 2013). BFI-2 contains 60 items, 12 for each domain. Each domain has 3 facets with an equal number of pro-trait and con-trait items. The inventory uses a Likert-type scale from 1 to 5 (1 for disagree strongly and 5 for agree strongly). Indicators of acquiescence were computed and modeled for the whole method.

Data Analysis

Count of total agreements were computed as a total number of items where participants responded with response 5 (agree strongly) and count of inclination to agreements as a total number of items where participants responded with responses 4 and 5 (agree a little; agree strongly). Correlation analyses of the count of total agreements and count of inclination to agreements for both time points were performed. These correlations were used as conditions for later validation of the acquiescence score through relationships of acquiescence with count of total agreements and count of inclination to agreements.

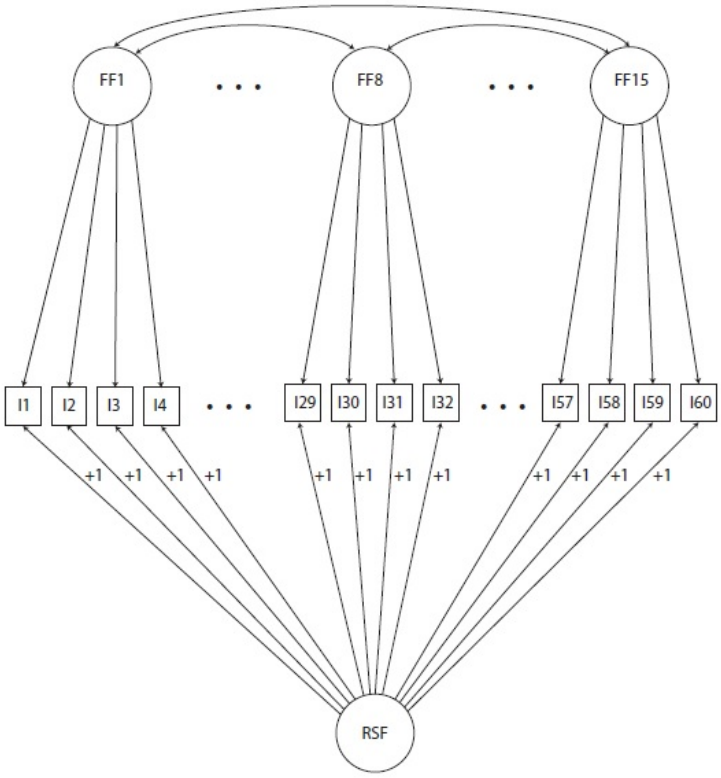
For both time points, manifest indicators of acquiescence were computed through deviation from the median of the response scale with non-recoded items, using the following formula:

$$Acquiescence = \frac{\sum_{i=1}^{n} itemscore_i}{n} - medianofresponsescale$$

To analyze the relationships between acquiescence and validation variables, count of total agreements, and count of inclination to agreements, Pearson's correlation analysis

was applied. This statistical method was also used for the analysis of time stability.

For latent identification of acquiescence, confirmatory factor analysis was performed with the bifactor model and using the Maximum-Likelihood as an estimator. For this analysis, R version 4.1.1 (2021) was used with the lavaan (latent variable analysis) package 0.6.-7 (Rosseel, 2012). Acquiescence was estimated for the whole method in both time points. The model contained fifteen facet factors and one response style factor (see Figure 1). Factor loadings of the response style factor to items were fixed to +1 and facet factors had free loadings. Correlations between facet factors were allowed; however, correlations between the response style and facet factors were set to zero. Firstly, CFA was performed only for facet factors, and later, the response style factor was added to the model. In the first step, validation of acquiescence was performed through criteria as fixing factor loadings to all items for the response style factor to +1; improving model fit after adding the response style factor into the model with only facet factors; non-zero but smaller variances of the response style factor than facet factors; and non-zero, but smaller factor loadings of the response style factor than facet factors. In the next step, count of total agreements and count of inclination to



