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Identity fusion predicts endorsement of pro-group behaviours targeting nationality, religion, or football in Brazilian samples

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A visceral feeling of oneness with a group – identity fusion – has proven to be a stronger predictor of pro-group behaviours than other measures of group bonding, such as group identification. However, the relationship between identity fusion, other group alignment measures and their different roles in predicting pro-group behaviour is still controversial. Here, we test whether identity fusion is related to, but different from, unidimensional and multidimensional measures of group identification. We also show that identity fusion explains further variance of the endorsement of pro-group behaviour than these alternative measures and examine the structural and discriminant properties of identity fusion and group identification measures in three different contexts: nationality, religion, and football fandom. Finally, we extend the fusion literature to a new culture: Brazil. To the best of our knowledge, this is the first research explicitly addressing a comparison between these two forms of group alignment, identity fusion and identification with a group, and their role in predicting pro-group behaviours.

Group belongingness is a central aspect of human life and has been a fundamental focus of interest for social psychologists for decades. A relatively new process that has recently attracted scholars' attention is a form of group bonding that entails a visceral feeling of 'oneness' with a group: identity fusion. Identity fusion is thought to be a related, yet independent, construct from group identification (see Swann, Gómez, Seyle, Morales, & Huici, 2009). Measures of identity fusion have been successfully tested as stronger predictors for the endorsement of pro-group acts and personally costly, pro-group behaviours than unidimensional measures of group identification (Gómez, Brooks, *et al.*, 2011; Jiménez *et al.*, 2015; Swann *et al.*, 2009).

Here, we show that identity fusion is related to, but different from, both unidimensional and multidimensional measures of group identification, explaining additional variance in the endorsement of extreme pro-group behaviours, compared to group

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identification measures. Moreover, this occurs irrespective of the social group participants are fused to, that is nation, religion, or football fans. This is the first time identity fusion and multidimensional measures of group identification have been compared, specifically for multiple social groups simultaneously, improving the generalizability of our findings. Finally, we test our predictions in a culture where neither identity fusion nor identification measures have yet been explored. We thus provide evidence of validity of corresponding measures for the first time in Brazilian Portuguese.

Social identity is 'the individual's knowledge that he belongs to certain social groups together with some emotional and value to him of this group membership' (Tajfel, 1972, p. 292). According to social identity theory (SIT; Tajfel, 1978; Tajfel & Turner, 1979), people have personal and social identities. The former concerns idiosyncratic characteristics of individuals that make them unique, while the latter covers characteristics of individuals that align them with a group. One of SIT's main tenets is that humans tend to aim towards achieving and maintaining a positive social identity (Tajfel & Turner, 1986). On a theoretical level, identity fusion differs from this traditional approach in several regards: (1) its emphasis on a profound connection between the individual and the entire group, including not only the group category (collective ties) but also its individual members (relational ties), which places a greater importance on the affective ties between ingroup members and with the group itself (Buhrmester & Swann, 2015; Gómez & Vázquez, 2015); and (2) the assumption that both personal and social identities of fused individuals may be activated, in such a way that when fused people act pro-socially towards the group, both identities are activated, conferring an increased sense of personal agency (Swann, Jetten, Gómez, Whitehouse, & Bastian, 2012). Although being strongly fused with a group seems to imply also being firmly identified with the group, high levels of identification do not presuppose high levels of fusion. On empirical grounds, previous work has consistently shown that measures of identity fusion are moderately related to, but qualitatively distinct from, measures of group identification, the former being a more relevant predictor of extreme forms of pro-group behaviour (see Gómez, Brooks, *et al.*, 2011; Jiménez *et al.*, 2015; Swann *et al.*, 2009 for three different measures of identity fusion).

Identity fusion is a visceral feeling of oneness with the group wherein the personal self joins with a social self and the borders between the two become porous. The result is a potent feeling of connectedness to the group whereby the integrity of either the personal or social self is not diminished. Group membership thus allows fused individuals to experience a high sense of personal agency (i.e., the capacity to initiate and control intentional behaviour) and reciprocal strength (i.e., the belief that oneself and the group each strengthen one another) (Gómez & Vázquez, 2015). For fused persons, strong relational ties with group members are likely to develop because members are valued not only by their membership but also due to their idiosyncratic personal qualities. Relational ties are also reinforced because fused individuals believe they share an 'essence' with other group members. For those who are fused, the connection with others and the group tends to be maintained over time and contextual factors are less likely to affect their strong commitment to the group (Vázquez, Gómez, & Swann, 2017). Once fused, both personal and social selves are activated simultaneously, resulting in an extraordinary personal investment in group acts (Swann *et al.*, 2012).

Identity fusion predicts: willingness to fight and die for the group (Gómez, Brooks, *et al.*, 2011; Gómez, Morales, Hart, Vázquez, & Swann, 2011; Swann *et al.*, 2014; Swann, Gómez, Huici, Morales, & Hixon, 2010; Swann *et al.*, 2009); willingness to sacrifice oneself for ingroup members on different intergroup and intragroup versions of the trolley

dilemma, a thought experiment in which participants have to make moral decisions as pulling a lever in order to avoid a runaway trolley killing five ingroup members instead of one (Gómez, Brooks, *et al.*, 2011; Swann, Gómez, Dovidio, Hart, & Jetten, 2010; Swann *et al.*, 2014); refusal to leave the group after being ostracized (Gómez, Morales, *et al.*, 2011); lifelong loyalty to the group (Newson, Buhrmester, & Whitehouse, 2016); readiness to deny group wrongdoing (Besta, Gómez, & Vázquez, 2014); and even the irreversible surgical change in primary sexual characteristics in transsexuals 2 years after measuring fusion with their cross-gender group (Swann *et al.*, 2015).

