A unified measure of moral neutralization

An addendum

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A Unified Measure of Moral Neutralization

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Introduction

The present addendum is an amendment to Ribeaud and Eisner's (2010) article on a unified measure of moral neutralization. In particular, it includes data from wave 5 of the z-proso study at age 13.7 that was not yet available at the time of the original publication which is based on the wave 4 measurement at age 11.3.

Among others, the additional data collection allows us to test the stability of the factor structure as well as of the predictive validity over time and to assess the amount of (longer term) test-retest correlation and the change-on-change correlations with selected outcomes.

Moreover, the original 16-item scale was extended by two items in order to more fully represent the range of neutralization mechanisms. Accordingly, we will also show how this amendment changed the overall scale characteristics.

1. The wave 5 data collection

The present addendum mainly relies on wave 5 data of the z-proso study described in Ribeaud and Eisner (2010). For this data collection all students that formed the initial gross sample of 1675 cases were recontacted since given their age, *passive* parent consent was sufficient according to the Swiss civil law. Accordingly, chances to recruit students that could not participate until now due to their parents' refusal appeared promising. The method and the setting of the survey was basically the same as at wave 4, i.e. paper-and-pencil questionnaires were completed in small groups under the supervision of trained survey collaborators in class-room settings. However, contrary to wave 4, the survey sessions took place outside regular school time. Since this seriously jeopardized the potential participation rate, students were offered a substantial financial incentive for participation worth 30 Swiss Francs (approx. 30 USD). Based on this approach 1366 participants could be recruited (81.6 % of the gross sample). In 1032 cases (61.6 % of the gross sample, 93.1 % of the wave 4 and 75.5 % of the wave 5 sample) data were available for both wave 4 and 5. Mean age at wave 5 was 13.7 years (*SD*=0.37) and 1.0 % attended a 8^{th}, 84.0 % a 7^{th}, 13.6 % a 6^{th}, and 0.5 % attended a 5^{th} grade class. 0.9 % attended a class without defined grades or with an unknown grade. Overall, 2.3 % of the participants attended a special education class. 49.5 % had a migration background, i.e., both parents were born abroad.

Using the same methodology as in earlier waves, a written teacher survey was conducted shortly after the student wave 5 survey. In contrast, parent surveys were discontinued after wave 4. For this reason, parent-reported outcomes are not reported in this addendum.

2. Measures and descriptive statistics

Moral neutralization (MN) was measured on the 16-item scale described in Ribeaud and Eisner (2010). In order to more fully reflect the range of neutralization mechanisms, two additional items related to minimization of agency that were part of the 35-item pretest but not of the final scale were (re-)included at wave 5 (items 23 & 30, Tab. 2, Ribeaud & Eisner, 2010).

The descriptive statistics of these items at both waves are presented in Table 1 along with key cross-wave comparisons. Minor deviations from Table 4 in the original publication are due to the restriction of the sample to cases with valid data at both wave 4 and 5.

Table 1 *Descriptive statistics and cross-wave comparisons of the MN items, waves 4 and 5 (N=1032)*

Item ID[1]	Item Label	Domain	Wave 4 M (SD)	Wave 5 M (SD)	Waves 4-5 t-value[2]	Waves 4-5 correlation
1	ok fighting to protect friends	Cognitive Restructuration	2.23 (0.98)	2.56 (0.94)	9.27***	.286***
2	ok fighting sb disrespecting friends	Cognitive Restructuration	1.40 (0.66)	1.63 (0.75)	8.31***	.209***
12	ok bullying sb who is bullied	Cognitive Restructuration	1.47 (0.70)	1.77 (0.77)	10.59***	.221***
13	sometimes ok bullying others	Cognitive Restructuration	1.56 (0.73)	1.92 (0.83)	12.15***	.248***
15	bullying is normal	Cognitive Restructuration	1.90 (0.91)	2.53 (0.91)	17.79***	.237***
22	sometimes people need to be bashed	Cognitive Restructuration	1.56 (0.83)	1.85 (0.96)	8.58***	.252***
24	only wimps avoid fights	Cognitive Restructuration	1.79 (1.02)	1.91 (1.00)	3.11**	.251***
29	ok fighting to defend rights	Cognitive Restructuration	1.67 (0.84)	2.02 (0.91)	10.77***	.257***
11	solve problems with violence	Distorting Consequences	1.26 (0.63)	1.51 (0.72)	9.47***	.203***
16	bullying to teach lesson	Distorting Consequences	1.51 (0.76)	1.80 (0.87)	9.29***	.253***
20	being bullied strengthens	Distorting Consequences	1.76 (0.87)	2.08 (0.91)	8.51***	.096**
3	ok being mean when misbehaving	Blame the Victim	1.51 (0.69)	2.04 (0.86)	17.53***	.228***
14	some kids deserve being bullied	Blame the Victim	1.85 (0.89)	2.13 (0.92)	8.48***	.312***
19	own's fault if bullied	Blame the Victim	2.14 (0.89)	2.36 (0.84)	6.27***	.134***
21	hurt others before they hurt	Assuming the Worst	1.51 (0.79)	1.77 (0.90)	8.00***	.263***
25	ok taunting, others taunt to	Assuming the Worst	1.79 (0.89)	2.44 (0.97)	17.85***	.191***
23	must hurt sometimes those with whom you have problems	Minimizing Agency	n.a.	1.82 (0.85)	n.a.	n.a.
30	ok fighting back when attacked	Minimizing Agency	n.a.	2.88 (1.03)	n.a.	n.a.

