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Newcomers' cognitive development of social identification: A cross-sectional and longitudinal analysis of self-anchoring and self-stereotyping

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Upon joining a new social category, group members strive to establish and maintain high social identification. Thus far, we know relatively little about the cognitive underpinnings of social identification when developing from a new to a well-established group member. This research investigates the differential impact of newcomers' self-stereotyping (i.e., assimilation of the self to group stereotypes) and self-anchoring (i.e., projection of self-attributes onto the ingroup) on the development of social identification over time. Across two time points during the academic year, first year psychology students ($N = 123$) filled in a questionnaire on their perceptions about the self, psychology students, and social identification. Cross-sectional and longitudinal analyses confirmed our hypotheses that self-anchoring instigated new group members' social identification, while self-stereotyping instigated social identification once group membership was more well-established. This research emphasizes the interactive role of the personal and social self in the development of social identification.

Imagine the time you finished high school and started studying psychology. How did you develop a bond with this new social category? As a newcomer, you may have thought you had some personal characteristics that would likely make you a good psychologist. At this stage, you may have assumed that who you are as a person would fit with the group. After a while, you likely became more familiar with what psychology students are typically like. At this stage, the integration of group stereotypes in your self-concept may have contributed to your group bond.

The example above illustrates that upon joining a new social category, group members undergo a psychological transformation from a new group member to a well-established group member, which shapes their formation of a group bond (Ashforth & Mael, 1989). Generally, new group members' primary concern upon joining a new social category is to attain and maintain strong social identification levels (Worchel, 1998). Such identification not only secures a sense of positive self-esteem, social support, and self-definition (Cassidy & Trew, 2001), but also shapes future attitudes and commitment towards the new social category (Worchel, 1998).

To date, surprisingly little is known about the processes that may instigate new group members' social identification and its development over time. Thus far, most studies have adopted a rather static perspective on social identification, focusing on its role at a certain

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point in time (e.g., Condor, 1996; Ellemers, Spears, & Doosje, 1999), or when switching from one social situation to another (e.g., Markus & Wurf, 1987; Turner, Hogg, Oakes, Reicher, & Wetherell, 1987). The studies that do adopt a longitudinal approach to investigate social identification as an outcome variable specifically do so in response to identity threats or unwanted categorizations (Bettencourt, Charlton, Eubanks, Kernahan, & Fuller, 1999; Doosje, Spears, & Ellemers, 2002; Jetten, O'Brien, & Trindall, 2002; Lemay & Ashmore, 2004). In this research we take a different, more dynamic approach. We investigate how newcomers' formation of cognitive overlap between the self and the ingroup (e.g., Smith & Henry, 1996) impacts on social identification when developing from a new to a well-established group member (irrespective of threat). Our aim is to demonstrate that the cognitive pathways that instigate social identification differ over time.

To do so, we focus on first year psychology students' cognitive development of social identification during their first 6 months at university. An important life change such as the transition to university offers a unique opportunity to investigate longitudinal changes in social identity processes because it places new demands on the cognitive representation of the self-concept relative to the new group (Bettencourt *et al.*, 1999; Markus & Kunda, 1986; Harter, 1999). We assume that this process can be guided by both the part of the self-concept that is *stable*, such that personality characteristics guide perceptions and behaviours towards the new group (Brissette, Scheier, & Carver, 2002), and by a part of the self-concept that is *flexible* and adapts to the new group's social norms and values (Amiot, Blanchard, & Gaudreau, 2008; Jetten *et al.*, 2002). In a similar vein, Deaux and colleagues (Deaux, 1993; Ethier & Deaux, 1994; Reid & Deaux, 1996) reason that people's self-concept includes both a personal identity, (i.e., idiosyncratic attributes), and a social identity (i.e., shared conception of a social category), and that both may provide meaning to a (new) social category.

Taking this dual view of the self as a starting point, one can also distinguish between two cognitive routes to infer a mental bond between the self-concept and the group (DiDonato, Ullrich & Krueger, 2011; Guimond, Chatard, Martinot, Crisp, & Redersdorff, 2006; Otten, 2005; Otten & Epstude, 2006; van Veelen, Otten, & Hansen, 2011, 2012), namely self-stereotyping (Turner *et al.*, 1987) and self-anchoring (Cadinu & Rothbart, 1996). We will discuss both social inference processes in further detail below, and argue that the impact of these two cognitive routes on social identification will differ over time.