The original identity fusion measure (Swann *et al.*, 2009) was a modified version of a measure by Schubert and Otten (2002), as an adaptation of the Inclusion of Others in the Self Scale (IOS), originally developed to assess attachment in close relationships (Aron, Aron, & Smollan, 1992). The IOS represents closeness between two individuals depicting two circles (a 'Me' circle and an 'Other' circle), which are completely separate or overlap to varying degrees. It was subsequently modified for measuring identification with groups (Coats, Smith, Claypool, & Banner, 2000) and assessing connection to other members of the group (Smith & Henry, 1996; Tropp & Wright, 2001; see also Aron *et al.*, 2004), and other groups (Wright, Aron, & Tropp, 2002). Although these adaptations have been used for measuring both identification and fusion, research has demonstrated that they measure different constructs by slightly modifying the instructions to participants. In the adaptation made for the identity fusion measure, the instructions were modified (focusing on the fusion construct instead of closeness or identification) and the circles could also *fully* overlap. For example, Swann *et al.* (2009) showed that the pictorial measure of fusion was only moderately related to the pictorial measure of identification by Tropp and Wright (2001), $r(248) = .23$ (in contrast, it was highly related to the verbal measure of identity fusion, see Gómez, Brooks, *et al.*, 2011; Gómez, Morales, *et al.*, 2011).

While the pictorial measure of fusion was successfully tested as predictor of pro-group behaviour, the meaning and nature of this process remained unclear. In an effort to better understand identity fusion, considering its theoretical premises, Gómez, Brooks, *et al.* (2011) developed and tested a verbal measure, which focused specifically on central aspects of the theory that could not necessarily be assessed via the pictorial measure. Verbal items are therefore related to the porous boundaries between the personal and social selves in fused individuals ('I am one with my country' and 'I feel immersed in my country'), the importance of affective ties with the group ('I have a deep emotional bond with my country'), and the reciprocal strength between the individual and the group ('I am strong because of my country' and 'I make my country strong'.). These items represent the main features of identity fusion theory and do not necessarily pertain to the majority of group identification measures. Exploratory and confirmatory factor analyses have revealed that items capturing identity fusion load on a different factor to items capturing group identification (assessed by Mael & Ashforth, 1992, unidimensional scale). Therefore, it is suggested that identity fusion is not merely an 'extreme social identification' process, but a different, unique phenomenon. In sum, research has consistently shown that the theoretical conceptualizations of identity fusion and group identification differ, and their differing outcomes are not simply a matter of using different measures.

However, the fact that previous research has only ever compared identity fusion with unidimensional scales of group identification and, taking into account that being fused with a group also implies being identified with that group, it makes sense that identity fusion could be more related to some of the components of group identification than other components. We believe that the best way to disentangle the conceptual relationships

between identity fusion and identification, as well as between these constructs and endorsement of extreme pro-group behaviour, is via a more exhaustive comparison between the measures of identity fusion and group identification. This premise can only be tested through multidimensional group identification scales, as is the case with the present investigation.

There are several measures for group identification, from single-item measures (e.g., Postmes, Haslam, & Jans, 2013), to unidimensional or multidimensional scales (e.g., Cameron, 2004; Jackson, 2002; Leach *et al.*, 2008). Here, we highlight the measure developed by Leach *et al.* (2008). This measure proposes a multifactor construct, dividing social identification into two second-order latent dimensions, composed of three and two components, respectively: self-definition, subdivided into individual self-stereotyping and ingroup homogeneity; and self-investment, subdivided into solidarity, satisfaction, and centrality. Leach's measure has already been validated in several other languages, including German (Roth & Mazziotta, 2015), Russian (Lovakov, Agadullina, & Osin, 2015), and Italian (La Barbera & Capone, 2016) and has been used in at least 20 studies focusing on different social groups, as reviewed in Lovakov *et al.* (2015). This makes it possible to compare this measure cross-culturally and across different groups. Therefore, we decided to use this measure not only for its conceptual framework, but also for its potential to be used as a comparative measure across studies and cultures. Here, for the first time, we present extensive research that considers multidimensional aspects of group identification, as well as fusion, in different social groups.

In this study, we focus on the relationships between identity fusion/group identification and a particular case of endorsement of extreme pro-group behaviour, that is willingness to fight and die for ingroup members. The association between fusion and self-sacrifice has been a constant since the theory was developed. Although identity fusion is a consistent predictor of self-sacrifice for one's group, recent research has also demonstrated that individuals can be fused with a value or a cause (which could be religious or not), for example, Judaism (Fredman, Bastian, & Swann, 2017).

Other lines of investigation have also focused on extreme behaviours on behalf of a cause, such as research on martyrdom – the psychological readiness to suffer and self-sacrifice for a cause (e.g., Bélanger, Caouette, Sharvit, & Dugas, 2014) – or sacred values – values people refuse to trade for material or monetary compensation (Atran, Axelrod, & Davis, 2007; Tetlock, 2003). Combining these approaches, the devoted actor model postulates that those who hold certain sacred values and are fused with a group that shares such values will be willing to make exceptionally costly and extreme sacrifices for their beliefs and their group, particularly under threatening conditions (Gómez *et al.*, 2017). Moreover, previous research shows that commitment to sacred values and identity fusion are independent predictors of willingness to sacrifice for the ingroup (Atran, Sheikh, & Gómez, 2014; Sheikh, Gómez, & Atran, 2016), although they can interact under external threats maximizing such willingness.