***p<.001; **p<.01
All items measured on a scale ranging from 1 (totally untrue) to 4 (totally true)
[1]Item ID as in Table 2 in the original paper
[2]df=1031

On a scale ranging from 1 (totally untrue) to 4 (totally true) the mean values of the items range from 1.26 to 2.88 with standard deviations comprised between 0.63 and 1.03 thus suggesting reasonable item variation as well as a good disparity in "item difficulty". Considering the additional "minimizing agency" items included at wave 5, item 23 is of intermediate "difficulty" whereas item 30 turns out to be the item with the highest approval rate.

Importantly, as suggested by the t-tests, all mean values increase consistently across waves. This finding brings forth additional, longitudinal evidence that all items are part of the same construct

(i.e., all elements of the latent construct change in the same way as the overall construct). Also, all items are significantly correlated across time which further supports the scale's consistency.

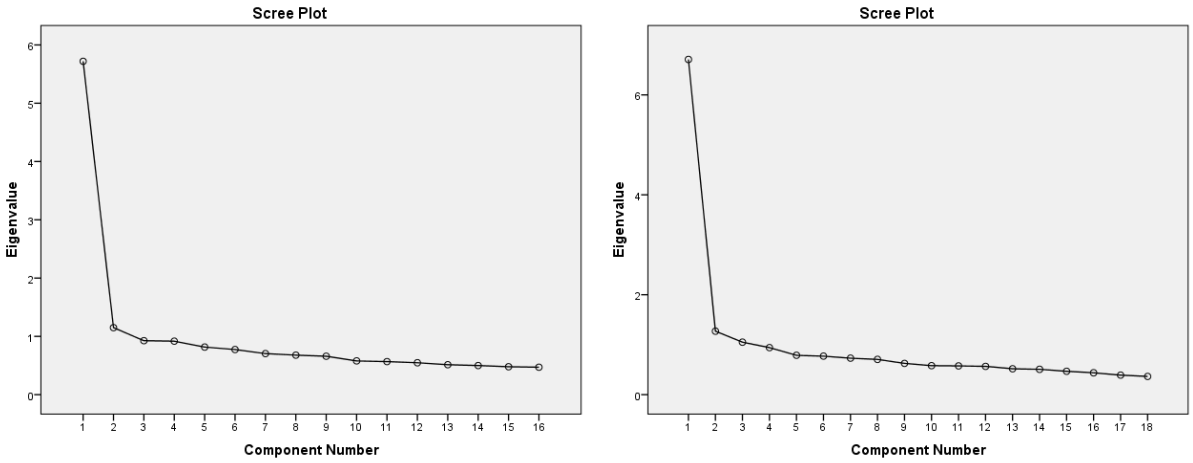
Cronbach's Alpha was .867 at wave 4, .888 at wave 5 (16-item scale) and .900 (18-item scale). Accordingly, the scale reliability improved across time and also by the addition of two items. Section 3 reports a more detailed assessment of the scale reliability based on factor analyses.

Finally, with regard to the criterion variables, we will focus on child- and teacher-reported key indicators already presented in the original paper that were measured in exactly the same way at both waves. Since the reliability statistics of the criterion variables at wave 5 are very similar to those at wave 4 they are not detailed here.