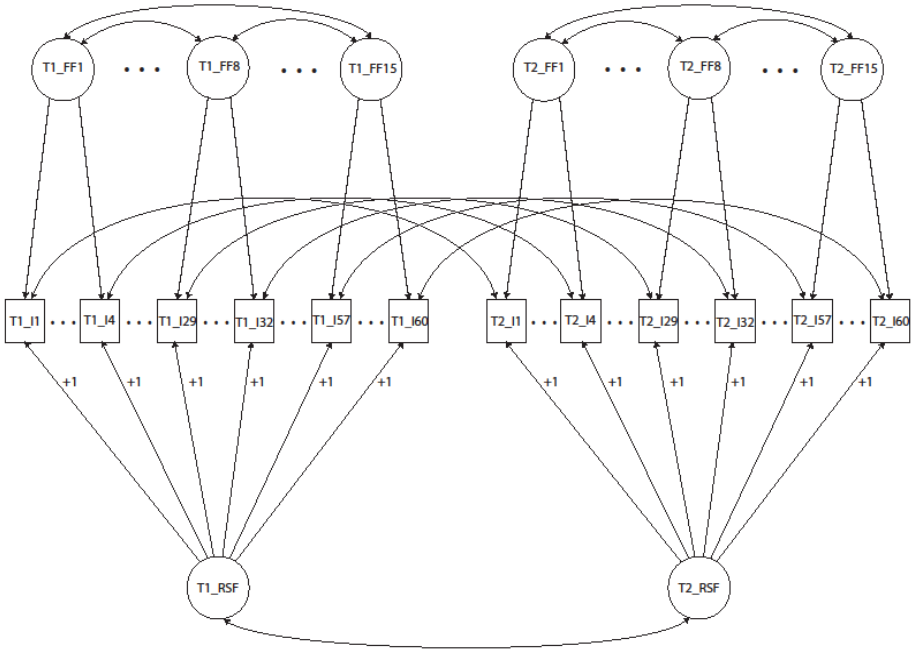
Note. FF = Facet factors; RSF = Response style factor; I = Item.

Figure 1 *Model with facet factors and one response style factor.*

agreements were added separately to the model as the observed variables for correlations with the response style.

In order to test the time stability, two models of two time points were included in one model (30 facet factors, 2 response style factors, see Figure 2). Correlations between facet factors and between response style factors were allowed; however, correlations between response style factors and facet factors were set to zero. Correlations between residuals were allowed as well (see Biderman et al., 2018). We reached metric invariance in the latent model for considering time stability of acquiescence (same factor loadings of same facet factors from both time points; for example, see Thielmann et al., 2020). The correlations between response style factors (see Figure 2) were considered to be indicators of time stability.

We explored correlations between acquiescence and education and age in both approaches. At the manifest level, correlations between acquiescence indicators and education were verified through Spearman's correlation and between acquiescence indicators and age through Pearson's correlation. At the latent level, all correlations were verified through correlations in confirmatory factor analysis. The syntax for all analysis is available at https://osf.io/cj2sy/?view_only=f6f80b46feac4faeba97335978418b71.



Note. T1 = Time point 1; T2 = Time point 2; FF = Facet factors; RSF = Response style factor; I = Item.

Figure 2 *Model with facets factors and response style factors in two time points.*

Results

Correlations between counts of agreements at both time points were computed. We found strong positive correlation (r = .69) in relation to count of total agreements. The correlation for the count of inclination to agreements was slightly lower (r = .49); we thus accepted both counts of agreements as stable in time and, in the following analyses, counts of agreements from another time point were used for correlation analyses with acquiescence. For the purpose of comparison to the time stability of acquiescence, we analyzed the time stability of facets at the manifest as well as the latent level. Time stability of personality facets ranged from r = .57 (compassion) to r = .77 (sociability) at the manifest level and from r = .78 (compassion) to r = .92 (sociability) at the latent level.

Manifest indicators of acquiescence were computed as deviations from the median of the response scale. The lowest level of acquiescence was not fixed to zero. Pearson's correlations were used to verify relationships between acquiescence indicators and count of total agreements, count of inclination to agreements (both counts of agreements from another time point), and age and Spearman's correlations were used to verify relationships between acquiescence indicators and age. Results are presented in Table 2. We found significant positive correlations between acquiescence and both counts of agreements at both time points, which means that the assumed requirements for validation of acquiescence were fulfilled. We found negative correlations between acquiescence and age at both time points and between acquiescence and education at the first time point. However, these correlations were very weak.

Time stability of acquiescence estimated by the manifest approach was analyzed by Pearson's correlations between the scores of two time points. We found a strong positive correlation (r = .50), suggesting that acquiescence estimated by manifest approach shows longitudinal stability.