In this paper, we explore significant gaps in the literature that need to be filled. First, there is still the need for evidence of validity and cross-cultural generalizability of measures of group identification and identity fusion in non-American/European contexts (Henrich, Heine, & Norenzayan, 2010). For instance, we are aware of only one 'general' measure of group identification adapted to the Brazilian context (Wachelke, 2012). This measure is unidimensional and not directly comparable to widely used measures in other cultures. Additionally, there are no measures of identity fusion validated for this context. Second, although dozens of studies have already compared the roles of identity fusion and group identification in predicting pro-group behaviours, no previous research has considered

multidimensional measures of group identification, which might overestimate the power of identity fusion as a predictor of pro-group actions. Finally, although several measures of group identification have been adapted to different social groups, they still lack strong evidence of measurement invariance, which has been empirically confirmed only for Leach's group identification measure (Lovakov *et al.*, 2015; Roth & Mazziotta, 2015). Additional evidence of measurement invariance for group identification and identity fusion will confirm the feasibility of their adaptation by only changing items' wording, making it possible to use the same instruments to investigate different social groups.

In an attempt to fill these gaps, we aimed to provide evidence of validity for two different measures translated and adapted to Brazilian Portuguese: Leach's group identification measure (Leach *et al.*, 2008) and identity fusion (Gómez, Brooks, *et al.*, 2011). In addition, we gathered data on each of these measures concerning three different target groups that have global relevance: nationality, religion, and football fandom. By measuring each construct in multiple groups, we were able to test for measurement invariance in each measure. Finally, we investigated the relationship between each measure and evaluated its relationship with the endorsement of extreme pro-group behaviours.

Specifically, we tested the following hypotheses and predictions: (1) measures of group identification and identity fusion will display evidence of structural validity (i.e., good model fit of their original factorial structure), convergent validity (i.e., statistically significant correlations with previous validated measures), and discriminant validity in a non-American, non-European culture not yet studied (Brazil) (i.e., identity fusion will explain additional variance of the endorsement of pro-group extreme behaviour) in different target groups (nationality, religion, and football fandom); (2) the assessed constructs will show weak invariance, indicating that item-factor loadings of the constructs are equivalent across the target groups (nationality, religion, and football fandom). Bearing in mind, this is the first time that a multidimensional measure of group identification has been compared with identity fusion, and we did not have strong *a priori* predictions regarding the relationship between these constructs. Thus, our last objective was to explore the association between each of the dimensions of Leach's identification scale and fusion, as well as the relationship between each of the dimensions of group identification and the endorsement of extreme pro-group behaviour.

Method

Participants

The majority of previous group alignment measures have been validated exclusively for English speakers or within European countries. To try and combat the WEIRD problem (research conducted with Western, Educated, Industrialized, Rich, and Democratic participants, see Henrich *et al.*, 2010), we gathered data in Brazil, which also suffers a dearth of group alignment measures with demonstrated validity. The only 'generic' measure adapted to the Brazilian context, to our knowledge, is based on Leach *et al.*'s (2008) scale, but largely consists of items that compose the Centrality dimension, and items that were not included in the final version of Leach's original measure (Wachelke, 2012). Furthermore, Wachelke's translation was designed to measure identification as a one-dimensional construct. Brazil has enormous potential for studies regarding group membership, considering its ethnic, class, and religious diversity. Not only is Brazil home

to large, relatively 'Western' cities, it also houses uniquely Brazilian regions and subpopulations, allowing impressive possibilities for non-'WEIRD' studies.

Participants were recruited through personal contact, invitations were posted on online forums and social media, and a snowball methodology was used. Of an initial 1,360 participants, we discounted (1) those who took more or less than 2.5 SD of the mean time of completion and (2) those who did not correctly follow the instructions in all five 'control questions' randomly assorted among the main survey items (e.g., 'This is a control question, please mark the number 6'). The final sample consisted of 1,160 Brazilian adults. These participants were distributed among three groups who were given similar questionnaires that focused on three different targets, according to group: nation, $N = 387$, $M_{age} = 28.9$ ($SD = 9.12$), 54.8% women; religion, $N = 372$, $M_{age} = 30.4$ ($SD = 9.77$), 66.7% women; and football fandom, $N = 401$ individuals, $M_{age} = 30.4$ ($SD = 9.95$), 52.4% women.

As we only collected data from Brazilian nationals, at the beginning of the survey participants were asked whether they were religious or supported a football club (yes or no). Depending on their answer, participants were randomly assigned to one of the target groups. Therefore, only participants with a religious affiliation or those who supported at least one football club answered the questionnaire for these groups, respectively. We focused on these three social identities specifically because they have worldwide relevance and have been used extensively in previous studies assessing both identification and fusion. By comparing these groups, we not only provide evidence for the generalization of the assessed measures (measurement invariance), but also replicate previous studies that showed evidence of validity for the same measures focusing on these social groups, but in different cultures. Moreover, these groups can be related to extreme pro-group behaviours, for example, far-right nationalist groups, religious fanaticism, and football-related violence among diehard fans. Descriptive statistics for level of education, race, and geographical distribution across target groups are shown in Table 1.

Measures

We used the scale developed by Gómez, Brooks, *et al.* (2011) to measure identity fusion and the multidimensional measure developed by Leach *et al.* (2008) to assess group identification (from now on referred to as 'Leach's group identification'). The measures are composed of seven items and 14 items, respectively, on a 7-point Likert scale, from 1 (strongly disagree) to 7 (strongly agree). These scales were translated and back-translated by bilingual speakers, before being presented in our online survey to Brazilian nationals.