Cognitive routes to self-group overlap

In general, for people to create a bond with a group, a certain degree of perceived cognitive overlap between the self and the group must be present (Smith & Henry, 1996). More mental overlap between self and group representation indicates higher social identification (Coats, Smith, Claypool, & Banner, 2000; Tropp & Wright, 2001). According to self-categorization theory (SCT; Turner *et al.*, 1987) the general cognitive strategy to create mental overlap is top-down, via self-stereotyping, or the assimilation of the self to group prototypes (e.g., Lorenzi-Cioldi, 1991; Simon & Hamilton, 1994; Voci, 2006). On the basis of the central assumption in social identity theory (Tajfel & Turner, 1979) that people have a social self-concept (as defined by prototypical group norms and values) and personal self-concept (the unique individual, different from others), SCT posits that when identifying with a social category, the social self becomes salient and the personal self shifts to the background, or *depersonalizes* (Mullen, Migdal, & Rozell, 2003; Turner *et al.*, 1987). Consequently, people come to describe themselves in terms of prototypical group characteristics. This process is called self-stereotyping and implies that self-group overlap

is based on conformity to socially shared, prototypical group norms. Importantly, according to SCT, self-stereotyping is the core process to create self-group overlap, while the personal self has no relevant role to play in the formation of a mental group bond.

Recent research, however, has shown that self-group overlap not only emerges through top-down processes, via self-stereotyping but also bottom-up, via self-anchoring¹ (Cadinu & Rothbart, 1996). Self-anchoring implies the projection of personal self-attributes onto a group. Self-anchoring was first demonstrated in minimal groups to explain why people display ingroup favouritism even towards such arbitrary groups (Cadinu & Rothbart, 1996; Clement & Krueger, 2002; Gramzow, Gaertner, & Sedikides, 2001; Otten & Wentura, 2001). In addition, research showed that self-anchoring is not only relevant in minimal but also in real groups (Otten, 2004; Otten & Epstude, 2006). Importantly, in contrast to self-stereotyping, self-anchoring implies that the personal self plays a central role in shaping a bond between the self and the group.

Social identification

Recent research has demonstrated that both the assimilation to group stereotypes (i.e., self-stereotyping) as well as the projection of personal characteristics onto the group (i.e., self-anchoring) may facilitate the level of social identification (van Veelen *et al.*, 2011). Specifically, this research provided the first evidence that when investigating self-anchoring and self-stereotyping simultaneously, both cognitive processes are significantly positively associated with the level of social identification. Further research also demonstrated that it depends on the type of group whether either self-anchoring or self-stereotyping works best as a cognitive route to social identification (van Veelen *et al.*, 2012). Specifically, self-stereotyping is highly dependent on the availability of knowledge of a group's prototypical characteristics (i.e., without such knowledge, there is very little to assimilate the self to), while self-anchoring merely relies on the personal self as a source of inference (Otten & Epstude, 2006; Robbins & Krueger, 2005). As such, research demonstrated that self-stereotyping facilitates social identification mostly in groups in which unobtrusive knowledge of group stereotypes is available, while self-anchoring facilitates the level of identification even in complete absence of such group knowledge (van Veelen *et al.*, 2012). Intuitively, this finding may already signal important implications for the differential impact of self-anchoring and self-stereotyping on new versus well-established group members' social identification.

Cross-sectional impact of self-anchoring and self-stereotyping on identification

Upon entering a social category, new group members generally know relatively little about their group, its members, and its norms and values (Amiot, de la Sablonniere, Terry, & Smith, 2007). Entering a new group means a time of uncertainty and unfamiliarity (Moreland & Levine, 1989), in which new group members still have a lot to learn about typical group norms and values, and how their group is different from other groups (Levine, Moreland, & Ryan, 1998). Considering this lack of clear knowledge about their group, we assume that new group members mainly rely on their personal self-knowledge to shape a cognitive bond with the group (i.e., self-anchoring).

¹ The terms *self-anchoring* and *social projection* are often used interchangeably in the literature, thereby referring to the process of using the self as a heuristic to make group judgements (e.g., Robbins & Krueger, 2005). For ease of readability we only use the term *self-anchoring* in this article, yet conceptually we consider the two terms as equivalents.

In support for this assumption, prior research revealed that in novel or ill-defined groups, people have a strong tendency to use the self as a source of information to fill the cognitive gaps in a group's representation (Otten & Wentura, 2001; Robbins & Krueger, 2005; van Veelen *et al.*, 2012). Moreover, in groups lacking clear knowledge of their identity content, self-anchoring rather than self-stereotyping typically predicts the level of social identification (van Veelen *et al.*, 2012). Assuming that for new group members it is also relatively unclear what the group's identity comprises, our first hypothesis is that upon entering a new social category, self-anchoring (more than self-stereotyping) will be positively associated with new group members' social identification (Hypothesis 1a).

After some time new group members have undergone a socialization process, which familiarizes them with the properties of the new social category and turns them into well-established group members (Amiot *et al.*, 2007). At this point, group members have likely developed a rich understanding of the group's stereotypes, and are more accurate in correctly inferring ingroup stereotypes, compared to when they were still newcomers (Park, Kraus, & Ryan, 1997; Ryan & Bogart, 2001). As a consequence, well-established group members' assimilation of the self to group stereotypes should now have a significant relation to social identification levels, while the importance of self-anchoring for well-established group members' level of identification may diminish somewhat (see also van Veelen *et al.*, 2012). Therefore, we hypothesize that self-stereotyping (more than self-anchoring) is positively associated with the level of social identification among well-established group members (Hypothesis 1b).