In the next step, we repeated the analysis using the latent approach. The main conditions for interpreting the response style factor in the latent approach are that the response style factor must improve the model fit; non-zero, but smaller variances for the response style factor than for facet factors; non-zero, but smaller factor loadings of the response style factor than facet factors; and positive correlations between acquiescence and both counts of agreements from a different time point. All conditions were reached at both time points. In an exploratory analysis, we only found a correlation between acqui-

Table 2 *Relationships between manifest indicators of acquiescence for both time points and count of total agreements, count of inclination to agreements, education, and age*

		Count of total agreements	Count of inclination to agreements	Education	Age
Acquiescence	T1	**.27**	**.39**	*-.10*	*-.10*
	T2	**.14**	**.32**	.04	*-.11*

Note. T1 = Time1; T2 = Time2; Presented results of correlation with education are expressed in Spearman's correlation coefficients; Presented results of correlations with count of total agreements, count of inclination to agreements, and age are expressed in Person's correlation coefficients; italics = $p < 0.05$; bold = $p < 0.01$ or $p < 0.001$.

escence and education at the first time point, however, only with a very weak effect size. We did not find any significant correlations between acquiescence and age. Results of indicators of model fit, variances, factor loadings, and correlations between acquiescence and count of total agreements, count of inclination to agreements, education, and age are presented in Table 3.

The latent model displayed in Figure 2 was used to estimate the time stability of acquiescence. To validly assess the time stability of acquiescence, we imposed metric invariance (factor loadings of facets factors were equal at both time points) in our model. Correlations between facet factors and response style factors were not allowed, but correlations between facet factors, correlations between response style factors at two time points, and correlations between residuals were allowed. Indicators of model fit before and after imposing metric invariance are presented in Table 4. We found a strong correlation between acquiescence latent factors in the first and the second time point suggesting that acquiescence is stable in time (r = .55).

Table 3 *Model fit indices, variances, factor loadings for models in CFA, and correlations between acquiescence and counts of agreements in both time points, education, and age*

		Acquiescence Time point 1	Acquiescence Time point 2
CFI	Without acq factor	.742	.761
	With acq factor	.829	.850
TLI	Without acq factor	.715	.736
	With acq factor	.812	.834
RMSEA	Without acq factor	.057 [.054-.059]	.058 [.055-.060]
	With acq factor	.046 [.044-.048]	.046 [.043-.048]
SRMR	Without acq factor	.075	.077
	With acq factor	.066	.068
Chi-Square	Without acq factor	3879.436	3961.695
	With acq factor	3106.142	3083.598
Degrees of Freedom	Without acq factor	1605	1605
	With acq factor	1604	1604
Variances	Facet factors	.133 - .587	.188 - .645
	Acquiescence factor	.036	.039
Factor loadings	Facet factors	.362 - .824	.346 - .862
	Acquiescence factor	.147 - .248	.156 - .263
Count of total agreements		**.371**	**.219**
Count of inclination to agreements		**.455**	**.399**
Education		*-.107*	-.067
Age		-.092	-.105

Note. acq = Acquiescence; Results of variances and factor loadings for facet factors are presented in the range from minimum to maximum; Results of factor loadings for acquiescence factor are presented in the range from minimum to maximum; Results of factor loadings of facet factors are in absolute value; Presented results of correlations are standardized correlation coefficients; italics = $p < 0.05$; bold = $p < 0.01$ or $p < 0.001$.

Table 4 *Model fit indices before and after metric invariance*

	Loadings freely estimated	Imposed metric invariance
CFI	.848	.847
TLI	.833	.834
RMSEA	.036 [.034-.037]	.036[.034-.037]
SRMR	.064	.064
Chi-Square	10192.200	10241.942
Degrees of Freedom	6522	6563

Discussion

In this study, two approaches were used separately to verify the time stability of acquiescence. The results of both approaches showed rather consistent time stability of acquiescence in the long-time period of almost two years. Our results are in line with previous studies, for example, studies of Danner et al. (2015), Wetzel et al. (2016) realized in Western Europe, and so we can assume that acquiescence is similarly stable in time in Eastern Europe as well. The time stability of acquiescence at the manifest and latent levels is quite similar. Based on these results, we conclude that acquiescent responding could be considered a stable tendency of the participant (rather participant-related than situation-related variable), and both approaches can be sufficient and useful tools for estimation of this tendency. When the results of time stability of substantive facets of Big Five are also included, correlations of acquiescence across two time points are slightly lower than those of the facets (difference was bigger in latent approach); nevertheless, acquiescence in terms of time stability is partly similar to personality traits, which supports the hypothesis of acquiescence as a participant-related construct. Considering acquiescence to be a time-stable and participant-related construct makes it possible for researchers to generalize the results of studies on acquiescence in a broader way. For example, trying to find predictors of acquiescence would be much harder, if acquiescence was not a stable construct and it was affected by situational variables – even the possibility to generalize such studies would be more limited.