3. Factor structure and reliability of the wave 5 MN measurement

We first report results of exploratory factor analyses (EFA) both for wave 4 and 5, since these were not reported for the *z-proso* dataset in the original paper. Although based on a strict application of the Kaiser criterion (i.e., eigenvalues > 1) at wave 4 a 2-factor and at wave 5 a 3-factor solution should be preferred, a closer analysis of the scree plots (figure 1) and of the corresponding eigenvalues and shares of explained variances clearly suggests a one-factor solution at both waves. Indeed, at wave 4 the first factor has an eigenvalue of 5.7 (35.7 % of explained variance) whereas the second factor has a massively lower eigenvalue of just 1.1 (7.2 %) that comes very close to the following factors eigenvalues which are comprised between 0.9 (factor 3) and 0.5 (factor 16).

Figure 1 *Scree plot of the eigenvalues of the factors extracted on the basis of the 16 MN items. Left: wave 4; right: wave 5*



At wave 5 the figure is very similar with an eigenvalue of 6.0 (37.4 %) for the first factor and of just 1.23 (7.6 %) for the second factor.[1]

[1] The figures for the full 18-item construct used at wave 5 are also very similar, with a first-factor eigenvalue of 6.7 (37.3 %) and a second-factor eigenvalue of 1.3 (7.1 %).

The MN construct's internal consistency at wave 5 was then assessed on the basis of the same confirmatory one-factor measurement model used for the wave 4 data. The initial solution without correlated error terms yields a similar yet somewhat worse model fit as for the wave 4 data (CFI=.887, RMSEA=.073 (χ^2=862.0; df=104; N=1366; p<.001). The analyses of the modification indices suggested that at least 17 error covariances needed to be freed up to achieve a model fit similar to the one found with six error covariances at wave 4 (CFI=.963, RMSEA=.045 (χ^2=332.8; df=87; N=1366; p<.001). Obviously, such a high number of correlated error terms is in contradiction to an ideal measurement model, especially because – in contrast to what we found at wave 4 – for many of these error terms there are no obvious meaningful explanations at hand, such as similar wordings or meanings. Intriguingly, their number has substantially increased since wave 4 whereby many "new" error covariances are stronger than those found at wave 4. Hence, there appears to be only little stability of these associations over time.

Typically, a high number of substantive error covariances is indicative of model misspecification and might suggest additional factors. However, both the results of the EFA presented above, which strongly indicates a one-factor solution, and the instability of the error covariances over time do not suggest additional substantive factors.[2] For these reasons – and because there is evidence that the high number of correlated errors is probably a general problem in this type of scales –, the one factor solution is further investigated. As a pragmatic compromise, the seven (out of 120 possible) error covariances with the highest modification indices in the combined wave 4 and 5 sample are modelled in the following analyses, four of which were already accounted for in the published wave 4 model. Given the instability of these error covariances, they are left unconstrained in all the models that follow. Importantly, whereas this model specification improves the overall model fit it does *not* affect the factor loadings that are in the focus of the following analyses. Indeed, the comparison of both the unstandardized and the standardized factor loadings in the model with all error covariances restricted to zero and the one with seven freely estimated error covariances suggests that the loadings do not differ significantly across these models (χ^2=5.7; df=16; p=.991 as regards the unstandardized loadings; χ^2=10.9; df=32; p=1.000 (sic!) as to the standardized loadings).

4. Multi-group tests of cross-wave and cross-gender invariance

In what follows, we first examine the stability of the factor loadings across waves 4 and 5 in the 16-item model. We then examine the stability of the factor loadings across genders in the new 18-item model at wave 5. Corresponding results for the 16-item model at wave 4 have been published in the original paper.

