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Conversational Flow

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Document Version

Publisher's PDF, also known as Version of record

Publication date:

2014

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Koudenburg, N. (2014). *Conversational Flow*. s.n.

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Chapter five

Uniform and Complementary Social Interaction: Distinct Pathways to Solidarity

Koudenburg, N., Postmes, T., Gordijn, E. H., & Van Mourik Broekman, A. (2014a). *Uniform and Complementary Social Interaction: Distinct Pathways to Solidarity*. Manuscript submitted for publication.

We would like to thank Janneke Brakels for her musical assistance, and Eva Rieger, Eva Mulder, Anna-Carolin Haye, and Ben van Dijk for their assistance in collecting the data. We would also like to thank all participants for their time and willingness to participate in this research.

Abstract

We examine how different forms of co-action give rise to feelings of solidarity. We propose that (a) coordinated action elicits a sense of solidarity, and (b) the process through which such solidarity emerges differs for different forms of co-action. We suggest that whether groups are based on uniform action (e.g. synchronizing, as when people speak in unison) or on more complementary forms of action (e.g. alternating, when speaking in turns) has important consequences for the emergent position of individuals within the group. Uniform action relies on commonality, leaving little scope for individuality. In complementary action each individual makes a distinctive contribution to group formation, thereby increasing a sense of personal value to the group, which should contribute to the emergence of solidarity. The predictions receive support from five studies, in which we study groups in laboratory and field settings. Results show that both complementary and uniform co-action increase a sense of solidarity compared to control conditions. However, in the complementary action (or turn-taking) condition, but not in the uniform action (synchrony) condition, the effect on feelings of solidarity is mediated by a sense of personal value to the group.

Uniform and Complementary Social Interaction: Distinct Pathways to Solidarity

five

Researchers often distinguish between groups and social categories. Group research tends to focus on small dynamic groups with some form of interdependence and social interaction. Studies of social categories often focus on a different set of processes: Group members' perceptions of large social groups that exist by virtue of some shared property such as nationality or ethnicity (e.g., Postmes, Spears, Lee, & Novak, 2005). Although categorical processes appear to be more prevalent in large groups and interactive processes in small groups (Lickel et al., 2000; Jans, Postmes, & Van der Zee, 2011) we believe that both sets of processes occur in all groups (small and large) to some extent. In the present paper, our broad aim is to learn more about the operation of interactive and categorical processes in small groups, in order to understand how feelings of solidarity emerge.

Solidarity may be based on similarities between individuals: Uniformity of characteristics or actions fosters both perceptions of entitativity and social categorization (e.g., Dasgupta, Banaji, & Abelson 1999; Lakens, 2011; Marsh, Richardson, & Schmidt, 2009; McGarty, Haslam, Hutchinson, & Grace, 1995). But solidarity can also emerge through interactions that appear to be much less uniform (Gaertner & Schopler, 1998; Koudenburg, Postmes, & Gordijn, 2013a, *Chapter 4*). Most social interactions tend to consist of sequences of complementary actions: In conversations, for example, people take turns making distinctive contributions. Interestingly however, the same groups that engage in dialogic interaction may, at other occasions, express and develop solidarity through uniform actions such as communal prayer, dance, etc.

Although similarity and complementarity may both foster a sense of solidarity, we propose that the process is very different because the individual group members play such different roles in the group's formation. In similarity-based groups, a sense of unity could be derived

from the ability to distinguish the own group from its social context, thereby placing the individual in the background (cf. Campbell, 1958; Turner, 1985). In complementarity-based groups however, the distinctive input of each individual is a fundamental part of the group's actions, making each individual of personal value to group formation. It is this distinction that is central to the current research.

Two Pathways to Solidarity

In the Oxford English Dictionary solidarity is defined as “the fact or quality, on the part of communities etc., of being perfectly united or at one in some respect, especially in interests, sympathies, or aspirations”. In sociological and social-psychological theorizing, the concept of solidarity has been used to explain the ways in which communities are tied together (e.g. Durkheim, 1893/1984) or to specify some sort of attachment of belonging to a group (Leach et al., 2008). Accordingly, we use the term solidarity here to refer to the both the experience that an aggregate of individuals constitutes a social unity (i.e. the entitativity of a group), and the feeling that one is part of this social unity (i.e. the sense of belonging or identification with this group).

A broad road range of theories proposes that similarity is a key predictor of solidarity. According to the similarity-attraction hypothesis (Byrne, Griffitt, & Stefaniak 1967; Byrne & Griffitt, 1969) people are more likely to feel attracted to similar others. In group research, self-categorization theory (SCT: Turner, 1982; 1985; Turner, Hogg, Oakes, Reicher, & Wetherell, 1987) proposes that people are most likely to categorize as group members when differences within the group are smaller than differences between groups. According to SCT, individuals tend to perceive themselves in terms of a shared stereotype that defines the ingroup in contrast to relevant outgroups (e.g., Hogg & Turner, 1987).

Postmes et al. (2005) argued that this type of group formation echoes some characteristics of Durkheim's (1893/1984) concept of *mechanical solidarity*: A form of solidarity anchored in commonalities or concurrent

actions. Durkheim associated mechanical solidarity with groups including indigenous tribes, who used rhythmic co-action to increase and express group unity. Indeed, more recent research has supported the idea that people synchronize their behavior in interactions (Bernieri & Rosenthal, 1991; Cappella, 1996; LaFrance, 1982) and that such synchronous interaction increases not only group entitativity (the perception of unity of the group as an entity) but also interpersonal liking (the strength of interpersonal relations within the group) and cooperative behavior (Hove & Risen, 2009; Lakens, 2010; Marsh et al., 2009; Valdesolo & DeSteno, 2011). Moreover, synchronous movement has been shown to blur self-other boundaries: Even complete strangers perceived themselves more similar to each other and showed more conformity to each other after synchronous, rather than a-synchronous stimulation (Miles, Nind, Henderson, & Macrae, 2010; Paladino, Mazzeuga, Pavani, & Schubert, 2010; Wiltermuth, 2012).

In modern societies however, Durkheim suggested that solidarity is *organic*: here individual complementarity serves as the basis for group formation and the individuality of group members becomes an important consideration in group functioning. Durkheim provides the example of a village composed of different craftsmen. Here, it is the way in which craftsmen complement and build upon each other, rather than the similarity of craftsmen, that provides a sense of solidarity in the village. Complementarity thus refers to the integrated and coordinated actions of individuals who, by virtue of their actions, are quite dissimilar of each other (or to be more precise: distinctive without being antagonistic).

Durkheim's observations can be related to contemporary research showing that interpersonal interaction is also a major predictor of feelings of entitativity and improved interpersonal relations within the group (Gaertner, Iuzzini, Guerrero Witt, & Oriña, 2006; Gaertner & Schopler, 1998; Koudenburg, Postmes, & Gordijn, 2011; 2013a; 2013c, *Chapter 3, 4, 7*; Lickel et al., 2000; Prentice, Miller, & Lightdale, 1994). This can be conceptualized as a bottom-up process in which a common sense of identity is *induced* from group members' individual contributions to the group (Postmes, Haslam et al., 2005; Postmes, Spears et al., 2005; see also Swaab, Postmes, Van Beest, & Spears, 2007).

Further research has shown that also in heterogeneous groups, inductive processes can provide a strong basis for identification (Jans et al., 2011).

In sum, there are two distinct ways in which solidarity can be achieved. One could be termed deductive (or mechanical): overarching similarities in the group influence group members to experience solidarity. This solidarity can be witnessed in different conceptually related indicators of solidarity including entitativity and social identification. Exactly the same indicators of solidarity are affected by a second pathway, which we termed inductive: the complementary actions of individual group members creating a successful community.

In the research by Postmes and colleagues, the process of identity formation is manipulated directly to be either inductive or deductive. The idea behind this is that this creates different types of solidarity, which has consequences for, for instance, the way group members deal with heterogeneity within the group (e.g. Jans et al., 2011, 2012). The present research builds on these prior studies, zooming in on the process of co-action in groups and its consequences for social solidarity. But rather than manipulating identity formation directly, we merely vary the mode of physical interaction between group members: We believe that the physical manifestation of the group shapes the development of a sense of solidarity.