The second goal of this study was to investigate how manifest and latent approaches meet correlation criteria for validation of acquiescence. In the manifest approach, authors do not use such conditions and automatically assume that deviation from the median of the response scale is an indicator of acquiescence (e.g., Rammstedt & Farmer, 2013; Soto et al., 2008). However, knowledge of the relationship of the manifest acquiescence indicator with these criteria could be informative, as a confirmation of assumed relations with these variables can strengthen the interpretation of such a variable as acquiescence. In the latent approach, the situation is a little more complicated, since different authors use different criteria for the validation of acquiescence. Some authors use only the conditions of improving model fit; non-zero, but smaller variances of acquiescence than in domain factors; non-zero, but smaller factor loadings of acquiescence than of domain factors; fixing factor loadings of acquiescence to items to +1; and the balanced number of pro-trait and con-trait items (e.g., Danner & Rammstedt, 2016). Billiet and McClendon (2000) also used conditions with a positive relationship with the count of agreements and

the absence of relationships with the count of middle responses. Chylíková (2020) applied these conditions, but instead of the count of middle responses, the count of agreements was divided into two parts – the count of total agreements and the count of inclination to agreements. However, these authors also used a condition of a negative relationship with education and a positive relationship with age. We did not include this condition in our study because of inconsistency in the previous studies, but we investigated these relationships at the exploratory level. We did not find consistent relationships between acquiescence and education and age and even when we found significant relationships, they were very weak. These results contribute to the discussion about non-consistent results of correlations between acquiescence and education, and age.

For future research, we do not recommend using education and age as validating factors for acquiescence, at least in our Eastern European setting. We rather suggest using the counts of agreements as validating factors. Whenever possible, counts of agreements from different time points could be used for validating acquiescence (with the assumption that acquiescence is stable over time, see also Billiet & McClendon, 2000; Chylíková, 2020). There is also a possibility to use counts of agreements from different methods, but, firstly, questions about domain specificity must be answered. Domain and method specificity of acquiescence is an important topic, and it is important to investigate domain generalizability of acquiescence across different methods (e.g., different personality inventories; see also Danner & Rammstedt, 2016). Another recommendation for future research is using the latent approach instead of the manifest approach to estimate acquiescence. We are aware that identifying acquiescence manifestly could be easier than through the latent approach. However, Danner et al. (2015) and Danner and Rammstedt (2016) recommended the latent approach as more appropriate, especially if a researcher correlates acquiescence with other variables and variables are only measured by a small number of items. The low number of items causes a low level of reliability (e.g., Hřebíčková et al., 2020) and could decrease the level of correlations (e.g., Danner et al., 2015).

Our study has several limitations. First of all, we used the online panel of a research agency as a source to recruit the participants. Data from research agencies are specific, especially because participants are rewarded for their participation. That could interfere with the motivation of participants which could present a significant factor contributing to acquiescence (see Lechner et al., 2019). Compared to other studies (e.g., Danner et al., 2015; Wetzel et al., 2016), our sample was smaller, which needs to be taken into account when generalizing our results. Another limitation is the nature of the method used – the personality inventory. Our results have limited generalization to other types of methods, for example, attitude scales or knowledge tests. Therefore, the time stability of acquiescence should be investigated using measures with different content in future research.

Conclusion

Our results confirmed that acquiescence is time stable even after almost two years, and, therefore, it is more of a participant-related than situation-related construct. A slightly higher level of time stability was found for the latent approach in comparison to the manifest approach. We also contributed to the issue of acquiescence validation through external criteria. The assumption of time stability makes it possible to use counts of agreements from another time point to vali-

date the identified acquiescence in line with previous recommendations (Billiet & McClendon, 2000; Chylíková, 2020) but omitting age and education as validating constructs. In future research, we suggest omitting these variables from validating criteria as well, at least in Eastern Europe. In further research, it is important to study whether acquiescence is also independent of the methods used or if it is domain and method-specific, as that would answer the question of whether counts of agreements from different methods could also be used to validate acquiescence.

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