Longitudinal impact of self-anchoring and self-stereotyping on identification

Although self-stereotyping may not profoundly impact on newcomers' initial level of social identification (see Hypothesis 1a), this is not to say that people do not at all engage in self-stereotyping in the beginning of their group membership. Specifically, upon entering an *already existing* social category such as 'psychology students', new psychology students likely already have some ideas about what the group's identity comprises. Yet, the little knowledge that new group members may have upon entering an existing social category is likely not sufficiently internalized and socially validated for self-stereotyping to be diagnostic for newcomers' identification (see also Postmes, Baray, Haslam, Morton, & Swaab, 2006). Only over time, through experience, interaction with, and observation of other ingroup members, the integration of stereotypes in the self-concept may become meaningful and socially validated (Haslam *et al.*, 1998; Smith & Postmes, 2011). Therefore, initial levels of self-stereotyping may have a profound impact on the level of social identification once group membership is well established. Specifically, those newcomers scoring high on self-stereotyping from the start may have had the opportunity to validate and internalize those stereotypes during the socialization phase, while those newcomers who did not score high on self-stereotyping initially, did not have such an opportunity. Therefore, we hypothesize that newcomers' initial level of self-stereotyping should have a positive, longitudinal impact on identification when group membership becomes more well-established (Hypothesis 2a).

At the same time, as the relevance of group stereotypes for social identification increases over time, the relevance of the personal self as a source of inference may diminish somewhat (see Amiot *et al.*, 2007, for a similar argument). Indeed, prior research has suggested that self-anchoring serves as a *temporal* heuristic to fill in the cognitive gaps in a group's identity representation (Otten & Epstude, 2006). To this end, the personal

attributes that newcomers' project onto the new group may likely be less applicable once more and more of the cognitive gaps in the group's identity representation are filled based on internalization of knowledge of group stereotypes (e.g., Robbins & Krueger, 2005). Therefore, while self-anchoring may predict the level of identification at the beginning of group membership (see also Hypothesis 1a), we do not expect a longitudinal impact of newcomers' self-anchoring on social identification when group membership becomes more well established (Hypothesis 2b).

The present research

This research investigates the cross-sectional and longitudinal impact of self-anchoring and self-stereotyping on newcomers' social identification. Cross-sectionally, we expect that newcomers' social identification is positively associated with self-anchoring more than with self-stereotyping (Hypothesis 1a), while a reverse pattern is expected for well-established group members' social identification (Hypothesis 1b). Longitudinally, we expect that newcomers' self-stereotyping significantly impacts on social identification once group membership is well established (Hypothesis 2a) while self-anchoring does not (Hypothesis 2b). To test our hypotheses we asked first year psychology students to fill in a questionnaire about their group membership as psychology student twice: at the beginning of their studies, and 6–7 months later towards the end of their first academic year.

Method

Design and procedure

At the beginning of their first study year, participants were recruited from the psychology programme at a large Dutch university. First year psychology students completed an online questionnaire at the start (Time 1 [T1]; during the very first week of their first semester), and 6–7 months later, towards the end of the second semester (Time 2 [T2]). We chose this particular time gap because in the Netherlands, first year students can decide to quit their studies, while still being fully reimbursed on their college fees. This arrangement ends after the first semester. Because we wanted to avoid a sample including people who may, already at a very early stage, anticipate withdrawal from their group membership, we collected our second data wave towards the end of the second semester. In line with previous research (Amiot *et al.*, 2007), this particular time gap also corresponds to the length of a socialization phase of a newcomer in a group.

The study was introduced as a longitudinal investigation of how individuals build a group bond. It was explained that participation was voluntary and that anonymity and confidentiality would be ensured. To this end, participants were asked to give anonymous identification codes in order to match their data files longitudinally. At both time points, students filled in exactly the same measures and received course credits in return. In addition, to minimize attrition rates two I-pods were raffled among those who participated twice.

Participants

In total, 446 first year psychology students ($M_{\text{age}} = 19.92$, $SD = 2.68$; 334 females) filled in the online questionnaire at T1 at the start of the academic year. At T2, roughly 6–7 months

later, 123 participants filled in the online questionnaire again ($M_{\text{age}} = 20.25$, $SD = 2.75$; 91 women). A dropout of 323 participants between $T1$ and $T2$ indicates a high attrition rate of 72.42%. This can for a good deal be attributed to the fact that psychology students were awarded course credits in exchange for participation. Halfway through the second semester, many psychology students had already attained the required amount of course credits for participating in psychological studies, thereby making participation at $T2$ less worthwhile. Moreover, each year over 5% of the first year psychology students drops out of college before the second semester starts. Important reasons for dropping out are students' difficulty with studying at an academic level, or students' considerable doubts about their study choice.²

The data of the 123 participants at $T2$ could be matched over time and were used for the final analyses.

Measures

The order in which we present our measures resembles the order in which they were presented in the questionnaire.