Sense of Personal Value to the Group

One of the differences between mechanical and organic processes of group formation lies in the contributions that individual group members make to it. Durkheim already observed that in organic societies there would be more scope for individuality. Indeed, if group formation is based on member similarity, there is little scope for individuality within the group. Group members should feel mutually replaceable and have little individual value to the group as a whole. For example, the solidarity between soldiers in a platoon is often based upon the principle that all are equal. This is embodied through uniform clothing,

as well as uniform action (e.g., marching, drill exercises). The similarity or replaceability of soldiers in their formation or units could be beneficial for the army's continuity in combat: The loss of individuals would not endanger the performance of a unit so long as their membership could be refreshed. The army and its units were (and to a large extent are) designed so that the loss of individual lives does not endanger the functioning of the organization. In such situations, feelings of solidarity are presumably less anchored in individual features, and based more on group features (platoon, division, branch, nation).

Conversely, when group formation is organic, the actions of individuals in the group are a direct determinant of the physical manifestation of the group. In a conversation, for instance, the flow of talk can only proceed smoothly if speakers organize their speech production and comprehension so that they take turns, reflect upon the other's utterances, etc. (Clark, 1996; Gambi & Pickering, 2011; Wilson & Wilson, 2005). To function as a coherent social unit, the input of all members in such organic group processes is essential: When one person or subgroup was to leave, the group would change. In other words, coordinating who talks when, and building upon what has been said by other speakers allows members to form a coherent social structure (Koudenburg et al., 2013a; 2013c, *Chapter 4, 7*). The structure of an organically formed group, for example as it emerges in a conversation, is based on the complementarity of the individual contributions to the group. Previous research suggested that the recognition of one's distinctive input within the group has positive consequences for personal wellbeing and can enhance a sense of connection (Bettencourt & Sheldon, 2001; Stryker, 1987; Vignoles, Chryssochoou, & Breakwell, 2000). Therefore, we expect that in such organic or complementary structures, the sense of personal value to the group will be an important predictor of an emergent sense of solidarity.

The Present Research

In the present paper we examine whether feelings of solidarity can emerge in the background of group members' coaction. We propose a

model in which coordinated action elicits a sense of solidarity. We measure three aspects of solidarity: First, we examine group members' perceptions of group *entitativity*, i.e. the extent to which they perceive their group as a social unit. Second, we assess the extent to which group members *identify* with the group. Third, we examine the extent to which group members feel that they *belong* to the group. Although it is clear that these three are closely related, we included them because they are central to different schools of thought in group research. Thus, entitativity is an important construct in interdependence research and refers to perceived unity at the collective level. Identification is an important variable in the social identity tradition, and refers to feelings of attachment to the group as an entity. Belongingness, finally, has been examined in research on ostracism and is linked in that literature to individual needs. Although these three concepts stem from distinct conceptual traditions, we believe they all tap into a sense of solidarity within the group. One could hypothesize that the three should be differentially affected by our manipulations. However, in line with the literature review above, we believe that it would be likely for all three variables to be affected in similar ways by coordinated action.

Additionally, we propose that this sense of solidarity emerges quite differently for complementary and uniform actions, respectively. When group members undertake complementary actions, for instance by taking turns in a conversation, a sense of personal value plays an important role. Here, the group's sense of solidarity is founded upon the integration of a unique combination of contributions from individual members. In contrast, when group members undertake uniform actions, such as when talking or singing in synchrony, identification processes are less likely to be influenced by a person's personal value to the group. Therefore, we expect that in the complementary action (turn-taking) condition, but not in the uniform action (synchrony) condition, the emergence of solidarity is mediated by the feeling that one is personally valuable to the group.

In this research, we hypothesize that a) both complementary and uniform action can increase solidarity in the form of increased perceptions of group entitativity, and increased identification with, and belonging to the group, b) a sense of personal value mediates the

relation between complementary action and feelings of solidarity, but not the relation between uniform action and feelings of solidarity, and c) compared to uniform action, complementary action leads to more divergence in a subsequent idea generation task, promoting creativity in groups.

We tested this model in five studies using different methods.⁶ Study 1 examines the general distinction between naturally occurring groups based on uniform action and those based on complementary action. Additionally, in Study 1 we develop a measure of sense of personal value to the group and examine whether it distinguishes between these groups. In Study 2, we manipulate different forms of coordination (synchrony vs. turn-taking) in dyads. We examine whether this leads to solidarity and how each of these forms is related to a sense of personal value. In Study 3, we test the same hypotheses in a different context (i.e., a choir) and with triads. Study 4 aims to replicate Study 2 and 3 in again a different context, namely amongst actors. Importantly, in Study 4 we also investigate the consequences of different social structures for group creativity and idea generation. Finally, Study 5 focuses on alternative explanations for the effects, in particular whether the different amount of effort involved in both forms of coordination may confound the effects. In addition, Study 5 examines whether a sense of personal value is only related to solidarity because individuals value themselves, or whether the value of others may also contribute to the emergent sense of solidarity.

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Study 1

In Study 1, we examined whether people would recognize both processes in group settings that naturally occurred in their daily life, and we examined what associations they had with these different settings. We asked participants to remember social experiences from their personal life in which they performed complementary actions or uniform actions. It was hypothesized that both situations promote equal

⁶ We performed 5 studies in this line of research. All studies are reported in the present paper.

levels of entitativity, identification, and belonging (H1), that a sense of personal value to the group is higher in the complementary action condition than in the uniform action condition (H2), and that this sense of personal value mediates the effect on the indicators of solidarity in the complementary, but not in the uniform action condition (H3).

Methods

The sample consisted of 199 participants ($M_{age} = 21.01$, $SD = 6.85$, 74% female) who were recruited via the undergraduate participant pool at the university of Groningen ($n = 164$), or via various online forums ($n = 35$). Undergraduates participated for partial course credit; the other participants were volunteers. Participants were randomly assigned to the conditions of a study in which coordination (uniform action vs. complementary action) was manipulated by remembering a situation in which they behaved similarly or complementary to others.

Procedure. Participants filled out an online questionnaire on 'social situations'. They were asked to think back to a group setting. In the uniform action condition it was stated: "Sometimes group members all perform actions that are roughly similar. Please take your time to think back to a situation in which you did something together with other people, and in which everyone acted more or less similarly." In the complementary action condition participants read "Sometimes group members all perform different actions. Please take your time to think back of a situation in which you did something together with other people, and in which everyone had a unique input." Participants were then asked whether they recognized this kind of situation, and to describe such a situation from their own experience. The recalled experiences were coded by a trained coder, who was blind to the conditions of the study. Subsequently, participants were asked to fill out a questionnaire about this experience.

Dependent variables. The questionnaire assessed participants' sense of personal value to the group. We developed a measure consisting of three items; "I had an important role in this group", "I think I was indispensable to this group", "Without me, this group would not function", and found this to have adequate reliability, Cronbach's $\alpha = .87$.

In addition, participants completed a 4-item entitativity scale (Jans et al., 2011, e.g. "I feel that the others and I are a unit", $\alpha = .91$) and a 14-item social identification scale (Leach et al., 2008, $\alpha = .94$). Feelings of belonging were measured by 4 items derived from the Need Threat Scale (Van Beest & Williams, 2008, e.g. "During the task I felt that I belonged with the others" $\alpha = .89$). As manipulation checks, participants indicated the extent to which they agreed with four items: In this situation "Everyone did something different", "Every group member had a different input" (*action complementarity*: $\alpha = .84$), and in this situation "Everyone acted the same", "All group members had the same input" (*action uniformity*: $\alpha = .78$).

Results

Seven participants were unable to remember a situation and their data were removed before the analyses (N complementary action condition = 5, N uniform action condition = 2). No outliers (Studentized Residuals > 3) were detected. An analysis of variance (ANOVA) on the manipulation check revealed that group members perceived the situation that they reported to have more action complementarity in the complementary action condition than in the uniform action condition: $M = 5.21$, $SD = 1.09$ and $M = 3.43$, $SD = 1.51$ respectively, $F(1, 185) = 85.32$, $p < .001$, $\eta^2 = .32$. Conversely, group members perceived the situation that they reported to have less action uniformity in the complementary action condition than in the uniform action condition: $M = 3.14$, $SD = 1.32$ and $M = 4.70$, $SD = 1.32$ respectively, $F(1, 185) = 65.03$, $p < .001$, $\eta^2 = .32$.

Description of situations. In the uniform action condition, participants mentioned behaviors such as playing sports and games (23%), going to a party, including behaviors such as dancing (7%), eating or drinking (13%), and chatting or laughing (12%). In addition, they mentioned situations which were characterized by some form of conformity to the group (14%), e.g. "The first time I went smoking, I smoked because everybody else did", "During a hazing ritual we all acted similarly (for instance when eating or singing) because we were

told to”, “We once went to a shop where we all bought something healthy, just because we did not want to look stupid”.

