When Group- and Self-Esteem Lead To "We-Thinking": When Does Social Identity Motivate Group Behavior?

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Abstract:

In this paper, we take as given that social identity motivates individuals to make group contributions and focus on examining the determinants of *when* it motivates these contributions. We test whether "we-thinking", group-regarding behavior in the presence of an individual-group tradeoff, is predicted by a specific relationship between group- and self-esteem. We define group- and self-esteem as having positive feelings about the relative performance of one's group and self. By extending Akerlof's model (2016), we predict that engaging in "we-thinking" is positively correlated with group-esteem and negatively with self-esteem. We proxy for group-esteem and self-esteem using rank-based measures and self-reported measures. Using a laboratory experiment, we manipulate subjects' group-esteem and self-esteem through intergroup and inter-personal competitions. We measure their engagement in "we-thinking" through a modified dictator game in which they allocate tokens to their group at their expense. Using the self-reported measures our predictions are supported: We find that subjects' self-reported group-esteem (self-reported self-esteem) is significantly positively (negatively) correlated with engagement in "we-thinking". Our results using the rank-based measure partially support the model's predictions: Individual rank is significantly negatively correlated with engagement in "we-thinking" when group rank is high. The findings have implications for when individuals are likely to adopt group-regarding behavior and for how to measure the psychological concept of group/self-esteem.

Keywords: group behavior, social identity, esteem, rank
JEL classification: C92, D71, D91

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1. Introduction

We live, work, and play in social groups. While this membership affords us a number of benefits, it also requires us to make contributions to the group, at times at the expense of individual payoffs. Thus, a question of interest is when and why we choose to contribute to our groups.[1] Social identity, defined as a person's sense of self that is derived from her perceived membership in a social group (Chen and Li, 2009), offers a lens through which to understand the phenomenon of group contribution. In the literature, the question of *why* actors contribute is well understood: they are willing to take actions that benefit the social group because there are direct utility gains from their social identity.[2] In this paper, we take as given that social identity motivates individuals to make group contributions and focus on examining the determinants of *when* it motivates these contributions.

Experimental economists have found that when an individual's social identity is made salient through priming (e.g., McLeish and Oxoby, 2011; Chen et al., 2014) and/or when people with the same social identity share a common experience (e.g., Eckel and Grossman, 2005) or interest (e.g., Guth et al. 2008), then this social identity can motivate group-regarding behavior. However, priming is difficult to effect in a natural setting or over the long term, and people sharing the same social identity do not always share common experiences or interests (e.g., in workplaces or schools; cf. Akerlof and Kranton 2002). As such, these mechanisms are difficult

[1] There have been many discussions about the relationship between self-interest and collective interest. One well-known example is Adam Smith's argument that different individuals' self-interests promote the interests of the whole society (1776). Another issue is the "tragedy of commons," with numerous studies offering proposed policy designs to resolve the tension between self-interest and common resources (e.g., Hardin, 1968; Wilson et al., 2013). Finally, some studies acknowledge the primitiveness of collective behavior and argue that it is not a simple summation of different individuals' behaviors (e.g., Searle, 1990; Gold and Sugden, 2007).

[2] According to existing economic theories about social identity, these utility gains are achieved by complying with the prescribed behaviors of the social identity (e.g., Akerlof and Kranton, 2000, 2002, 2005) or enhancing the status of the social group (Shayo, 2009).

to implement outside of the laboratory and would be difficult to engineer in field settings.

However, insight from social psychology suggests that the extent to which a person feels positive about her social identity and idiosyncratic aspects of her identity (hereafter, individual identity) may be good predictors of when social identity is likely to affect behavior. Social Identity Theory (Tajfel and Turner, 1986) and Self-categorization theory (Turner and Oakes, 1986) suggest that a person gains utility from both her social identity and individual identity. How much utility her social identity yields depends on the extent to which she feels positive about her social identity based on her comparison of her social group with other reference groups.[3] In similar fashion, how much utility is obtained from her individual identity depends on the analogous comparisons of feelings to reference individuals.[4] Thus, the relative degree of her positive feelings about her social identity and of her positive feelings about her individual identity may be predictive of her tendency to take group-favoring actions.

These ideas are also captured in R. Akerlof's (2016) model; he formally defines a person's group-esteem (self-esteem) as her positive feelings derived from comparing her own group (herself) with reference groups (individuals).[5] Akerlof argues that the *relationship* between these forms of esteem predicts engagement in "we-thinking" (a willingness to treat group goals as one's own).

In this paper, we investigate the relationship between group-esteem (self-esteem) and

[3] Specifically, Tajfel and Turner (1979) write, "..Social identity may be positive or negative according to the evaluations … of those groups that contribute to an individual's social identity. The evaluation of one's own group is determined with reference to specific other groups through social comparisons in terms of value-laden attributes and characteristics. Positively discrepant comparisons between in-group and out-group produce high prestige; negatively discrepant comparisons … result in low prestige." (p. 40)

[4] According to Social Comparison Theory (Festinger, 1954), people usually use others who share some idiosyncratic features with them as reference individuals. However, which group(s) or which individual(s) are used as reference groups or individuals are not the focus of this study.