Self-anchoring

After the general introduction, all participants first rated 19³ traits on their applicability to the *personal self* on a 9-point Likert scale (1 = not at all applicable; 9 = completely applicable). Subsequently, we made participants aware of their group membership as a psychology student (ingroup salience) and participants rated the same 19 traits again, but this time on their applicability to the ingroup psychology students. We constructed a self-anchoring score based on these 19 trait ratings on the self and the group.

Construction of a self-anchoring score. Measuring self-anchoring in real groups can be quite a challenge (e.g., Otten, 2004; Otten & Epstude, 2006). Most prior research on self-anchoring relied on minimal group paradigms (MGP). In a MGP, social identities can generally not be derived from pre-existing knowledge on group stereotypes. Hence, it is quite safe to assume that in minimal groups, self-group overlap can only be inferred unidirectionally from the personal self (Gramzow *et al.*, 2001; Otten, 2005). However, in this study we focus on real groups. Here, social inferences can be based on two sources of knowledge, namely the personal self (i.e., self-anchoring) and the group's stereotypes (i.e., self-stereotyping). Therefore, with self-anchoring in real groups, to optimally capture the diagnostic value of the self one should limit the interference of group knowledge to a minimum.

As a first step to do so, we made sure that the order of self and group trait ratings was always such that self-ratings *preceded* group ratings. Moreover, trait ratings on the self

²In addition, we tested whether the attrition of participants was related to the level of social identification at $T1$ (Little, Lindenberg, & Maier, 2000). A univariate analysis of variance (ANOVA) revealed that participants who dropped out scored lower ($M = 4.83$, $SD = 0.95$) on social identification than those who stayed in the sample ($M = 5.10$, $SD = 0.84$), $F(1, 444) = 6.99$, $p = .009$, $\eta_p^2 = .015$. Although this finding corresponds to the fact that the dropout sample at $T1$ contains students who may have considerable doubts about their study choice, we should also interpret this effect with some caution given that the absolute difference between the means is very small, as well as the effect size of the F-test.

³Initially, we included 20 traits to measure self-anchoring; however, the trait 'mathematical' was eliminated from the score, because it turned out to be counter-stereotypical for psychology students and not ambiguous.

were always measured *prior* to making the group ‘psychology students’ salient. In this way, any contamination of personal self-ratings based on the salience of the social category could be minimized (Otten & Epstude, 2006; van Veelen *et al.*, 2011). Secondly, for the self-anchoring score, we included only traits that were – according to a pilot study – ambiguous in their applicability to psychology students (thus, neither stereotypical nor counter-stereotypical). Research showed that by focusing on traits that are clearly defined for the self, but are ambiguous with respect to their applicability to the group, self-anchoring can be measured most accurately (Otten & Epstude, 2006). Finally, to make sure that self-group overlap is not confounded with *valence*, all traits were pilot tested for being relatively neutral in valence (i.e., around the midpoint of a 7-point scale; 1 = *very negative*; 7 = *very positive*).

To obtain a self-anchoring score for each participant, self-group overlap was measured by calculating intra-individual profile correlations based on the 19 traits rated on their applicability to the self and the group (e.g., Otten & Wentura, 2001; van Veelen *et al.*, 2011). In addition, the profile correlations were controlled for item popularity. Item popularity is the general tendency to endorse an item, for example, due to social desirability or valence effects. For each trait, popularity was calculated as the proportion of positive endorsement of a trait (i.e., scoring 6–9 on the Likert scale; de la Haye, 2000; Krueger & Clement, 1994; see Appendix for the trait list). Individual scores could vary between –1 and 1, and higher scores indicated higher self-anchoring.

Self-stereotyping

While participants were asked to rate the 19 ambiguous traits on their applicability to the group psychology students, we also asked them to rate the group on 15 other traits, pilot tested for being *stereotypical* or *counter-stereotypical* for psychology students on a 9-point scale (1 = *not at all applicable*; 9 = *completely applicable*). Subsequently, participants rated the personal self again. This time, self-ratings were made specifically on the 15 *stereotypical* traits. Analogous to the procedure for self-anchoring, we constructed a self-stereotyping score based on these 15 stereotypical trait ratings on the self and the group.

Construction of a self-stereotyping score. Measuring self-stereotyping in real groups, and disentangling it from self-anchoring is just as challenging as vice versa. With self-stereotyping, to optimally capture the diagnostic value of the group’s stereotypes one should keep the interference of the personal self to a minimum. As is evident from the previous paragraph, we therefore only used traits that were – according to a pilot study – stereotypical or counter-stereotypical for the group psychology students. Moreover, self-ratings on stereotypical traits were deliberately measured *after* the group category was made salient in order to make sure that the group was available as a heuristic to define the self. This procedure was adapted from earlier research showing that self-stereotyping is most prevalent when it is based on stereotypical rather than ambiguous traits, and when group ratings precede self-ratings (Guimond *et al.*, 2006; Latrofa, Vaes, Cadinu, & Carnaghi, 2010).