In the complementary action condition, participants mentioned things that involved organizing an activity or event (34%) including things like “everyone painted a different part of the house”, “We organized a New Year’s Eve party, and everyone had their own task. One organized the drinks; someone else arranged a location, etc.” In addition, participants mentioned making a school- or work assignment (33%), and sports or games that were characterized by a distinct input of each player (7%).

Table 5.1 Means (SD’s) for the dependent variables in Study 1.

	Similarity (n = 99)	Complementarity (n = 93)
Personal Value	3.45 (1.48)	4.12 (1.45)
Entitativity	5.28 (1.23)	5.05 (1.31)
Belonging	5.54 (1.13)	5.39 (1.07)
Identification*	4.73 (1.18)	4.79 (1.14)

Note. For Identification there were 3 missing values.

Dependent variables. As predicted, participants had a stronger sense of personal value in the complementary action condition than in uniform action condition, $F(1, 190) = 9.83, p = .002, \eta^2 = .05$. In line with the predictions, no differences in perceived entitativity ($F(1, 190) = 1.49, ns$), feelings of belonging ($F < 1, ns$) and identification ($F < .1, ns$) were found. Means are summarized in Table 5.1.

Indirect effect. As expected, we did not find differences between conditions on the indicators of solidarity. However, we predicted that a sense of personal value to the group would explain solidarity in the complementary action condition, but not in the uniform action condition. To test this, we estimated the indirect effect of complementary action (vs. uniform action) via personal value on

perceived entitativity, identification, and belonging using the bootstrapping procedure developed by Hayes (2012). The effect size of the indirect effect is indicated by K^2 (Preacher & Kelley, 2011). The analyses revealed an indirect effect of condition via personal value on identification ($B = .13$, $SE = .06$, 95% bootstrapped CI [.04; .28], $K^2 = .06$), perceived entitativity ($B = .24$, $SE = .09$, 95% bootstrapped CI [.09; .44], $K^2 = .10$), and belonging, ($B = .21$, $SE = .08$, 95% bootstrapped CI [.08; .39], $K^2 = .11$). When modeling this effect, the direct effect of complementary action on perceived entitativity became negative, $B = -.46$, $SE = .17$, $t = -2.69$, $p = .01$, a suppression effect suggesting that a sense of personal value contributes to why perceptions of entitativity in complementary groups are as high as in uniform action groups. A similar negative direct effect appeared for belonging, after modeling the effect of personal value, $B = -.36$, $SE = .15$, $t = -2.41$, $p = .02$. No direct effect of condition on identification was found ($t < 1$, *ns*).

Discussion

Study 1 shows that in recollections of real-life group situations, high complementarity was associated with situations that are descriptively very distinct from high uniformity. Uniformity evoked a broad range of situations revolving around shared social activities whose main purpose appears to be communal enjoyment (e.g., having fun through socially scripted and symbolic forms of interaction). Complementarity evoked situations that were much more instrumental and focused on achievement of some common goal (e.g., collaborative work to achieve some desirable outcome). Despite the marked difference between both kinds of activities recalled, they were associated with approximately equal levels of perceived group entitativity, experienced belonging and identification. However, in complementary situations group members recalled a sense of personal value, and this predicted their feelings of solidarity.

Although we find Study 1 of descriptive interest and suggestive of the social processes that are central to this paper, we believe that for various reasons (the correlational nature of the data, the inability to control for confounds, the reliance on explicit recollection for tapping

into processes that might be of an implicit nature) we cannot draw any firm conclusions. Study 2 therefore experimentally studied the emergence of a shared identity “in the background” of a particular dyadic activity that participants were asked to perform. In order to examine whether feelings of solidarity would emerge as a result of the co-action, a control condition was included in Study 2.

Study 2

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Methods

Seventy-six undergraduate students ($M_{age} = 19.08$, $SD = 1.68$, 66 female, 10 male) participated in a study for partial course credit or a single reward of 5 euros.⁷ Previously unacquainted dyads were randomly assigned to one of 3 conditions (control vs. synchrony vs. turn-taking).^{8,9}

Procedure. Participants entered the lab individually and were seated in separate cubicles after which they were assigned to a partner. After filling out an informed consent form, participants were instructed to read a story through headsets together with their assigned partner. The story was one page long and concerned a man who visited a

⁷ The sample size in each of the following studies was based on a minimum of 20-25 per condition (cf. Simmons, Nelson, and Simonsohn, 2011). Because this is dyadic or triadic data, however, individual studies may still be somewhat underpowered if intraclass correlations (ICC) are very high.

⁸ Two dyads knew each other beforehand. Analyzing the data without these two dyads yielded similar results.

⁹ This research builds on prior research (e.g., Koudenburg et al., 2011a) that examines the impact of smoothly coordinated interaction to various control conditions, including a condition in which interactions are disrupted by silences. Accordingly, this first experimental study contained two conditions in which we attempted to disrupt group collaborations by brief delays in auditory feedback. But this disruption manipulation failed: In the turn-taking condition a short delay disrupted interaction in the predicted way, but in the synchronous interaction condition it caused complete breakdown of interaction in several groups. Because this means that delay conditions are no longer equivalent and comparable and because these conditions are not relevant for the current paper, we decided not to report them. In addition, the dependent variables reported in the paper were embedded in a larger questionnaire, which contains additional variables (see Koudenburg et al., 2011a). We have only reported the most central dependent variables here, but the full set of results is available from the first author.

restaurant. In the synchrony condition, participants were instructed to read the story simultaneously (in sync) with their partner. In the turn-taking condition, participants read the sentences of the story in turn. In the control condition, participants read the story and were informed that their partner was reading the story in the next cubicle. It took dyads about 5 minutes to read the whole story. After reading, participants took off their headsets and filled in a questionnaire. Finally, participants were fully debriefed and thanked for their participation.

Dependent variables. Participants' sense of personal value to the dyad ($\alpha = .78$), entitativity ($\alpha = .93$), and belonging ($\alpha = .96$) were measured as in Study 1. Identification was assessed with three subscales of the Leach et al. identification scale (2008, $\alpha = .92$): Solidarity ($\alpha = .93$), satisfaction ($\alpha = .90$) and homogeneity ($\alpha = .88$). Because the groups consisted of only two members, the self-stereotyping subscale was deemed less relevant. In addition, because these were newly formed dyads, we thought that questions about the centrality of the group to the individuals' identity would not make any sense to some of the participants. Therefore, we did not measure these identification subscales.

Results

Two orthogonal Helmert contrasts were specified: ψ_1 differentiated between coordinated interaction (synchrony and turn-taking) and the control condition. ψ_2 differentiated between the synchrony and the turn-taking condition. The intra-class correlations (ICC1; Bliese, 2000) for entitativity (.54), identification (.61), belonging (.80) suggested that multilevel analysis was required. The sense of personal value had a much lower ICC1 (.03), which is consistent with the idea that this is an assessment of distinctiveness made at the individual level. To account for the interdependence of the data, we used Hierarchical Multilevel Analysis. Means are summarized in Table 5.2.

Solidarity. Individual-level perceptions of entitativity, belonging and identification were regressed onto dyad-level contrasts ψ_1 and ψ_2 . The analysis showed that participants who had a coordinated interaction perceived their dyad to be more entitative than participants in the

control condition, $\psi_1: \gamma = 2.02, SE = .30, t(36) = 6.67, p < .001$. In addition, participants in the turn-taking condition perceived their dyad to be more entitative than those in the synchrony condition, $\psi_2: \gamma = .76, SE = .32, t(36) = 2.40, p = .022$.

Similarly, participants who had a coordinated interaction felt more belonging to the group than participants in the control condition, $\psi_1: \gamma = 3.28, SE = .26, t(36) = 12.68, p < .001$. In addition, participants in the turn-taking condition felt that they belonged more to the group than those in the synchrony condition, $\psi_2: \gamma = .69, SE = .27, t(36) = 2.53, p = .016$.

Finally, participants in the coordinated interaction conditions identified stronger with their dyad than participants in the control condition, $\psi_1: \gamma = 1.80, SE = .26, t(36) = 6.85, p < .001$. No difference was found between the turn-taking and the synchrony condition ($\psi_2: t < 1$).