Table 2 shows the results of the cross-wave comparison. The tests of multi-group structural invariance provide limited confirmation of invariance across measurement waves. Constraining the factor loadings to equality across waves yields a significant decrease in model fit (χ^2=75.4; df=16;

[2] In order to check if the high number of substantive error covariances is specific to the present scale and/or sample, the factor- and the related error structure of a set of moral disengagement (MD) variables in another Swiss German youth sample was tested. The data, kindly provided by Sonja Perren and Fabio Sticca, consists of 12 items from Bandura et al.'s (1996) MD scale which was tested in a general population sample of 511 youths with a mean age of 15.4 years. 47.2 % of the sample were female. EFA again clearly suggested a one-factor solution whereas the CFA of the one-factor model indicated a substantial number of significant correlated error terms. Accordingly, the error structure found in our scale and data appears to be a general pattern in MD and related scales that would need closer scrutiny.

p<.001) which is further exacerbated when the indicators' error terms are also constrained to equality (i.e., when *standardized* loadings are constrained to equality; χ^2=221.3; df=32; p<.001). In contrast to this strict test of invariance, the more lenient comparison of the CFI and RMSEA suggests that the equality constraints only decrease the overall model fit to a very limited extent (CFIs of .947, .941, and .928; RMSEAs of .036, .036, .039, respectively). In particular, the stable RMSEA values – a measure that penalizes for complexity – suggests that the decrease in model fit is compensated by the decrease in complexity of the model.

Table 2 *Tests of factorial invariance across data collection waves (at ages 11.3 and age 13.7) in the 16-item model of MN*

Model	**CFI**	**RMSEA**	**χ^2**	**df**	**$\Delta\chi^2$**	**Δ df**	**p**
Unconstrained across groups	.947	.036	704.2	194			
Equal (unstandardized) loadings	.941	.036	779.6	210	75.4	16	<.001
Equal loadings & equal error terms (equal standardized loadings)	.928	.039	925.5	226	221.3	32	<.001

A closer look at the standardized factor loadings shows that they remain in a very similar range across waves with values ranging between .38 and .67 at wave 4 and .38 and .68 at wave 5. Only one factor loading substantially differs across waves ("many problems can be solved with violence"; χ^2=53.8; df=1; p<.001). This is also reflected in a standardized loading increasing from .41 at wave 4 to .66 at wave 5 (+.25). All other changes range below +/-.08.

Table 3 *Tests of factorial invariance across gender groups in the 18-item model of MN (wave 5)*[3]

Model	**CFI**	**RMSEA**	**χ^2**	**df**	**$\Delta\chi^2$**	**Δ df**	**p**
Unconstrained across groups	.936	.037	725.3	252			
Equal (unstandardized) loadings	.927	.038	808.4	270	18	83.1	<.001
Equal loadings & equal error terms (equal standardized loadings)	.910	.041	955.5	288	36	230.2	<.001

Table 3 shows the results of the cross-gender comparison in the extended 18-item model used at wave 5. These tests again provide limited confirmation of structural invariance across gender groups. Constraining the factor loadings to equality across waves yields a significant decrease in model fit (χ^2=83.1; df=18; p<.001) which is further augmented when standardized loadings are constrained to equality (χ^2=230.2; df=36; p<.001). In contrast, the comparison of the CFIs and RMSEAs again

[3] The results shown are based on a model with two additional error covariances.

suggests that the equality constraints decrease the overall model fit to a very limited extent (CFIs of .936, .927, and .910; RMSEAs of .037, .038, .041, respectively).

The good accordance between the female and the male model is also reflected by the similar range of standardized factor loadings (.28 to .65 as to girls; .34 to .69 as to boys). Just as for the wave 4 data (see Ribeaud and Eisner, 2010), factor loadings generally tend to be somewhat higher in the male population.

A more detailed item-wise analysis suggests that discrepancy is limited to a limited set of indicators. In particular, the item "many problems can be solved with violence" again by far contributes most to the discrepancy found (χ^2=57.2; df=1; p<.001).

Overall, the tests of structural invariance suggest a reasonable, although not perfect stability of the measurement model of MN across genders and measurement waves. Given the comparatively large discrepancy found in both comparisons for the item "many problems can be solved with violence", it might be considered to drop it from the scale.

5. Criterion validity

Table 4 shows the correlations between the MN construct and selected criterion variables.

Table 4 Correlations of MN with selected constructs

	W4 16-items	**W5 16-items**	**W5 18-items**
Gender (1=male; 2=female)	-.248***	-.299***	-.318***
SBQ Prosociality (Child)	-.269***	-.318***	-.319***
SBQ Prosociality (Teacher)	-.149***	-.230***	-.233***
SBQ Direct/Overt Aggression (Child)	.585***	.675***	.683***
SBQ Direct/Overt Aggression (Teacher)	.268***	.281***	.287***
SBQ Indirect/Covert Aggression (Child)	.457***	.515***	.513***
Bullying (Child)	.417***	.451***	.453***
Low Self-Control (Child)	.514***	.545***	.544***

****p<.001*

Overall, at both waves and for both versions of the MN scale we find strong and highly significant correlations with the selected criterion variables, including gender. Correlations are higher with regard to child (i.e., within-informant) compared to teacher-reported outcomes. In particular, the

correlation with the child-reported overt aggression scale turns out to be exceptionally high for a social science measurement, with a correlation of r=.68 for the 18-item scale at wave 5.