To assess convergent validity, we added additional measures related to group belongingness: a group identification unidimensional scale already validated in Brazilian Portuguese by Wachelke (2012) (from now on referred to as 'Wachelke's group identification') and an adapted version of the single-item social identification measure (SISI) from Postmes *et al.* (2013). For Wachelke's group identification, respondents indicated how much they agreed with six items on a 7-point Likert scale from 1 (strongly disagree) to 7 (strongly agree); for the SISI, participants answered a single item asking how much they identified themselves with the target group from 1 (Nothing at all) to 10 (Extremely). All measures are depicted in the Supporting Information (Table S1).

Participants also answered a series of questions to test their endorsement of extreme pro-group behaviours (Swann *et al.*, 2009). This is a seven-item scale used to assess willingness to fight and die for one's group (e.g., 'I would fight someone physically threatening another [Ingroup] member'), which has been used as a dependent variable to

Table 1. Sociodemographic data

	Nationality	Religion	Football
N	387	372	401
Mean age (*SD*)	28.9 (9.12)	30.4 (9.77)	30.4 (9.95)
Women (in %)	54.8	66.7	52.4
Men (in %)	45.2	33.3	47.6
Highest educational level (in %)			
Less than undergraduate	2.4	2.2	2.2
Undergraduate student	41.6	38.7	37.2
Bachelor or equivalent	17.8	18.5	18.7
Graduate student	12.4	13.7	11.0
Graduate (MBA, Master, PhD equivalent)	25.8	26.9	30.9
Race or colour (in %)			
White	73.7	73.4	77.1
Black	2.6	3.8	2.0
Pardo/Brown	17.8	19.1	17.2
Yellow	1.3	1.6	1.2
Indigenous	1.0	0.2	0.3
Do not know/Undeclared	3.6	1.9	2.2
Region of Brazil (in %)			
South	52.6	49.2	63.1
South east	23.2	21.5	18.5
North	3.2	3.2	2.0
Northeast	13.8	13.7	9.7
Midwest	4.1	9.7	4.2
Out of Brazil	3.1	2.7	2.5
Some religious belief (in %)			
Yes	44.2	100	62.6
No	55.8	0	37.4

test the consequences of extreme group alignment, that is identity fusion (Gómez & Vázquez, 2015; Swann *et al.*, 2012). For all measures, items focused on 'other members' of each group (e.g., 'I have a deep emotional bond with other members of my religion', for the religion target group).

Procedure

Item translation and adaptation
Two independent bilingual researchers translated items from the original scales, followed by back-translation by another two independent translators. The back-translated items were then reviewed by one of the authors, who is a native English speaker, for clarity and accuracy in capturing the intent of the original items. Items that were judged to be unclear or inaccurate were revised, translated into Brazilian Portuguese, and back-translated by two independent translators once more. This process continued until all items were considered to be appropriate translations.

Data collection
After demographic questions, participants were asked their nationality, whether they were religious, and whether they were a football fan. They were then allocated to one of

those three target groups with the appropriate measures included in their survey (i.e., only religious individuals and football fans answered the measures focusing on these respective identities). The order of the instruments was random for each participant.

Analyses

As each of the measures had been previously tested in different populations, we assessed evidence of structural validity for the Brazilian Portuguese versions using Confirmatory Factorial Analysis (CFA) using R software and the package Lavaan (Rosseel, 2012). The data showed high violations of a multivariate normal distribution (items had kurtosis values >7.0) for all measures. Hence, we used the Satorra–Bentler (SB χ^2) adjustment for non-normality in CFA (Satorra & Bentler, 1994). Assessed goodness-of-fit indices included the comparative fit index (CFI), Tucker–Lewis index (TLI), root-mean-square error of approximation (RMSEA), and standardized root-mean-square residual (SRMR). The criteria for evaluation of fit indices followed Hu and Bentler (1999): Very good model fitting is indicated by CFI and TLI > .95, RMSEA < .06, and SRMR < .08, while adequate model fitting encompass values ranging from .90 to .94 for the CFI and TLI, .07 to .08 for the RMSEA and .90 to .10 for the SRMR. Additionally, due to the sensitivity of chi-square indices to sample size, we divided the test statistic by its degrees of freedom and considered accepted values less than, or equal to, 2.0 as indicative of good model fit (Meade, Johnson, & Braddy, 2008). The internal consistency of each measure was assessed by calculating the Cronbach's alpha for the items that made up each construct.

After assessing model fit independently for each target group, we attempted to show measurement invariance among target groups for those measures that showed good fit indices. For this analysis, we used the 'measurement invariance' function in the Lavaan R package (Rosseel, 2012), in accordance with Hirschfeld and von Brachel (2014). Model 1 tested for configural invariance, in which the same factor structure is imposed on all groups. Model 2 tested for weak invariance, and the factor loadings were constrained to be equal across groups. Model 3 assessed strong invariance, setting factor loadings, and intercepts constrained to be equal across groups. Finally, Model 4 tested for strict invariance, constraining factor loadings, intercepts, and residual variances to be equal across groups.