Personal value to the dyad. A similar analysis showed no significant effect of ψ_1 on sense of personal value to the dyad: $\gamma = .52, SE = .33, t(36) = 1.56, p = .13$, although mean scores on personal value were somewhat higher in the interaction conditions than in the control condition. In addition, ψ_2 did not significantly affect participants' sense of personal value, $\gamma = .58, SE = .35, t(36) = 1.63, p = .11$, but means were in the predicted direction: Participants in the turn-taking condition had a somewhat higher sense of personal value than those in the synchrony condition.

Table 5.2 Means (SD's) for the dependent variables in Study 2.

	Control (n = 21)	Synchrony (n = 28)	Turn-taking (n = 27)
Personal value	3.46 (1.53)	3.70 (1.16)	4.27 (1.25)
Entitativity	2.55 (1.09)	4.18 (1.14)	4.94 (1.00)
Belonging	2.17 (.86)	5.10 (1.07)	5.78 (.71)
Identification	2.84 (.89)	4.49 (.91)	4.76 (.89)

Process. We hypothesized that in the turn-taking condition, but not in the synchrony condition feelings of solidarity would be predicted by the extent to which people had a sense of personal value to the dyad. This hypothesis received some support from the correlational data (see Table 5.3). Participants' sense of personal value was related to entitativity, belonging and identification in the turn-taking condition, but not in the synchrony condition.

Table 5.3 Multilevel regression coefficients per condition in Study 2. Entitativity, belonging and identification are regressed upon a sense of personal value to the group.

	Control	Synchrony	Turn-taking
Entitativity	.51*** (.12)	.04 (.17)	.45*** (.12)
Belonging	.17 (.12)	.03 (.15)	.27** (.10)
Identification	.25* (.12)	.10 (.11)	.30* (.12)

Note: * $p < .05$, ** $p < .01$, *** $p < .001$.

Discussion

Study 2 showed that having a coordinated interaction with a partner increased feelings of solidarity. Participants who read a story together perceived their dyad to be more entitative, felt that they belonged more, and identified more with their dyad than participants in a control condition. In addition, participants who read the story by taking turns with the other member of their dyad reported slightly higher perceptions of entitativity and higher

levels of belonging than those who read the story in synchrony. This was an unexpected finding suggesting that, if anything, complementary action led to slightly stronger perceptions of solidarity than synchronous action did. No significant effects of the different ways of coordinating speech on identification were found.

It was hypothesized that participants' sense of personal value would increase when taking turns, rather than reading in synchrony. The data

did not support this hypothesis, although the means were in the predicted direction. However, it is quite likely that a dyad is too small for members to negate personal value to the group: Indeed, in order to consider a dyad a “group” (even in the synchrony condition) requires both participants: A group of one is not typically considered a group. Study 3 therefore examined groups of three participants to account for this limitation.

Although the degree to which participants had a sense of personal value was not directly influenced by the speech coordination manipulation, for participants who took turns their sense of personal value was highly related to the measures of solidarity. In contrast, for those who read in synchrony we found no relation between sense of personal value and the measures of solidarity. Results are thus at least somewhat consistent with the idea that personal value can create a sense of solidarity on a basis very distinct from the homogeneity beliefs that are often assumed to be central to social identity formation (cf. Jans, Postmes, & Van der Zee, 2012).

Study 3

Because speaking in synchrony is a more uncommon activity than speaking in turns, we wanted to replicate these findings across several settings. One such context in which synchronous and turn-taking group activities can be compared is singing. The activity of singing together has often been suggested to increase a sense of togetherness (Durkheim, 1954; Anderson, 1991; Bellah, 2006). Indeed, many groups, such as sororities, churches, and tribes use singing in their activities, pointing to the symbolic relevance of this group activity. Research on singing has (to our best knowledge) almost exclusively focused on the act of singing in unison (Anderson, 1991). However, singing often also occurs in more complementary forms where multiple voices can be discerned, for example in part-singing, in duets or in canon. The present study contrasted singing in unison to complementary singing. We reasoned both would lead to an increased sense of solidarity to the group, but that the role of individuality in the process would be very different.

Methods

Thirty-one singers ($M_{age} = 40.49$, $SD = 15.89$, range 14-65; 6 male, 25 female) participated voluntarily in a field-study advertised to be about “singing together”. Participants were informed about the study via their choirs, their singing teachers, or posters in the music institute and signed up for the study individually. All participants participated voluntarily. After arrival at the music institute, participants consecutively went through all three conditions (control vs. synchrony vs. turn-taking) in random order, each time with a different group of two or three singers. Thus, for each round, participants were randomly assigned to groups, which were randomly assigned to one of three conditions.

In each of the conditions participants were asked to sing the song *Use Somebody* (written by the Kings of Leon). Three days before the study, participants received the lyrics and a link to the vocal and piano version of the song (performed by Laura Jansen). In the synchrony condition, members of the group were instructed to sing the song simultaneously, in unison. In the turn-taking condition, members were instructed to sing the song by taking turns. In the control condition, each group member was instructed to sing the first two verses of the song solo, in presence of the other group members. In each condition, the singers were accompanied by a piano.

After each round, participants filled out a questionnaire assessing their sense of personal value to the group ($\alpha = .84$), perceptions of entitativity ($\alpha = .90$), and feelings of belonging ($\alpha = .84$) similar to previous studies.¹⁰ Additionally, participants indicated the extent to which they felt that they had a *voice* in the group, with 5 items: “I had the ability to make my own voice heard”, “I dared to make my own voice heard”, “I could be myself in the group”, “I could be different than others in this group”, “I tried to make my own voice heard”, $\alpha = .79$.

In order to not make it too apparent to participants that the study was concerned with people’s feelings of solidarity, these questions were

¹⁰ Because the design of Study 3 required that participants filled out the same questionnaire three times, we reduced the length of the questionnaire by not including a measure of identification.

embedded in a larger list of filler items about various aspects of the singing, e.g., the perceived aesthetics of the performance, various feelings aroused by the singing, etc. After the third round of questionnaires, participants were fully debriefed and had the opportunity to ask questions.

Results

Again, two contrasts were specified to differentiate between conditions in which participants were singing together and the control 'solo' condition (ψ_1), and between the synchrony and the turn-taking condition (ψ_2). Hierarchical Multilevel Analysis with Cross-classified effect modeling was used to correct for the interdependence of the data. The outcomes were measured at level 1. This level was nested within individuals (each individual participated 3 times), and within groups (each group consisted of three individuals).^{11,12} Because of the nested structure of our model and the small sample size, we decided not to exclude outliers.¹³ Means are summarized in Table 5.4. The within participant ICC1s for personal value to the group (.66), entitativity (.39), belonging (.04), and voice (.51) indicated that we needed to correct for interdependence of the data on the individual level. Within groups, the ICC1s for personal value to the group (.07) and voice (.07) were quite low, but the ICC1s for entitativity (.14) and belonging (.12) indicated that there was variance that could be explained at the group level.

Solidarity. A regression including both contrasts at the group-level was performed to predict measurement-level entitativity with the group, while correcting for the level of the individual. No between-condition differences were found for perceptions of entitativity, ψ_1 : $t <$

¹¹ We found no influence of order (whether it was the first, second, or third round of the experiment).

¹² In theory, one could also model the influences of group members in the previous round, on the individual outcomes of the next round. However, to reduce complexity, we did not include these models.

¹³ When screening for multilevel outliers, two outliers appeared. Because these participants appeared normal on the other measures, and we preferred not to remove single measurements from our dataset, we decided to test our hypotheses both with and without outliers. No differences emerged, (except for a marginal effect of ψ_2 on entitativity: $\beta = -.43$, $SE = .26$, $t(86) = -1.67$, $p = .10$), and reported the data with all cases included.

1, *ns*, and ψ_2 : $t < 1$, *ns*. A similar analysis on feelings of belonging showed the predicted effect: Participants who were singing together (either in synchrony or by taking turns) experienced higher feelings of belonging than participants in the control condition ψ_1 : $\beta = .64$, $SE = .29$, $t(88) = 2.24$, $p = .03$. No differences between the synchrony and turn-taking condition were found, ψ_2 : $t < 1$, *ns*.

Personal value to the group. No effects of ψ_1 on sense of personal value to the group were found, $t < 1$, *ns*. However, on ψ_2 , a marginally significant effect in the predicted direction was found: Participants in the turn-taking condition felt they had a somewhat higher personal value to the group than those in the synchrony condition, $\beta = .45$, $SE = .26$, $t(88) = 1.76$, $p = .08$.