Compared to wave 4 (column 1) all correlations with criterion variables are stronger at wave 5 when using exactly the same MN construct (column 2). Given the generally better reliability both of the MN construct (see above) and of the criterion variables (not shown), it appears likely that the improvement found does not only indicate a substantial increase of the correlations but also reflects a better measurement of all constructs at wave 5. Hence, it appears that with increasing age participants better understand the items and answer more adequately and consistently.

The extension of the scale with two additional items (column 3) tends to slightly increase the scale's criterion validity. This likely reflects a further improvement of the measurement of the MN construct.

6. Stability over time & change-on-change variation with selected criteria

In the methods section we showed that the mean values of all items of the MN scale increased across waves and also that all items were positively and significantly correlated across time. Accordingly, this translates in an overall increase of the composite scale's mean value from 1.68 to 2.02 ($t=19.54$; $df=1031$; $p<.001$) and in a substantial 2.4-years cross-wave correlation of $r=.397$ ($p<.001$). This is a stability coefficient similar to the one found for child-reported overt aggression ($r=.472$; $p<.001$). Given the high cross-sectional within-informant correlations between aggression and MN as well as the similar stability coefficients of both scales we eventually also examined the change-on-change correlation between both scales by correlating the respective difference scores (W5-W4). Again we found a remarkably high correlation between both constructs with a correlation coefficient of $r=.545$ ($p<.001$). With regard to bullying perpetration we also find a change-on-change correlation coefficient of $r=.336$ ($p<.001$) that is only slightly lower than the respective cross-sectional correlations shown in Table 4. These results suggest that MN and aggression/bullying are intimately related phenomena that co-vary within individuals across time.

7. Conclusions

Overall, the results from the wave 5 data corroborate the findings published in the original article (Ribeaud & Eisner, 2010). We again found strong evidence for a one-factor structure of the MN construct that has also been established in many other studies that focused on moral disengagement. Compared to wave 4, consistency increased at wave 5, and the extension of the scale by two "minimizing agency" items further improved the scale's consistency.

With increasing age we also found more significant correlated error terms in the measurement model. A first verification in another dataset from another sample using a different MN scale suggested that the problem of correlated errors is not specific to the present scale and sample and that it might well be a general problem with MN/MD scales that has not been addressed yet. Since correlated error terms are generally considered as an undesirable characteristic of measurement models, it appears advisable to further research this issue.

At wave 5 we also found generally higher correlations with selected outcomes which can both reflect a better measurement of MN and the outcomes with increasing age of the participants as well as a substantial increase of these correlations in the maturation process. The 18-item version of the scale tended to further increase the correlation with criterion variables.

Different cross-wave analyses further supported the quality of the scale. First, all constituting items changed in the same direction across time, i.e., their mean values increased. Second, all cross-wave correlations among these items turned out to be consistently and significantly positive. Both findings are additional evidence that all items are indicators of the same latent construct. Given this consistent pattern in the underlying indicators, the mean value of the overall scale also increased across time and we found a strong positive cross-wave correlation suggesting a relative stability of the construct across a substantial period of time (2.4 years). Finally, the within-individual changes in MN turned out to be closely correlated with self-reported changes in aggression and bullying.

Overall, the MN scale described here and in Ribeaud and Eisner (2010) appears to be a reliable and valid measure of different facets of aggression- and bullying-related MN that were derived from different but closely related theoretical approaches, namely moral disengagement, neutralization techniques, and self-serving cognitive biases. It also turned out to be an exceptionally strong predictor of different aggressive outcomes such as overt and covert aggression as well as bullying. It predicts both within-informant (child-reported) outcomes as well as – to a lesser extent – parent- and teacher-reported aggressive outcomes. Considering these different advantageous aspects, the scale might well be considered for an international comparative study on MN. A next step towards such an instrument would be the development of an English master version of the instrument that would need to be derived both from the original English wordings of the items as well as from the German version that was presently used.

References

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