Finally, to check for discriminant validity, we used the endorsement of extreme pro-group behaviours as the dependent variable in hierarchical linear regression analyses for each target group. We specifically evaluated whether fusion scores explained additional variance, beyond what can already be explained by group identification measures. Therefore, in the first step, the predictors were Postmes' one item group identification and the five dimensions of Leach's group identification. In the second step, identity fusion was entered into the model.[1] We did not include Wachelke's measure in the regression model due to its overlap with the Centrality dimension from Leach's group identification measure (the same three items) and another item ('I identify with other [Ingroup] people') that is extremely similar to Postmes' one item group identification measure ('I identify

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[1] *Although it could be possible to use a multilevel modelling approach for the religious affiliation sample, we did not ask participants' specific religious affiliation and framed the measures' items in a generic form, not specifically to any religion (e.g., 'I have a deep emotional bond with members of my religion'). Based on the fact that Brazil's population is composed mainly of Christians (86.8%) and only a minority of non-Christians (5%) (Instituto Brasileiro de Geografia e Estatística, 2010), and the researchers' previous experience indicating that the proportion of non-Christians in research pools is even lower, we believe that it would not be possible to adequately separate religious subgroups according to their different views on extreme pro-group behaviours.*

with [target group]'). Moreover, we decided to include the five dimensions of Leach's group identification measure separately to take advantage of its multidimensional approach, which provides a finer description of the construct, contrary to unidimensional measures or composite scores. Considering that the predictors are known to be related to each other and to the independent variable, we also computed partial correlations, which represent the relationship between each predictor and the outcome, controlling for the effects of the other predictors.

Results

Structure and reliability evidence
Factor loadings were mainly above .60 in all target groups (Table 2). Cronbach's alphas were similar across target groups and are depicted in Table 3 for each measure. Identity fusion and Leach's group identification measures showed very good or adequate model fitting for all assessed indices in all target groups. CFA fit indices are presented in Table 4.

Results for the measurement invariance tests suggested configural and weak invariance between the three target groups for both identity fusion and Leach's group identification (Table 5). Configural invariance tests confirmed previous CFA results, indicating that the constructs had the same general factor structure in all three target groups. This suggests that the tested measures are conceptualized similarly whether the items focus on nationality, religion, or football fandom. Moreover, both measures exhibited good model fit for the weak invariance test, indicating that item-factor loadings of the constructs were equivalent across the groups. In other words, the results imply that we measured the same latent variables across groups.

Nonetheless, there was no evidence for strong invariance, suggesting that the groups had different indicator intercepts, which meant it was not possible to evaluate mean differences in latent variables across groups. This also suggests that participants from the different target groups scored differently for each construct.

Discriminant and convergent validity
Correlations between constructs are displayed in Table 3. The majority of the Pearson coefficients were above .50, indicating that all the measures were related to each other, as expected. Inspection of the coefficients for identity fusion and the group identification measures indicated that the highest coefficients in all three target groups were between identity fusion and Leach's solidarity and centrality dimensions, as well as Wachelke's group identification. Not coincidentally, Wachelke's group identification, which is based on Leach *et al.*'s (2008) original measure, also correlated highly with all of Leach's identification dimensions that composed the self-investment second-order latent factor ($r > .70$ in all target groups).

Hierarchical linear regressions
We ran hierarchical linear regression analyses for each target group with endorsement of extreme pro-group behaviours as the dependent variable. Mean scores for Postmes' one item group identification and the five dimensions of Leach's group identification measure were entered in the first step, and identity fusion in step two. Although the predictors correlated, there was no evidence of multicollinearity, as indicated by low VIF values

Table 2. Standardized loadings of each measure's items for each target group

	Standardized loadings		
Item	Nationality	Religion	Football
Identity fusion			
Fusion1	.76	.63	.61
Fusion2	.78	.82	.76
Fusion3	.72	.79	.78
Fusion4	.75	.83	.80
Fusion5	.77	.69	.77
Fusion6	.58	.61	.70
Fusion7	.72	.80	.78
Self-investment			
Solidarity	.94	.90	.99
Solidarity1	.86	.91	.86
Solidarity2	.81	.78	.78
Solidarity3	.77	.86	.80
Satisfaction	.90	.87	.80
Satisfaction1	.88	.89	.85
Satisfaction2	.76	.62	.67
Satisfaction3	.87	.87	.85
Satisfaction4	.91	.91	.91
Centrality	.87	.95	.87
Centrality1	.50	.69	.77
Centrality2	.90	.89	.91
Centrality3	.92	.87	.94
Self-definition			
Individual self-stereotyping	.98	.99	.98
IndSelfStereo1	.91	.89	.90
IndSelfStereo2	.84	.83	.88
Ingroup homogeneity	.61	.79	.66
InGr_Homog1	.96	.90	.82
InGr_Homog2	.74	.79	.81

(<3.89) and no conditioning index >30 for a given variable explaining more than .50 the variance for at least two different variables (Tabachnick & Fidell, 2012; see Table S2).

The models were statistically significant for all target groups in both steps (Table 6). For the nationality condition, at step one, only centrality (β = .17, t = 2.35, p < .001) contributed significantly to the regression model, $F(6,380)$ = 9.05, p < .001, which accounted for 12.5% of the variation in endorsement of extreme pro-group behaviours. Introducing identity fusion in step two explained an additional 1.4% of variation and this change in R^2 was significant, $F(1,379)$ = 6.01, p = .015. At this step, only identity fusion contributed significantly to the model (β = .18, t = 2.45, p = .015). For the religion condition, at step one, individual self-stereotyping (β = .21, t = 2.52, p = .012) and ingroup homogeneity (β = −.17, t = −2.54, p = .012) contributed significantly to the regression model, $F(6,365)$ = 5.25, p < .001, which accounted for 13.5% of the variation in endorsement of extreme pro-group behaviours. Introducing identity fusion score in step two explained an additional 5.3% of variation and this change in R^2 was significant,

Table 3. Zero-order correlations and descriptive statistics for each measure across the three target groups

Nationality (N = 387)