Voice. Participants perceived that they had more voice in the control condition, than in the conditions in which they sang together, ψ_1 : $\beta = -.47$, $SE = .14$, $t(88) = -3.38$, $p = .001$. In addition, A marginal effect on ψ_2 showed that participants in the turn-taking condition felt that they had somewhat more voice than those in the synchrony condition, $\beta = .26$, $SE = .16$, $t(88) = 1.68$, $p = .096$.

Table 5.4 Means (SD's) per condition for the dependent variables in Study 3.

	Solo (n = 29)	Synchrony (n = 31)	Turn-taking (n = 31)
Personal value	4.26 (1.37)	3.91 (1.46)	4.38 (1.93)
Belonging	4.47 (1.31)	5.04 (1.24)	5.12 (1.22)
Entitativity	4.01 (1.37)	4.37 (1.49)	4.10 (1.18)
Voice	6.01 (.81)	5.38 (.87)	5.65 (1.07)

Process. We examined whether feelings of belonging and perceptions of entitativity could be predicted by sense of personal value

to the group.¹⁴ Cross-classified multilevel regressions indicated that a sense of personal value predicts both entitativity ($\theta = .18, SE = .09, t(89) = 1.96, p = .052$), and belonging ($\theta = .28, SE = .08, t(89) = 3.74, p = .001$). Voice predicts belonging ($\theta = .31, SE = .14, t(89) = 2.30, p = .024$) but does not significantly predict entitativity ($\theta = -.11, SE = .15, t < 1, ns$). Finally, voice was related to a sense of personal value, $\theta = .87, SE = .12, t(89) = 6.76, p < .001$.

Discussion

Study 3 shows that singing together, compared to singing alone, increases feelings of belonging. Perceptions of entitativity do not change as a result of the way of singing. The data reveal a marginal effect suggesting that compared to singing in unison, singing in turns increases a sense of personal value to the group. These feelings are related to a sense of belonging and perceptions of entitativity. Together these results indicate that singing in a complementary fashion can elicit feelings of belonging and entitativity up to a level similar as singing in unison, possibly because of an increased sense of personal value to the group.

Comparable to the results on personal value, Study 3 showed that participants felt that they had more *voice* in the turn-taking condition, than in the synchrony condition. The variable voice related to the extent to which people felt that they could make their own voice heard. However, whereas a sense of personal value to the group was related perceptions of group entitativity, voice appeared to be unrelated to group entitativity. This possibly suggests that feelings of group unity may depend less on being given scope for independent action than on making a recognizable contribution to a group product.

In Study 3, we did not find that singing together increased entitativity compared to a control condition in which participants were singing solo. Possibly, the experience of singing solo in the presence of others emphasized the relation between singer and 'audience', therefore eliciting a sense of entitativity in itself. Supporting this idea, we found

¹⁴ Because of the complex structure of our model, we decided not to examine mediation.

that a sense of personal value to the group in the solo condition was almost as high as in the turn-taking condition, suggesting that participants may have experienced some form of complementarity when singing solo. This was a limitation, because Study 3 now lacked a 'true' control condition to which the effects on entitativity could be compared. In Study 4 we therefore included a control condition for which the development of different actor-audience relations would be less likely.

Study 4

Together, the first three studies suggest that a sense of solidarity can emerge through co-action. The results also show that complementary actions elicit a structure that is qualitatively different from uniform action with regard to the position of the individual. Study 4 focuses on the consequences of these different forms of solidarity for the level of divergence within groups.

Convergence and divergence within groups

In social structures in which similarity is the defining feature of the group, behavior that deviates from the norm is a problem to the internal cohesion of the group. Indeed, research suggests that in such groups, norm deviations are experienced as threats to the distinctiveness of the own group with regard to other groups and therefore often elicit punishment (Festinger & Thibaut, 1951; Marques & Paez, 1994).

Research has shown that such a search for consensus can lead to a convergent style of thinking, in which group members are likely to concentrate on the proposed viewpoint to the exclusion of other considerations (Nemeth, 1986; Nemeth & Kwan, 1987; Stasser, Taylor, & Hannah, 1989). For instance, they are likely to discuss information that is already shared among group members, rather than bring new facts to the table (Stasser, 1988).

Whereas groups that are based on member similarities are likely to think in a convergent manner, groups based on complementarity may not function in a similar way. For instance, when members are assigned expert roles, this can lead to more coordinated information sharing, in which members mutually recognize each other's responsibility for specific domains of information (Stasser, Stewart, & Wittenbaum, 1995). Similarly, norms that promote individualism, originality or critical thought can decrease sanctions against dissenting group members (Hornsey, Jetten, McAuliffe, & Hogg, 2006; Moscovici & Lage, 1978; Postmes, Spears, & Cihangir, 2001). Taking this a step further, this research suggests that in groups that are based on individual contributions, voicing dissimilar opinions may be less harmful for the group's social identity. After all, it is not their distinctiveness from other groups that informs members about who they are as a group, but rather the individual coordination amongst members that promotes a sense of solidarity. In line with this reasoning, exposure to minority viewpoints has been shown to elicit more divergent thought (Nemeth, 1986) and heterogeneous groups have been suggested to be more effective in problem solving than homogeneous groups (Hoffman & Maier, 1961, but see Mannix & Neale, 2005 for a review of different effects of different types of heterogeneity).

Taking this together, Study 4 tests the hypothesis that groups based on complementarity are more likely to think in a divergent manner than groups that are based on uniformity. That is, we expect complementary action to increase the generation of both more ideas (fluency) and more original ideas (originality), which are argued to contribute to creativity, problem solving and decision-making (Guilford, 1956; Nemeth, 1986).

Coordinated action in theatre

In Study 4, we made use of actors to read out a text in synchrony or in turns. Actors were chosen because both forms of synchronous speech and turn-taking are naturally occurring in plays as well as in practice sessions. In fact, in ancient Greek tragedies or comedies, synchronous speaking in *unison* is a normal occurrence: It is the mode in which the chorus observes and comments on the action of the actors. Interesting

to note is that in Greek drama, the chorus often repeats portions of the text that have also appeared in dialogue. It has been suggested that this “vox populi” affirms the statements made by individuals through the public and renders it truthful (a form of social validation, in other words; Back, 1988). A contemporary version of synchronous speech is often incorporated in modern plays, such as musicals or grand operas and this form is a well-rehearsed aspect of actors’ training.

Method

Ninety-three actors ($M_{age} = 22$, $SD = 4.61$, 57 female, 36 male) participated in groups of three in a field study for a single reward of 5 euros. Groups were randomly assigned to the conditions of a study in which interpersonal coordination was manipulated (synchronous vs. turn-taking vs. control) by reading a poem.

Participants were recruited at different professional and amateur theater companies and schools. After filling out the informed consent form participants of all groups were instructed to recite the Dutch translation of the poem *The Raven* by *Edgar Allan Poe*. In the synchrony condition, participants were instructed to recite the poem simultaneously with the other participants, in the same rhythm. In the turn-taking condition, they were instructed to recite the sentences of the poem in turn. In the control condition, participants were instructed to recite the poem, independently of each other. Participants did not synchronize in this condition. Afterwards, they completed a questionnaire assessing their sense of personal value to the group ($\alpha = .80$), perceptions of entitativity ($\alpha = .85$), feelings of belonging ($\alpha = .80$) and identification ($\alpha = .92$) in the same way as in Study 2. Finally, participants were fully debriefed.

Group creativity task. After filling out the questionnaire, all groups received the instructions for a group creativity task. They were asked to write a promotion plan for a theater play of *Romeo and Juliet* (Shakespeare). Groups were asked to discuss how to handle the promotion, and to write down their plan on an A4-paper. They were given 15 min to complete the task, and during this time the

experimenter left the room. The group task was videotaped for later analysis.

Results

As in Study 2, two contrasts were specified: ψ_1 differentiated between coordinated interaction (synchrony and turn-taking) and no coordinated interaction (control), ψ_2 differentiated between the synchrony and the turn-taking condition. The ICC1's for entitativity (.43), identification (.47), belonging (.39) and sense of personal value to the group (.15) suggested that multilevel analysis was needed. One multilevel outlier was removed (Standardized residual on one of the dependent variables > 3). Means are summarized in Table 5.5.