Again, intra-individual profile correlations were calculated to capture the level of overlap between group and self-ratings on the 15 stereotypical traits (Latrofa *et al.*, 2010; van Veelen *et al.*, 2011). Moreover, the stereotypical traits we also relatively neutral in valence, and profile correlations were controlled for by item popularity.

Taken together, this procedure allowed us to measure self-anchoring and self-stereotyping within-participants in one research paradigm (van Veelen *et al.*, 2011, 2012).

Social identification

Social identification was measured with seven items from the self-investment identification scale by Leach *et al.* (2008) on a 7-point Likert scale (1 = *I do not agree*; 7 = *I totally agree*).⁴ Example items are 'I feel a bond with psychology students' and 'I am glad to be a psychology student' ($\alpha_{T1} = .83$; $\alpha_{T2} = .89$).

Results

Descriptive statistics

Table 1 displays longitudinal changes in means and standard deviations of all variables in the study. Repeated-measures analysis showed that the mean levels of self-anchoring and self-stereotyping do not change over time. When entering an already established group (such as psychology students) both processes seem to be present at the beginning of group membership and also when group membership is more well established. Furthermore, social identification did not change significantly over time (see Table 1). Importantly, while repeated-measures analyses revealed no mean level changes in identification over time, this does not imply that the process explaining *how* newcomers identify with groups across time points may not change either (see also Amiot, Terry, Wirawan, & Grice, 2010). Next, we will therefore focus on the correlations between social identification, self-anchoring, and self-stereotyping to investigate how the different cognitive processes are associated with social identification at different time points.

Cross-sectional analysis

Table 2 displays cross-sectional zero-order correlations and partial correlations between the social inference variables self-anchoring and self-stereotyping and social identification. The partial correlations constitute correlations between self-anchoring and other variables in the model, controlling for self-stereotyping and vice versa. To investigate the unique impact of self-anchoring and self-stereotyping on social identification, and secure the discriminant validity of both social inference processes, investigating partial and zero-order correlations is important (see also van Veelen *et al.*, 2011).

Table 1. Means (*M*), standard deviations (*SD*), and mean changes over time

	Time 1		Time 2		<i>F</i> (1, 122)	<i>p</i>	η_p^2
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Self-anchoring	0.21	0.33	0.19	0.36	00.40	.527	.00
Self-stereotyping	0.21	0.35	0.18	0.38	00.51	.479	.00
Social identification	5.09	0.84	5.08	0.97	0.00	.97	.00

⁴ To measure social identification, we specifically focused on the self-investment subscale by Leach *et al.* (2008), because following recent work by Postmes, Haslam, and Jans (2012), this captures the essence of social identification, defined as the positive emotional valuation attached to one's group membership. Indeed, Postmes *et al.* (2012) showed that the single-item 'I identify with my group' relates most strongly to the items of the self-investment scale. In contrast, it relates less to self-definition items, which focus on perceptions of similarity between group members, rather than on the emotional significance an individual attaches to the group.

Table 2. Cross-sectional zero-order correlations and partial correlations at *T1* and *T2* of all variables

		SA	SST	Social identification
SA	<i>r</i>	—	.35***	.27**
	<i>pr</i> ^a	—	—	.25**
SST	<i>r</i>	.57***	—	.12
	<i>pr</i> ^a	—	—	.03
Social identification	<i>r</i>	.25**	.27**	—
	<i>pr</i> ^a	.12	.17 [†]	—

Note. Cross-sectional correlations above the diagonal represent *T1*, and cross-sectional correlations below the diagonal represent *T2*. SST = self-stereotyping; SA = self-anchoring.

^aAll partial correlations are controlled for by the respective other projection process. Thus, all *pr* correlations with SA are controlled for the effect of SST and vice versa.

****p* < .001, ***p* < .01, **p* < .05, [†]*p* < .10.

As expected, inspection of both zero-order and partial correlations showed that at *T1*, self-anchoring significantly and positively associated with social identification while self-stereotyping was not. In contrast, at *T2*, zero-order correlations show that *both* self-anchoring and self-stereotyping were significantly positively associated with social identification. Yet, based on the partial correlations, when controlling for self-anchoring, only self-stereotyping was (marginally) significantly correlated with social identification (*pr* = .17, *p* = .066), while the correlation between self-anchoring and social identification dropped to non-significance (*pr* = .12, *p* = .21). This difference between zero-order and partial correlations is likely due to the fact that self-anchoring and self-stereotyping have more overlap in explained variance at *T2* ($r_{\text{self-anchoring, self-stereotyping}} = .57$) compared to *T1* ($r_{\text{self-anchoring, self-stereotyping}} = .35$).

Overall, this pattern of results confirms our expectation that self-anchoring is a more important process associated with the level of social identification at *T1* (Hypothesis 1a), while self-stereotyping becomes a more important process associated with the level of social identification at *T2*, once group membership is well established (Hypothesis 1b).