			Zero-order r						Endorsement of extreme pro-group behaviours
Variable	1	2	3	4	5	6	7	8	
1. Identity fusion		.68**	.66**	.68**	.38**	.56**	.77**	.57**	.33**
2. Solidarity			.75**	.70**	.36**	.66**	.79**	.56**	.31**
3. Satisfaction				.67**	.39**	.65**	.76**	.58**	.30**
4. Centrality					.39**	.58**	.91**	.49**	.32**
5. IGH						.54**	.37**	.32**	.17**
6. ISS							.66**	.62**	.23**
7. Wachelke's group identification								.72**	.31**
8. SISI									.18**
M	3.13	4.47	4.39	3.86	3.71	3.6	4.3	4.56	2.04
SD	1.44	1.57	1.58	1.65	1.53	1.60	1.45	1.76	0.95
Cronbach's alpha	.87	.86	.91	.80	.83	.87	.86	–	.78

Religion (N = 372)

			Zero-order r						Endorsement of extreme pro-group behaviours
Variable	1	2	3	4	5	6	7	8	
1. Identity fusion		.71**	.54**	.62**	.43**	.56**	.73**	.59**	.39**
2. Solidarity			.71**	.76**	.57**	.70**	.82**	.67**	.31**
3. Satisfaction				.76**	.48**	.64**	.78**	.59**	.31**
4. Centrality					.48**	.65**	.93**	.61**	.28**
5. IGH						.68**	.50**	.44**	.13**
6. ISS							.67**	.57**	.29**
7. Wachelke's group identification								.79**	.30**
8. SISI									.23**
M	2.15	3.55	4.54	3.73	3.38	3.25	3.63	3.85	1.58
SD	1.23	1.74	1.71	1.84	1.58	1.60	1.66	1.92	0.79
Cronbach's alpha	.89	.87	.89	.85	.83	.85	.89	–	.77

Table 3. (*Continued*)

Football (N = 401)

				Zero-order r					Endorsement of extreme pro-group behaviours
Variable	1	2	3	4	5	6	7	8	
1. Identity fusion		.64**	.50**	.69**	.37**	.62**	.75**	.61**	.43**
2. Solidarity			.69**	.76**	.48**	.75**	.79**	.61**	.38**
3. Satisfaction				.68**	.34**	.59**	.73**	.59**	.30**
4. Centrality					.37**	.69**	.94**	.64**	.34**
5. IGH						.59**	.38**	.32**	.19**
6. ISS							.72**	.56**	.26**
7. Wachelke's group identification								.80**	.39**
8. SISI									.31**
M	1.67	2.75	4.36	2.56	3.01	2.44	2.79	3.16	1.31
SD	0.94	1.48	1.68	1.68	1.47	1.41	1.5	1.76	0.54
Cronbach's alpha	.88	.85	.89	.90	.80	.88	.90	–	.73

Notes. ISS = Individual self-stereotyping; IGH = Ingroup homogeneity; SISI = Single-item social identification measure.
*p < .05; **p < .001.

Table 4. Goodness-of-fit indicators for models of identity fusion and leach's group identification measures

	N	S-B χ^2	df	p	S-B χ^2/df	CFI	TLI	RMSEA	IC 90% RMESA	SRMR
Identity fusion										
Nationality	387	41.17	14	<.001	2.94	.98	.96	.07	0.050–0.092	0.031
Religion	372	37.69	14	.001	2.69	.97	.95	.07	0.049–0.086	0.034
Football	401	21.46	14	.090	1.53	.97	.96	.04	0.015–0.054	0.029
Leach's group identification										
Nationality	387	104.20	71	<.001	1.47	.99	.98	.04	0.021–0.047	0.028
Religion	372	150.48	71	<.001	2.12	.98	.97	.06	0.044–0.065	0.046
Football	401	178.68	71	<.001	2.52	.97	.96	.06	0.052–0.072	0.041

Note. S-B χ^2 = Satorra–Bentler chi-square correction; *df* = degrees of freedom; CFI = comparative fit index; RMSEA = root-mean-square error of approximation; SRMR = standardized root-mean-square residual.

$F(1,364) = 23.73, p < .001$. At the second step, in addition to individual self-stereotyping ($\beta = .18, t = 2.25, p = .025$) and ingroup homogeneity ($\beta = -.17, t = -2.54, p = .012$), both satisfaction ($\beta = .16, t = 2.11, p = .035$) and identity fusion contributed significantly to the model ($\beta = .34, t = 4.87, p < .001$). Finally, for the football condition, at step one, only solidarity ($\beta = .31, t = 3.62, p < .001$) contributed significantly to the regression model, $F(6,394) = 12.99, p < .001$, which accounted for 16.5% of the variation in endorsement of extreme pro-group behaviours. Introducing identity fusion in step two explained an additional 5.8% of variation and this change in R^2 was significant, $F(1,393) = 29.56, p < .001$. At the second step, in addition to solidarity ($\beta = .26, t = 3.12, p = .002$), both individual self-stereotyping ($\beta = -.21, t = -2.72, p = .007$) and identity fusion contributed significantly to the model ($\beta = .36, t = 5.43, p < .001$). Summing up, the inclusion of identity fusion in step two of the regressions accounted for an additional, significant amount of variance in all three target groups and this variable was positively related to the dependent variable in all three models (see Table 6).

Discussion

In this study, we have shown that identity fusion, a visceral feeling of oneness with a group, is related to, but different from, unidimensional and multidimensional measures of group identification. Results also indicate that identity fusion explains additional variance concerning the endorsement of pro-group behaviours in three different contexts: nationality, religion, and football fandom. Although recent work on identity fusion has examined its properties in eleven countries from five continents (Swann *et al.*, 2014), we extended these findings to another culture: Brazil.