Solidarity. A multilevel regression included both contrasts as group-level predictors for individual-level identification with the group. A marginally significant effect of ψ_1 was found, indicating that participants who had a coordinated interaction identified more with the group than participants in the control condition, $\gamma = .61$, $SE = .31$, $t(28) = 1.99$, $p = .056$. No significant effect of ψ_2 on identification was found, $\gamma = .48$, $SE = .35$, $t(28) = 1.39$, $p = .18$, although means were somewhat higher in the turn-taking than in the synchrony condition. A similar regression on feelings of belonging revealed that coordinated interaction increased feelings of belonging compared with the control condition, ψ_1 : $\gamma = 1.38$, $SE = .24$, $t(28) = 5.73$, $p < .001$. ψ_2 did not significantly affect belonging, $\gamma = -.01$, $t < 1$, *ns*. Moreover, coordinated interaction led to higher perceived entitativity compared with the control condition, ψ_1 : $\gamma = 1.25$, $SE = .32$, $t(28) = 3.91$, $p = .001$. ψ_2 did not significantly affect entitativity, $\gamma = .03$, $t < 1$, *ns*.

Personal value to the group. Results showed that participants who had a coordinated interaction (either in synchrony or by taking-turns) reported higher feelings of personal value to the group than participants in the control condition, ψ_1 : $\gamma = .70$, $SE = .30$, $t(28) = 2.32$, $p = .03$. Importantly, ψ_2 also significantly affected participants' sense of personal value, $\gamma = .78$, $SE = .34$, $t(28) = 2.31$, $p = .03$, such that participants in the turn-taking condition had a higher sense of personal value to the group than participants in the synchrony condition.

Mediation. We tested two different mediation hypotheses: One for the indirect effect of synchrony (vs. control, dummy D1) through a sense of personal value on the indicators of solidarity; and one testing the same effect for turn-taking (vs. control, dummy D2). This was a multilevel mediation: *Condition* was a group level (2) variable, which predicted *sense of personal value to the group* and *entitativity, belonging, and identification* at the individual level (1). We followed guidelines provided by Preacher, Zyphur, and Zhang (2010) for conducting a 2-1-1 multilevel mediation. As predicted, there was no evidence for mediation of the synchrony condition effect, via personal value, on identification ($\gamma = 0.66, SE = 0.66, t(28) = 1.00, ns$), nor on entitativity ($\gamma = 0.55, SE = 0.52, t(28) = 1.07, ns$), nor on belonging ($\gamma = 0.07, SE = 1.51, t(28) = .04, ns$). However, the effect of turn-taking (D2) via personal value on identification was significant, $\gamma = 2.34, SE = 1.06, t(28) = 2.20, p = .03, 95\% CI [.26; 4.42]$, as was the mediation effect on entitativity, $\gamma = 1.94, SE = .80, t(28) = 2.44, p = .015, 95\% CI [.38; 3.49]$.¹⁵ No evidence for a mediation of the effect on belonging was found, $\gamma = .23, SE = 5.34, t < 1, ns$. As hypothesized, in the turn-taking condition, but not in the synchrony condition, participants' sense of personal value to the group predicted identification and the degree to which the group was perceived as an entity.

Creativity. The videotapes of the group task were coded by two independent coders. They coded for the number of unique ideas that were generated by the group. Afterwards, each idea was coded for originality on a scale from 1 = not original, to 5 = very original. Ideas were unoriginal when they were often mentioned across groups or commonly known. Original ideas were defined as rare, unusual and/or radical ideas (Rietzschel, Nijstad, & Stroebe, 2007). The number of original ideas was defined as the number of ideas that was rated with a 3 or higher on originality (Paulus, Kohn, & Arditto, 2011). The interrater reliability (McGraw & Wong, 1996) for the number of ideas was .80, $p < .001$; for the originality of ideas .69, $p < .001$ and for the number of original ideas per group .61, $p < .001$. This can be interpreted as a

¹⁵ Mediation could also be tested by including the original contrasts as predictors. The results of this analysis were similar, but we decided to report the dummy-variables here to facilitate interpretation.

medium to strong agreement between the raters (LeBreton & Senter, 2008). The scores of the two raters were averaged before analysis; means are summarized in Table 5.5.

Because the ideas were generated in groups, the data was analyzed only at the group level. No effect was found for ψ_1 , suggesting that a coordinated interaction did not increase idea generation, $b = -1.11$, *ns*, nor did it increase the number or original ideas created, $b = -1.62$, *ns*. However, a trend was found on ψ_2 , showing that groups in the turn-taking condition generated somewhat more ideas than those in the synchrony condition, $b = 3.48$, $SE = 2.32$, $t(28) = 1.50$, $p = .145$, $\eta^2 = .08$. Moreover, groups in the turn-taking condition generated a marginally higher number of original ideas than those in the synchrony condition, ψ_2 : $b = 3.51$, $SE = 1.84$, $t(28) = 1.91$, $p = .066$, $\eta^2 = .12$.

Table 5.5 Means (SD's) per condition for the dependent variables in Study 4.

	Control (n = 29)	Synchrony (n = 30)	Turn-taking (n = 33)
Personal value	2.72 (1.32)	3.03 (1.22)	3.82 (1.46)
Identification	4.62 (1.05)	4.99 (1.04)	5.47 (.89)
Entitativity	3.45 (1.16)	4.68 (1.20)	4.70 (1.00)
Belonging	3.93 (1.23)	5.32 (.83)	5.30 (.76)

Idea generation task (group level)

	Control (n = 10)	Synchrony (n = 10)	Turn-taking (n = 11)
Fluency	18.55 (3.89)	15.70 (5.11)	19.18 (6.47)
Number of original ideas	9.30 (2.74)	6.85 (4.24)	10.36 (5.16)

Discussion

Results show that reading a poem in a coordinated way increased group members' identification with the group, as well as their perceptions of entitativity and feelings of belonging compared to participants in a control condition. Turn-taking increased group members' sense of personal value to the group, thereby increasing their levels of identification and perceptions of entitativity. Participants who read in synchrony, on the other hand, felt equally valuable to the group to those in the control condition. Thus, when participants were allowed to contribute their unique individual lines in the recital of the poem, this not only augmented their sense of personal value to the group, but also increased their sense of solidarity within the group.

We reasoned that the different structure of the groups and the different room for distinct individual contributions could have consequences for the creativity of these groups. The results show that coordinated communication in itself does not increase fluency or originality in an idea generation task. However, a trend suggested that the structure of communication does make a small difference for subsequent collaboration: Groups in which individuals took turns tended to generate a few more ideas, and in particular more original ideas on a subsequent task, than groups which initially spoke in synchrony. This suggests that groups that are structured around the idea that each individual has a unique value to the group, may show a slight increase in divergent and creative thinking.

Study 5

The purpose of Study 5 was to devote attention to two additional issues. We examined an alternative explanation for the equal (or in Study 2 somewhat higher) feelings of solidarity in the turn-taking condition: Talking sequentially could be less effortful than the synchronous communication.¹⁶ Research on fluency has shown that the

¹⁶ It could also be hypothesized that efforts would be reduced in the synchrony condition, following for instance the literature on social loafing (Karau & Williams,

subjective ease with which people process information influences their judgment on a range of social dimensions (e.g. liking, truthfulness, etc.; see Alter & Oppenheimer, 2009 for a review). Extrapolating from this, it is possible that the relative ease of the turn-taking task in comparison to the synchrony tasks (at least in Study 2 and 4) increased feelings of solidarity in this condition. In Study 5, this alternative explanation was examined by adding a condition in which turn-taking was made more effortful. If feelings of solidarity were to be caused by the ease of turn-taking, rather than by the complementary coaction itself as we hypothesized, this should be reflected by higher levels of solidarity in the turn-taking low effort condition, compared to the turn-taking high effort condition.

In addition, Study 5 examined whether a sense of personal value was solely important to solidarity because of self-investment, or whether the value of *other* group members would similarly play a role in the development of a sense of solidarity. Conceptually, this would be quite important to know: If the value of *others* were to play a role in emergent sense of solidarity in complementary collaborations, this would be direct evidence that the process of creating solidarity is not entirely self-centered, but that it is a group process, in which contributions of others play a role as well.

Methods

Participants were 150 undergraduate students ($M_{age} = 19.48$, $SD = 2.41$, 75% female) who participated in triads ($n = 40$) or dyads ($n = 15$) in a field study for partial course credit or a single reward of 6 euros. Groups were randomly assigned to the conditions of a study in which interpersonal coordination was manipulated (synchronous vs. turn-taking normal effort vs. turn-taking high effort) by reading a poem.