Longitudinal analysis

In a next step, we investigated the impact of self-anchoring and self-stereotyping on social identification longitudinally. We expected that self-stereotyping at *T1* would significantly predict the level of identification at *T2* (Hypothesis 2a), while self-anchoring at *T1* would not significantly impact on the level of identification at *T2* (Hypothesis 2b). To investigate the longitudinal relationship between the variables, cross-lagged path analyses were performed, using AMOS to yield maximum-likelihood parameters. In our analytical approach, we estimated our hypothesized model (Model 1) including the predicted longitudinal effect of self-stereotyping at *T1* on social identification at *T2*. To provide goodness-of-fit-indices for our model, we used multiple criteria, namely the traditional χ^2 index, the root mean square error of approximation (RMSEA), which should approximate .06 or less, and the Non-Normed Fit Index (NNFI), the Comparative Fit Index (CFI) and the Incremental Fit Index (IFI), which should all be above .90 (Hu & Bentler, 1999).

In Model 1 (see Figure 1), we estimated the expected associations between the six variables in our model. First, the curved, double-headed lines in the model indicate that all *T1* variables were allowed to correlate cross-sectionally, and that all error terms from the endogenous variables were allowed to correlate as well. Secondly, the horizontal lines

Figure 1. Parameter estimates in the cross-lagged path model (Model 1) testing the longitudinal prediction of self-stereotyping at Time 1 (T1) on social identification at Time 2 (T2). Note. Rectangles indicate measured variables. Small circles reflect residuals (e); bold numbers above endogenous variables represent amount of variance explained (R^2). Unidirectional arrows depict autoregressive and cross-lagged paths. Standardized maximum-likelihood parameters are used. Bold estimates are statistically significant at $^\dagger p < .10$ (marginal); $* p < .05$; $** p < .01$; $*** p < .001$ (two-tailed).

indicate the *autoregressive effects* between self-anchoring at T1 and T2, self-stereotyping at T1 and T2, and social identification at T1 and T2. These parameters signal the longitudinal stability of the measures. Third, the diagonal lines in our model represent the *cross-lagged effects*. We estimated cross-lagged paths between self-anchoring and self-stereotyping across time points, as we assume that those who seek to create mental self-group overlap, will likely do so by inferring this overlap via both directional cognitive pathways (see also Cadin & De Amicis, 1999; van Veelen et al., 2011). Most importantly, we estimated the cross-lagged path from self-stereotyping at T1 social identification at T2 to test Hypothesis 2a. Estimations of the cross-lagged parameters in the model control for the autoregressive effects. This implies that any significant cross-lagged effect, reflecting the longitudinal influence that variable X at T1 exerts on variable Y at T2, indicates predictive power over and above the stability of these measures.

Model 1 obtained good fit, $\chi^2 = 3.01$, $p = .39$, $df = 3$, $RMSEA = .01$, $NNFI = .98$, $CFI = 1.00$, $IFI = 1.00$ (see Table 3). Results on the parameter estimates (see Figure 1) showed that all autoregressive paths were significant ($p < .001$). Moreover, the cross-lagged paths between self-stereotyping at T1 and self-anchoring at T2 ($\beta = .22$, $t = 2.72$, $p = .006$) and vice versa ($\beta = .15$, $t = 1.77$, $p = .077$) were significant or marginally significant. Most importantly, confirming Hypothesis 2a, self-stereotyping at T1 significantly predicted identification at T2 ($\beta = .19$, $t = 2.35$, $p = .019$).

Subsequently, we tested two alternative models to provide evidence for the robustness of our hypothesized model. In Model 2, we adjusted Model 1 such that we added a cross-lagged path from self-anchoring at T1 to identification at T2. Here, we wanted to show that adding self-anchoring as a longitudinal predictor of identification would not result in significantly better model fit, compared to the more parsimonious Model 1 (see also Kline, 2011). The goodness-of-fit indices for this second model indicated good model fit (see Table 3), but not significantly better than Model 1 ($\Delta\chi^2 = 1.00$, $\Delta df = 1$, ns). Moreover, confirming Hypothesis 2b, the cross-lagged path between self-anchoring at T1 and

Table 3. Model fit statistics for hypothesized cross-lagged path analysis (Model 1) and two alternative models (Models 2 and 3)

	Fit statistics									
	χ^2	df	p	RMSEA	NNFI	CFI	IFI	$\Delta\chi^2$	Δdf	Δp
Model 1 ^a	3.01	3	.39	.01	.98	1.00	1.00			
Model 2 ^b	2.02	2	.37	.00	.98	1.00	1.00	1	1	ns.
Model 3 ^c	1.07	2	.59	.00	.99	1.00	1.00	1.96	1	ns.

Note. RMSEA = Root Mean Square Error of Approximation; NNFI = Non-Normed Fit Index; IFI = Incremental Fit Index; CFI = Comparative Fit Index.

^aHypothesized model: longitudinal impact of self-stereotyping *T1* on social identification *T2*.

^bAlternative model with longitudinal impact of self-anchoring *T1* of social identification *T2* added.

^cAlternative model with reversed causal path from social identification *T1* on self-stereotyping *T2* added.

identification at *T2* was not significant ($\beta = -.01$, *ns*). Hence, self-anchoring (*T1*) did not have a longitudinal impact on social identification (*T2*).