We display evidence of weak invariance between three social groups (nationality, religion, and football fandom) indicating that the constructs studied here are interpreted similarly across these differing social identities, all of which have global reach. The adequacy of the original structures for these different groups suggests that these measures may be adapted to additional groups, by only changing the wording in each item. Although this has been a common procedure, it has lacked extensive tests (cf. Lovakov *et al.*, 2015; Roth & Mazziotta, 2015). Here, we provide compelling evidence that it is indeed a valid

Table 5. Measurement invariance analyses across target groups for identity fusion and leach's identification measures

Measure	Model and group	S-B χ^2	Δ S-B χ^2	df	Δ df	CFI	Δ CFI	RMSEA	Δ RMSEA
Identity fusion	Model 1								
	Equal factor structure	93.84 **	–	42	–	.97	–	.06	–
	Model 2								
	Equal factor structure and factor loadings	125.37**	31.53	54	12	.96	.01	.06	<.01
	Model 3								
	Equal factor structure, factor loadings and intercepts	221.91**	96.54	66	12	.90	.05	.08	.02
Leach's group identification	Model 1								
	Equal factor structure	553.84**	–	213	–	.97	–	.064	–
	Model 2								
	Equal factor structure and factor loadings	614.27**	60.43	237	24	.97	<0.01	.064	<.01
	Model 3								
	Equal factor structure, factor loadings and intercepts	871.87**	257.60	251	14	.95	0.02	.08	.02

Note. S-B χ^2 = Satorra–Bentler chi-square correction; *df* = degrees of freedom; CFI = comparative fit index; RMSEA = root-mean-square error of approximation.
**p < .001.

Table 6. Summary of hierarchical regression analysis for variables predicting endorsement of extreme pro-group behaviours

Nationality ($N = 387$)	Step 1					Step 2				
Predictor variables	B	$SE\ B$	β	pr	VIF	B	$SE\ B$	β	pr	VIF
Solidarity	0.08	.05	.14	.08	2.97	0.06	.05	.09	.06	3.12
Satisfaction	0.07	.05	.12	.08	2.79	0.05	.05	.09	.06	2.85
Centrality	0.10	.04	.17*	.12	2.28	0.07	.04	.12	.08	2.48
IGH	0.02	.04	.04	.03	1.44	0.02	.04	.02	.02	1.45
ISS	−0.02	.05	−.03	−.02	2.63	−0.02	.05	−.03	−.02	2.64
SISI	−0.02	.04	−.04	−.03	1.82	−0.04	.04	−.08	−.06	1.90
Identity fusion						0.12	.05	.18*	.13	2.42
F			9.06**					8.72**		
R^2			.13					.14		
F for change in R^2			9.06**					6.01*		

Religion ($N = 372$)	Step 1					Step 2				
Predictor variables	B	$SE\ B$	β	pr	VIF	B	$SE\ B$	β	pr	VIF
Solidarity	0.08	.04	.18	.10	3.41	0.01	.04	.02	.01	3.89
Satisfaction	0.07	.04	.15	.10	2.76	0.08	.04	.17*	.11	2.77
Centrality	0.00	.04	−.01	.00	3.20	−0.03	.04	−.06	−.04	3.26
IGH	−0.09	.03	−.17*	−.13	1.94	−0.08	.03	−.17*	−.13	1.95
ISS	0.10	.04	.21*	.13	2.80	0.09	.04	.18*	.12	2.82
SISI	−0.01	.03	−.01	−.01	1.97	−0.03	.03	−.07	−.05	2.03
Identity fusion						0.22	.05	.34*	.25	2.18
F			9.50**					12.04**		
R^2			.14					.19		
F for change in R^2			9.50*					23.73**		

Football ($N = 401$)	Step 1					Step 2				
Predictor variables	B	$SE\ B$	β	pr	VIF	B	$SE\ B$	β	pr	VIF
Solidarity	0.12	.03	.31**	.18	3.53	0.10	.03	.26**	.16	3.58
Satisfaction	0.01	.02	.02	.02	2.25	0.02	.02	.05	.04	2.27
Centrality	0.03	.03	.09	.06	3.07	−0.01	.03	−.04	−.02	3.36
IGH	0.02	.02	.05	.04	1.57	0.02	.02	.04	.04	1.57
ISS	−0.06	.03	−.15	−.09	3.02	−0.08	.03	−.21**	−.14	3.09
SISI	0.04	.02	.12	.09	1.89	0.01	.02	.03	.02	2.02
Identity fusion						0.21	.04	.36**	.26	2.27
F			12.99**					16.17**		
R^2			.17					.22		
F for change in R^2			12.99**					29.56**		

Notes. ISS = Individual self-stereotyping; IGH = ingroup homogeneity; SISI = single-item social identification measure; pr = partial correlation.
*$p < .05$; **$p < .001$.

practice. However, the fact that there was no evidence for strong measurement invariance indicates that although the structure of the constructs are similar between groups, researchers should not compare different groups' mean scores (e.g., social identification

for nationality vs. social identification for football). If researchers intend to compare mean scores between groups, these measures' mean scores should not be entirely relied upon; instead, the idiosyncrasies of each group must be taken into account. Although 'generic' measures that can be adapted to multiple social groups have benefits, particularly increased generality, it is still important to pay attention to the specificity of each social group and how these identities relate to different group belongingness constructs.

Inspection of Pearson correlation coefficients indicated high positive coefficients for identity fusion and Wachelke's group identification in all three target groups. Wachelke's group identification is based mainly on the centrality dimension of Leach *et al.*'s (2008) group identification scale, as indicated by the high positive correlation between these two. In line with this, centrality also presented high positive correlation coefficients with fusion in general. In fact, centrality could be regarded as more related to fusion than the other dimensions, considering that its items emphasize the role of personal identity (e.g., 'important for my identity', 'important part of how I see myself'). However, it only predicted endorsement of extreme pro-group behaviours in the nationality sample.