Participants were seated around a table behind individual laptops. After filling out the informed consent form, participants of all groups were instructed to read a fragment of the poem “*Mei*” (Dutch for “May”)

1993). However, as turn-taking represents a more frequently occurring situation, we expected people to be very accustomed to this version of the task, which therefore requires less effort.

by *Herman Gorter*. Participants were instructed to recite the poem from their computer screen. Sentences turned red at the moment they were supposed to be recited by the participant. In the synchrony condition, participants were instructed to recite the poem simultaneously with the other participants, in the same rhythm. In both turn-taking conditions, participants were instructed to take turns when reciting the lines of the poem. However, the computer was programmed such that in the normal effort turn-taking condition sentences turned red in a rhythm that would allow for smooth transition of speaking turns. However, in the high effort turn-taking condition, the sentences turned red in an unpredictable and disordered rhythm. In order to have a coordinated interaction (i.e. without interruptions), participants needed to be alert to changes in rhythm and adjust their speech tempo to the others.¹⁷

Before starting, participants were given the time to read the poem, then listened to an audiotape of the first two verses of the poem, and finally engaged in a practice session. The practice session involved reading the first two verses following the instruction for the assigned condition. Afterwards, participants completed a questionnaire on their laptops containing measures of entitativity ($\alpha = .83$), belonging ($\alpha = .85$), identification (all subscales except for the centrality subscale, $\alpha = .93$), and sense of personal value to the group ($\alpha = .87$). Furthermore, we added three rephrased personal value questions to examine the degree to which participants felt that each of the *other* group members was of value to the group (e.g. “*I think the person on my right/left is indispensable to the group*”). Scores correlated highly for both other group members ($r = .80$), and were therefore combined. The total scale of *perceived value of others to the group* had a high reliability ($\alpha = .91$). To assess the level of effort participant rated their agreement with the statements the task was exacting, easy (reverse coded), required a lot of effort (1 = strongly disagree, 7 = strongly agree). Participants were

¹⁷ Note that when designing the experiment, our original prediction was that in the high effort condition, the varying rhythm of turn-taking would disrupt participants' ability to successfully take turns. But when running the experiment, we noticed that participants were able to vary speech rates so fluently that there were very few disruptions: They simply sped up or stopped to allow others to continue with their turn. Interpretations of the effects in this condition were thus post-hoc. We decided to present effects as high effort simply because this is more easily interpretable for readers.

debriefed and given the opportunity to ask question before leaving the laboratory.

Results

Again, two orthogonal Helmert contrasts were specified: ψ_1 differentiated between the synchrony condition and both turn-taking conditions, ψ_2 differentiated between the normal effort and the high effort turn-taking condition. The ICC1's for entitativity (.26), belonging (.14), identification (.20) and sense of personal value to the group (.16), and perceived value of others to the group (.13) indicated that multilevel analysis was required. Therefore, data was screened as in Study 4, which led to the removal of one multilevel outlier (Standardized residual on one of the dependent variables > 3). Means are summarized in Table 5.6.

Manipulation check. First, we tested whether participants in the high effort turn-taking condition would indeed perceive the task to be more effortful than those in the low-effort turn-taking condition. This was indeed the case, $\psi_2: \gamma = .43$ $SE = .21$, $t(52) = 2.02$, $p = .05$. No difference was found in effort between the synchrony and the two turn-taking conditions, $\psi_1: \gamma = -.27$ $SE = .19$, $t(52) = 1.42$, ns .

Solidarity. The regression included both contrasts as group-level predictors for individual-level indicators of solidarity. As expected, we found no differences between the synchrony and the turn-taking conditions in levels of identification, $\psi_1: \gamma = .05$, $t < 1$, ns , perceptions of entitativity, $\psi_1: \gamma = .07$, $t < 1$, ns , or feelings of belonging $\psi_1: \gamma = .13$, $t < 1$, ns . Unlike the alternative explanation would suggest, we did not find a difference between the low effort and high effort turn-taking conditions on either identification, $\psi_2: \gamma = -.13$, $t < 1$, ns , entitativity, $\psi_2: \gamma = .06$, $t < 1$, ns , or belonging $\psi_2: \gamma = -.01$, $t < 1$, ns . Thus, the level of effort that was needed to coordinate behavior did not affect levels of identification, perceptions of entitativity of feelings of belonging.

Value to the group. As predicted, participants who interacted in synchrony reported a lower sense of personal value than participants in both turn-taking conditions, $\psi_1: \gamma = .87$, $SE = .25$, $t(52) = 3.47$, $p = .001$.

In addition, ψ_2 did not significantly affect feelings of personal value, $\gamma = .12$, $t < 1$, *ns*, suggesting that the higher sense of personal value to the group in the turn-taking is not explained by the low levels of effort that the task required.

Similar results were found on the perceived value of the other group members; participants in both turn-taking conditions perceived the others to have higher value to the group than participants in the synchrony condition did, ψ_1 : $\gamma = .81$, $SE = .22$, $t(52) = 3.62$, $p = .001$. No differences were found between the participants in the simple and difficult turn-taking condition, ψ_2 : $\gamma = 0.23$, $t < 1$, *ns*.

Table 5.6 Means (SD's) per condition for the dependent variables in Study 5.

	Synchrony (n = 49)	Turn-taking normal effort (n = 50)	Turn-taking high effort (n = 50)
Personal value	2.99 (1.19)	3.91 (1.41)	3.96 (1.45)
Perceived value of others	3.49 (1.13)	4.27 (1.38)	4.45 (1.26)
Entitativity	3.91 (1.14)	4.15 (.80)	4.12 (.99)
Belonging	4.30 (1.11)	4.61 (.91)	4.51 (.85)
Identification	3.74 (1.04)	3.96 (.73)	3.77 (.81)
Effort	3.61 (.99)	3.13 (.99)	3.55 (1.18)

Mediation. We examined whether there was an indirect effect of turn-taking (vs. synchrony) via sense of personal value to the group on the indicators of solidarity (Preacher et al., 2010). To test the complete model, both contrasts were group level predictors in the analysis, personal value was an individual level mediator and entitativity, identification, and belonging were individual level dependent variables. Results showed the predicted effect of ψ_1 via sense of personal value on identification, $\gamma = .91$, $SE = .35$, $t(55) = 2.61$, $p = .009$, 95% CI [.23; 1.60],

and entitativity, $\gamma = 1.19$, $SE = .48$, $t(55) = 2.50$, $p = .012$, 95% CI [.26; 2.12], but not on belonging, $t < 1$, *ns*.

Importantly, the effects on entitativity and identification were not only mediated by a sense of personal value to the group, but also by the perception that *others* were valued: Indirect effect on identification, $\gamma = 1.24$, $SE = .35$, $t(55) = 3.53$, $p < .001$, 95% CI [.55; 1.94], and entitativity, $\gamma = 1.67$, $SE = .56$, $t(55) = 3.00$, $p = .003$, 95% CI [.58; 2.76]. If anything, the mediation by sense of personal value of others appeared to be slightly stronger. In fact, a sense of personal value was highly positively correlated to the experienced value of others ($r = .75$), suggesting that the perceived importance of self positively relates to the perceived importance of others in the group. Again, no mediation was found for the effects on belonging, $t < 1$, *ns*.

Discussion

The results of Study 5 replicate that an increased sense of personal value in the turn-taking conditions compared to the synchrony condition mediate the effects on feelings of identification and perceptions of group entitativity. Thus, when taking turns, rather than acting in synchrony, a sense of personal value to the group explains the emergence of a sense of solidarity.

Importantly, results show that the extent to which others are valued is just as predictive of the level of solidarity as a sense of own value to the group is. This finding reveals that the forming of solidarity is not primarily self-centered in nature: It is a group process in which contributions of others as well as self play a role.

In the turn-taking high effort condition, although the task was structured in a way that it was difficult to coordinate speech, participants were reluctant to interrupt each other. Instead, they tried to speak faster or stopped their sentence when another participant started speaking. It appeared that the motivation to have a smoothly coordinated conversation was so high that people were able to have conversational flow despite the impediments. We thus conclude that individuals are able to coordinate their actions even if this requires

extra effort (see also Richardson, Marsh, Isenhour, Goodman, & Schmidt, 2007), and that this ability helps them to acquire feelings of solidarity. Thus, the data of Study 5 provided no support for the alternative explanation that alternating speech would elicit solidarity because it requires less effort than speaking in synchrony.