In a second alternative model (Model 3), we aimed to rule out a potential reversed causal pathway between social identification and self-stereotyping, because in the social identity literature (e.g., Tajfel & Turner, 1979; Turner *et al.*, 1987) social identification is often perceived as a predictor of self-stereotyping (see also Haslam, Oakes, Reynolds, & Turner, 1999). However, the additional cross-lagged path from social identification at *T1* to self-stereotyping at *T2* did not result in significantly better model fit, compared to the more parsimonious Model 1 ($\Delta\chi^2 = 1.96$, $\Delta df = 1$, *ns*; see Table 3). Moreover, the cross-lagged path between identification at *T1* and self-stereotyping at *T2* was not significant ($\beta = .11$, *ns*).

Taken together, the cross-lagged path analyses in Model 1 confirmed our hypotheses and fitted the data most optimally, when tested against two alternative models.

Discussion

In this research, we provided the first empirical evidence showing that new and well-established group members' social identification is instigated by different cognitive pathways. Specifically, our cross-sectional analysis revealed that newcomers' self-anchoring (and not self-stereotyping) was positively associated with social identification, while well-established group members' self-stereotyping (and not self-anchoring) was positively associated with social identification. Moreover, self-anchoring only had a relatively short-lived impact on newcomers' social identification: Using the self as a heuristic to fill cognitive gaps in a group's representation fostered social identification as a newcomer, but no longitudinal effects of newcomers' self-anchoring on social identification levels at *T2* were revealed. These findings are in line with earlier work showing that the impact of self-anchoring on social identification is especially pronounced in ill-defined group situations, but attenuates once knowledge on the group's identity content increases (van Veelen *et al.*, 2012). In contrast, for self-stereotyping, cross-sectional analysis revealed no effect of this process on newcomers' social identification, but it did on well-established group members' identification. Moreover, results from our cross-lagged path analyses revealed that newcomers' self-stereotyping did have a long-term effect on social identification: self-stereotyping among newcomers became diagnostic for the level of

social identification once group membership was well-established. These findings are in line with previous research (Haslam *et al.*, 1998; Smith & Postmes, 2011) showing that only through experience with, interaction with, and observation of other ingroup members, stereotypes can become meaningful and socially validated as an integrated part of the self.

In addition, while our data provide clear evidence for a differential impact of self-anchoring and self-stereotyping on identification among new and well-established group members, we also find that the prevalence of both social inference processes is similar across time points, and that both are consistently positively correlated with each other. Although at first glance these findings may seem hard to reconcile, this pattern of results actually fits nicely with our argument and with earlier research. Specifically, in real groups, both self-anchoring and self-stereotyping have been shown to form cognitive means to the same end (i.e., self-group overlap; Cadinu & De Amicis, 1999; van Veelen *et al.*, 2011). This implies – in line with our results – that they should not be negatively interdependent, but should rather correlate positively with each other. At the same time, the *relative impact* of the two processes on identification has been shown to differ depending on the group context (see van Veelen *et al.*, 2012). In this study, we again find such moderating effect, namely depending on the novelty of group membership.

Theoretical implications

With this research, we provide deeper understanding of the cognitive processes that guide group members' psychological transformation from a newcomer in a group to a well-established group member. To our knowledge, this is the first empirical test to show the importance of an integrative and dynamic approach to the relevance of the personal self (i.e., self-anchoring) and the social self (i.e., self-stereotyping) on the cognitive development of social identification among newcomers in groups. Specifically, our findings reveal that while newcomers mostly rely on the use of personal characteristics as an anchor to give meaning to and affiliate with their group, well-established group members also rely on a part of the self-concept that is flexible and adaptable to the social context, namely the social self. Such innovative insight empirically supports earlier work suggesting longitudinal changes in the cognitive integration of new social identities in the self (Amiot *et al.*, 2007). Moreover, it builds on prior research showing that the role of group stereotypes, their social validation, and integration in the self becomes increasingly important for social identity processes as group membership becomes more well-established (Haslam *et al.*, 1998; Ryan & Bogart, 2001).

On a more general note, our research contributes to the idea that the social and personal self may not necessarily be two qualitatively distinct, antagonistic entities (e.g., Tajfel & Turner, 1979; Turner *et al.*, 1987), but may rather be intermingled in the process of social identification (e.g., Deaux, 1993; Jetten & Postmes, 2006; Reid & Deaux, 1996). The personal and social self may even grow closer together over the course of group membership, as our data shows an increase in the positive relation between self-anchoring and self-stereotyping over time. This finding may provide a valuable starting point on research broadening our understanding of when and how our personal and social selves may collide (Swann, Jetten, Gómez, Whitehouse, & Bastian, 2012).