In addition, we found high positive correlations between identity fusion and the solidarity dimension, and mid- to high positive correlations between fusion and satisfaction. Taking into account the irrevocability principle of identity fusion (Swann *et al.*, 2012; a; see also Newson *et al.*, 2016; Vázquez *et al.*, 2017), and that strongly fused individuals are willing to self-sacrifice for the group, it is understandable that these individuals display strong levels of solidarity towards ingroup members and satisfaction with belonging to the group.

In contrast, individual self-stereotyping and ingroup homogeneity presented mid- to low positive correlations with identity fusion in all target groups. Indeed, one would not expect these constructs to be highly related to fusion, considering the relational ties principle of fusion (Swann *et al.*, 2012), which states that fused people are predisposed to recognize the unique personal and social identities of other ingroup members allowing for personalized attraction to them.

In general, there were some variations between the correlation of the different dimensions of identification and identity fusion across the target groups (e.g., for Nationality both solidarity and centrality had equally high coefficients, while for religion solidarity had a higher correlation with fusion). This highlights possible differences across diverse social identities regarding the relationship between different measures of group alignment, which is also in line with the absence of strong measurement invariance. We believe that the relationship between identity fusion and social identification dimensions is an important avenue for future research. It is also worth noting that the correlation between identity fusion and the single-item social identification measure (Postmes *et al.*, 2013) was smaller, suggesting that there is less overlap between these constructs. In sum, the positive correlations between the measures indicate that while the constructs are somewhat overlapping, they are not necessarily equal.

Regarding the correlations between the endorsement of extreme pro-group behaviours and identity fusion, and of each of the dimensions of group identification, we also saw a heterogeneous pattern between the target groups. Nonetheless, some consistent results also emerged. Identity fusion presented higher positive correlations with extreme pro-group behaviour in all three target groups (but quite similar to some identification dimensions, as per the nationality sample). This was also indicated by the partial correlation coefficients, which controlled for the effect of the additional independent measures in the model. This is in accordance with previous research

showing that identity fusion is a better predictor of pro-group sentiments and behaviours than unidimensional measures of group identification (Buhrmester *et al.*, 2012; Swann, Gómez, Dovidio, *et al.*, 2010; Swann *et al.*, 2014).

The relevance of this relationship was further evidenced by the hierarchical regression analysis. This indicated that identity fusion explains additional variance of the endorsement of extreme pro-group behaviours when included to the models after social identification measures in all target groups. In addition, all the identification dimensions were positively correlated with endorsement of extreme pro-group behaviours. However, when considering their relevance for the linear regression models, we found distinct patterns for each target group. For religion, satisfaction and individual self-stereotyping had positive coefficients, while ingroup homogeneity displayed a negative coefficient. For football, the solidarity dimension had a positive coefficient, while individual self-stereotyping had a coefficient in the opposite direction. For nationality, only identity fusion entered as a significant predictor in the second step.

Although we did not have an *a priori* hypothesis regarding these differences, we believe that these results are a further indication that fusion and social identification are different constructs. For example, while identity fusion had a positive influence on the endorsement of extreme behaviours in all three models, explaining additional variance, the influence of individual self-stereotyping differed for religion (i.e., positive) and football (i.e., negative). This is also in line with the absence of strong invariance between these groups, as the dimensions of social identification might be interpreted differently between these social identities, rendering different relationships between these dimensions and the endorsement of extreme pro-group behaviours. This is a promising avenue of research for those interested in exploring the effects of different dimensions of group identification on the endorsement of extreme pro-group behaviours.

A limitation of the present study is the skewed sample, comprised of largely urban, Caucasian, well-educated Brazilians with Internet access. Although we have come some way from WEIRD (Western, Educated, Industrialized, Rich, and Democratic), American, psychology undergraduate demographics (Henrich *et al.*, 2010), it is advisable that further studies verify these measures' validity in other samples representing different subgroups within Brazilian society. Our translation and adaptation provide a platform for this future work.

Finally, although the focus of this paper was on the relationships between identity fusion and group identification to specific social groups and a particular case of endorsement of extreme pro-group behaviour, recent research has also demonstrated that individuals can be both fused (e.g., Fredman *et al.*, 2017) and identified (e.g., Bliuc, McGarty, Reynolds, & Muntele, 2007; Haslam, Reicher, Millard, & McDonald, 2015; McGarty, Bliuc, Thomas, & Bongiorno, 2009; McGarty, Thomas, Lala, Smith, & Bliuc, 2014) with ideas, values, or causes. Even though it is plausible that the mechanisms explaining why some individuals self-sacrifice for a group and/or its members are the same mechanisms involved in self-sacrificing for an idea, this remains an open question for future research.

Conclusions

We have presented evidence of validity for social identification and identity fusion measures adapted to a novel cultural context, which paves the path for the test of these constructs' universality. Moreover, we showed that these instruments can be applied to different social groups, increasing their scope and providing further evidence of the

importance of these constructs in human group processes. Last, but not least, we replicated previous results indicating that although identity fusion and group identification measures are related, they seem to be measuring distinct and separate phenomena. Considering the amount of evidence showing that identity fusion is related to the endorsement of extreme pro-group behaviours, which we replicate here, we see fusion as an important research area to be further developed.

Acknowledgements

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Supporting Information

The following supporting information may be found in the online edition of the article:

Table S1. Measures in Brazilian Portuguese and the original in English.
Table S2. Multicollinearity diagnostics for the three regression models.