General Discussion

five

The present research shows that during coordinated action, processes of identity formation take place. Findings suggest that solidarity can emerge as a result of different forms of coordinated action: Uniform action, in which similarities between group members are central and individuality is in the background; and more complementary forms of action, in which the individual actions of each group member contributes to the emergence of solidarity. To differentiate these processes of group formation, we identify sense of personal value to the group as a mediator. More specifically, evidence from five studies reveals that compared to people who act in uniform ways (e.g. synchronously), people who act in ways complementary to each other have a higher sense of personal value to the group, which increases their levels of identification and perceptions of group entitativity. These findings contribute to the literature in a number of ways.

First, the results suggest that identity formation can occur as a side effect of co-action. Previous research on social identity formation (Postmes, Haslam et al., 2005; Postmes, Spears et al., 2005) has distinguished between top-down processes of identity formation on the one hand, in which groups form their identity by contrasting their own group with relevant outgroups (e.g. Turner, 1982; 1985) and bottom-up processes on the other hand, in which a group is based on the individual contributions of its members. It has been suggested that the basis on which groups are formed defines the nature of the group: Whereas deductively formed groups allow for little variation between individuals within the group, inductively formed groups can be strengthened by individual differences of their members (Jans et al., 2012).

The present research extends this research. In particular it sheds light on processes of induction, by showing that the way in which individuals coordinate their actions influences the nature of the solidarity. But although the turn-taking results are directly relevant to inductive social identity formation, we point out that the synchrony findings are not directly attributable to deductive social identity formation. The reason is that although synchrony relies on the process of deduction, it may do so in the absence of a shared social identity derived from superordinate commonalities (cf. Postmes, Haslam et al., 2005; Postmes, Spears et al., 2005). Indeed, although in our experiments group actions were coordinated through experimental instructions, none of our studies ensured that a shared social identity was made salient. Although there are situations in which synchrony is predefined by a higher order that could be construed as a shared identity (e.g., in the army, or in a directed orchestra), synchrony is often defined by the entrainment of the behavior between different individuals (e.g. Bernieri & Rosenthal, 1991; Richardson et al., 2007). Thus, the proper conclusion from the present research, we believe, is that synchronous action in groups creates a solidarity in which individuals feel that they add little personal value and are to some extent dispensable to the group. Moreover, synchronous action may create a group structure in which individual distinctiveness is problematic and therefore leaves less room for creativity.

Second, the present research identifies a sense of personal value to the group as a mediator of these effects. More specifically, findings show that when individuals behave in a complementary way, for instance when performing a group task in which they have distinguishable contributions, or when having a conversation in which they take turns, a sense of solidarity is developed on the basis of members' feelings of being an essential component of the group. In contrast, in groups that are structured by similarity, like a choir singing in unison or an army in which soldiers march synchronously, a sense of personal value to the group does not play such a critical role in the process of identification. Our results show that complementary and synchronous co-action are equally likely to increase solidarity within the group, but differ in whether they position the individual in the foreground, or in the background of group formation.

These results provide insight in the role of individuality in groups. Although the need to belong to groups and the need for personal distinctiveness may sometimes be contrasting needs (e.g., Brewer, 1991), the present research illustrates that in certain settings this need not be the case. Our results show that accentuating individual contributions in a group may promote, rather than reduce identification with a group, as this underlines the value of individuals to the group. This finding is in line with research which shows that in inductively formed groups, member heterogeneity may contribute to identification processes (Jans et al., 2011). We extend this finding by showing that in addition to groups that are formed in an inductive way, coordinated action of a complementary nature can similarly underline the essentiality of distinct individual contributions to the group. In addition, the present research identifies the critical role of a sense of personal value to the group in identification processes.

Third, the results of Study 4 suggest that groups that are based on complementary structures may be more successful when generating ideas in subsequent collaboration tasks. More specifically, a trend was found in which complementary action groups generated somewhat more, and somewhat more creative, ideas than groups that had previously acted in synchrony. Although this finding should be interpreted with caution – the results were only marginal and based on a relatively small number of groups – we believe that it provides a potential direction for future research. More specifically, it points to the possibility that compared to groups based on uniformity, complementary groups may be more likely to think divergently; which has been argued to contribute to creativity, problem solving and decision making (Guilford, 1956; Nemeth, 1986). Future research could further examine whether different forms of co-action can improve group performance on for instance creative or decision-making tasks.

Finally, in Study 5 we show that although in complementary groups the focus is more on the individual, this should not be equated with self-centeredness. Instead, Study 5 reveals that perceiving other members as valuable is at least as important in predicting identification and entitativity, as is the sense of personal value to the group. It thus appears that in complementary-based groups, it is not only critical that

one is 'being heard'. Instead, it is the combination of individual inputs from self and others that predicts feelings of solidarity. Indeed, Study 3 shows that singing solo in a choir increases ones sense of *voice* – or the feeling that one is being heard. However, this did not result in increased perceptions of entitativity. In contrast, the subjective feelings of value of self and others *both* relate to perceptions of the group as an entitative whole, suggesting that self and others are treated as similarly important not just in groups founded upon uniformity, but also in groups founded upon complementary actions. This is a conclusion with important implications, for it implies that group systems that are founded upon complementarity need not be intrinsically more competitive or more prone to inequality. But since the conclusion is based on results of a single study, we emphasize that this would be an important issue for future research.

The five studies conducted in this research used different methods to test the proposed model. Findings were replicated in several contexts, making use of naturally occurring groups in an online study (Study 1), and manipulated groups in controlled lab environments (Studies 2 & 5) and field studies (Studies 3 & 4) with different samples from the general population, undergraduate students, singers, and actors respectively. The coordination activities that were examined included activities performed in naturally occurring groups, such as sports, talking, making assignments, organizing events etc. (Study 1), the act of singing together (Study 3), reciting stories via headsets (Study 2) or reciting poems in either a free rhythm (Study 4) or a directed rhythm (Study 5). By exploring different methods we may have sacrificed some experimental control, which could have affected the tightness of our results. However, we believe that testing our model in different contexts increased the ecological validity of our findings.

Limitations and Directions for Future Research

One important caveat is that (in the nature of experimental research) we attempted to differentiate idealized states in which groups are either based on uniformity vs. complementarity. Of course, this notion of two

types of processes is likely to present an overly simplistic view on reality. We believe that most groups rely on both complementary and uniform inputs from its members, and therefore both processes described here should be evident, to a greater or lesser extent, in all groups in society. Nevertheless, the results of Study 1 do suggest that it may be fruitful to make this distinction even in real-life groups.

One more minor issue concerns some slight variations in findings across studies. First it is important to point out where there was no variability: We found relatively similar results across all indicators of solidarity, with coordinated action increasing feelings of belonging, levels of identification, and perceptions of entitativity. Although we had no a priori expectations for differences between these three constructs, the literature does suggest that they are distinct indicators that capture different aspects of solidarity. Whereas entitativity is defined as the overarching sense of unity that group members experience, identification is concerned with the relation of the individual with the group. These constructs are closely related (e.g., Castano, Yzerbyt, & Bourguignon, 2003; Jans et al., 2011). In our studies, we confirmed that the effects on perceived entitativity and identification were both mediated by a sense of personal value to the group.

But with respect to this mediation, effects on belongingness were slightly more elusive: In Study 4 and 5, no mediation was found. Although it is difficult to interpret null effects, we may speculate that part of the reason for this lies with the measure used: The Need Threat Scale (Van Beest & Williams, 1996). In this scale, items of belonging are mixed with items of rejection, such as the reversed item “I felt accepted by the others group members”. We successfully used this as a measure of solidarity in a previous line of research, in which belonging was threatened by a disruption of conversational coordination (Koudenburg et al., 2011a; 2013a; 2013c, *Chapter 3, 4, 7*). However, in the current studies no such threat is present: Participants can coordinate successfully in both the synchrony and the turn-taking condition—they just use different ways of coordination. Perhaps this absence of any threat may explain why this scale proved to be less sensitive in the present studies.

Conclusions

In the present research we show that a sense of 'us' can emerge in the background of specific actions that individuals perform together, but that the nature of these actions (complementary or uniform) shapes the groups via different pathways. This sense of 'us' consists not just of perceptions of group entitativity but also a sense of individual identification to the group. This confirms that dynamic processes in small groups can take on a more categorical and more interactive shape, both of which produce a sense of solidarity. The crucial difference between these two processes is not the level of solidarity they produce, but its quality: Categorical processes relegate individual group members to the background of group formation. In interactive processes, by contrast, individuals are at the forefront of what it means to be "us".