Limitations and future research

In our research, we examined both cross-sectional and longitudinal changes in the development of social identification. This approach speaks to the importance of

combining and differentiating between cross-sectional and longitudinal predictors of social phenomena (Bateman & Strasser, 1984; Meyer, Bobocel, & Allen, 1991), and helps us to understand the dynamic between short-term and long-term instigators of identification at different phases during group membership. Longitudinally, our research model also allows causal inferences to be made regarding the development of group affiliations over time. In particular, our cross-lagged path analyses provided empirical evidence for our proposed causal path from self-stereotyping at *T1* to identification at *T2*, rather than vice versa.

However, based on our cross-sectional analyses, a causal path from self-anchoring and self-stereotyping to social identification cannot be unequivocally established. In the case of self-anchoring, particularly in new groups, it seems intuitively most likely that self-anchoring serves as a predictor of social identification; it makes sense to first provide content to a relatively unknown group identity before being able to establish an affective group bond. Yet in the case of self-stereotyping the causality issue might be more complex. Specifically, in contrast to our assumptions, social identity theorists would argue that in a situation in which a group identity is highly salient, high identifiers are particularly motivated to self-define in terms of group stereotypes (Haslam *et al.*, 1999; Spears, Doosje, & Ellemers, 1997; Turner *et al.*, 1987). We agree that situational salience of a group's identity may enhance the tendency to self-define as a stereotypical group member. Importantly, however, the reason why we chose for the reversed causal order in our model is because we aimed to understand how newcomers' general level of identification with groups develops, independent of situational salience. Therefore, we consider self-anchoring and self-stereotyping as cognitive processes explaining identification. Combined with the outcomes of our longitudinal analyses, we conclude that it is highly plausible that self-stereotyping can indeed function as a predictor of social identification.

In this research, we worked to disentangle a self-stereotyping from a self-anchoring process in real groups. Although the employed method has been successfully applied before (Latrofa *et al.*, 2010; van Veelen *et al.*, 2011, 2012), and is rooted in prior research focusing on self-anchoring and self-stereotyping measures (e.g., Cadinu & De Amicis, 1999; Guimond *et al.*, 2006; Otten & Epstude, 2006; Otten & Wentura, 2001), we acknowledge that we cannot completely rule out the possibility that the self-group overlap captured by a self-stereotyping score, may also pick up slightly on a self-anchoring process and vice versa. Particularly considering that the self is one of the most rich and readily available sources of knowledge (Clement & Krueger, 2000; e.g., Krueger, 2007) it may be nearly impossible to completely rule it out as alternative source of inference. However, the traits to measure both processes were carefully selected based on psychology students' ratings on what they considered conventionally shared stereotypes or what they considered ambiguous to psychology students. Thus, despite potential individual differences in how stereotypical or ambiguous traits were perceived, we are quite confident about the internal validity of our measures. In addition, a further strength of our approach to the data analyses is that both processes were investigated in one research design (partial correlations, path analysis). This also ensures that any variance explained by self-anchoring, was controlled for by self-stereotyping and vice versa.

Our longitudinal investigation of social identification processes is attuned to newcomers upon entering an *already existing social category*. Such categorical groups exist largely as cognitively shared abstractions and as such, investigating the cognitive representations of the self and the group in such context is highly relevant. However, we want to stress that our investigation is significantly different from the

research devoted to studying the formation of interactive or small groups (e.g., Jans, Postmes, & Van der Zee, 2012; Lickel, Hamilton, & Sherman, 2001; Prentice, Miller, & Lightdale, 1994; Tuckman, 1965). Here, there may likely not be any prior knowledge on group stereotypes, and group norms and values have to evolve entirely through group interaction. Possibly, the role of self-anchoring relative to self-stereotyping might even be more relevant at the beginning of group membership in such groups. We therefore encourage future research on cognitive development of self-group relations in these types of groups.

Conclusion

This article provides the first empirical evidence for the differential impact of self-anchoring and self-stereotyping on newcomers' social identification, depending on the *length* of their group membership. Such cognitive insight in how newcomers' social identification develops over time is highly valuable, and denotes the importance of a dynamic view on the role of the personal and social self at different stages of group membership. In addition, from a practical point of view, insights of this study may help to guide those, who enter new groups (schools, work, and new neighbourhoods), in attaining a strong sense of social identification. In optimizing this process, we recommend an integrative approach taking advantage of both the more stable (personal) and flexible (social) self. Specifically, providing newcomers the opportunity to project their personal self onto the group's identity seems pivotal as a first cognitive basis to build up a group bond, while assimilation to group's norms and values may be more relevant as time progresses.

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Appendix: Trait list

Ambiguous traits	Stereotypical traits
Sweet tooth	Sensitive
Economical	Reader (books)
Handy	Curious
Environmentally conscious	Thoughtful
Mysterious	Social
Insecure	Emotionally intelligent
Extravagant	Concerned for others
Religious	Interested in others
Vain	Self-critical
Musical	Emotional
Nature lover	Good listener
Artistic	Self-assured (counter)
Tidy	Thinker
Irritable	Talker
Sporty	Empathetic
Animal lover	
Theatrical	
Fond of travelling	
Politically involved	