[5] The original phrase Akerlof (2016) uses to describe the positive feeling derived from the group's relative performance is "esteem one accords her group". In this paper, it is abbreviated to "group-esteem".

engagement in "we-thinking". We first adapt Akerlof's model (2016) by articulating how group-esteem and self-esteem affect an individual's willingness to contribute to her group's payoffs, and we predict that group-esteem (self-esteem) is positively (negatively) correlated with engagement in "we-thinking" behavior. To test these predictions, we conduct a laboratory experiment. In this experiment, we manipulate people's group-esteem and self-esteem by asking subjects to participate in inter-group and inter-personal competitions which vary the extent to which they feel positive about their social identity and individual identity.

To experimentally proxy for group-esteem and self-esteem, we use rank-based measures and self-reported measures. Our rank-based measures use the rank of the performance of one's group (hereafter, *group rank*) and the rank of one's individual performance (hereafter, *individual rank*). Our self-reported measures (hereafter, *self-reported group-esteem* and *self-reported self-esteem*) ask subjects to report the extent to which they feel good about their group's and their individual performance in the competitions.[6] Each subject's "we-thinking" is measured by the number of tokens she allocates to maximize group payoffs at a cost to her individual payoff.

Our experimental results regarding the relationship between self-reported esteem and "we-thinking" support our theoretical predictions: We find that subjects' self-reported extent to which they feel good about their group's (individual) performance is significantly positively (negatively) correlated with the number of tokens they allocate to their group, holding their self-reported extent to which they feel good about their individual (group's) performance

[6] We use rank-based measures because it is commonly used in experimental economics and presumably the basis of people's positive feelings derived from intergroup and inter-personal comparisons; however, the self-reported measures may be closer to the psychological construct articulated in Tajfel and Turner (1979) and Akerlof (2016). The rank-based measures and self-reported measures are presumably both highly correlated with group and self-esteem and thus mutually highly correlated as well. We test whether they perform similarly when we use them to predict "we-thinking" behavior.

constant. With respect to the relationship between rank-based measures and engagement in "we-thinking", we find that when group rank is high, individual rank is significantly negatively correlated with "we-thinking", but this correlation disappears when group rank is low.

Our findings contribute to the literature on group behavior and social identity. We demonstrate that measurable features of groups and individuals can be used to predict *when* people are willing to contribute to a social group at the expense of their individual benefit. Second, to the best of our knowledge, this is the first study which empirically tests how group-regarding behavior is *jointly* affected by group rank and individual rank, and we show that a person's individual rank can play a crucial role in her willingness to take group-regarding behavior when interacting with group rank.

The rest of the paper is organized as follows. Section 2 reviews relevant literature and Section 3 presents the theoretical motivation for this study. Section 4 describes the experimental design. Section 5 lists the hypotheses in the context of the experiment. Section 6 provides our experimental results and analysis. Section 7 discusses our interpretations of the results and possible implications. Section 8 concludes.

2. Literature Review

2.1. Why group-esteem and self-esteem affect "we-thinking" according to insights from social psychology and Akerlof's theory

Tajfel and Turner's Social Identity Theory (1979) suggests that a person's subjective evaluation of her social group, based on her comparison of her group with other reference groups, affects the extent to which she associates herself with the social group. They note that

people's identification with social groups are "relational and comparative," and "positively (negatively) discrepant comparisons between in-group and out-group produce high (low) prestige." (p.40) When a social identity is negative or unsatisfactory, which leads to low prestige, she is more likely to associate herself less with (i.e., place less weight on) the social group. From a behavioral perspective, it is reasonable to argue that this psychological dissociation will lead to weaker willingness to engage in behavior that benefits the social group.

Apart from social identity, each person also has an identity as an idiosyncratic individual (i.e., individual identity) (Turner and Oakes, 1986). Self-categorization Theory posits that there is a "functional antagonism" between a person's individual identity and social identity regarding the "degree to which they are functionally pre-potent in determining self-perception in any given situation." (p.241) Said differently, both social and individual identity enter utility and the "functional antagonism" could be expressed as opposing weights on the individual and social identity components of the utility function. Changes in positive or negative discrepant comparisons between self and others, or between one's social group and an outgroup, could cause a shift in the weights. Thus, for example, a negative discrepant comparison between self and others leads a person to lower the relative weight placed on individual identity, and then the social identity is more likely to receive a larger relative weight in the utility function. This should lead to stronger willingness to engage in "we-thinking".

Echoing the insight from Social Identity Theory and Self-categorization Theory, R. Akerlof (2016) points out that people's positive feelings derived from inter-group and inter-personal comparisons can be decisive in shifting weight between the identity of a social group and the identity as an individual. He uses the words *esteem one accords her group* (*group-*

esteem) and *self-esteem* to describe an individual's positive feelings stemming from her judgment of the relative performance of her group and herself.

Akerlof argues that a more positive feeling derived from a person's group (individual) relative performance or, using his terminology, a higher group-esteem (self-esteem), should lead to a stronger (weaker) willingness to engage in "we-thinking", holding all other factors constant. In other words, group-esteem (self-esteem) should be positively (negatively) correlated with engagement in "we-thinking," holding self-esteem (group-esteem) constant.

2.2. Group rank and individual rank as proxies for group-esteem and self-esteem

One possible reason for a lack of empirical evidence that tests Akerlof's theory is that group-esteem and self-esteem are two psychological concepts which are hard to observe. However, Social Identity Theory (1979) suggests that *group rank* and *individual rank*, defined as the relative position of a group or an individual (respectively) based on some commonly agreed external criterion(-a), might be a valid proxy for group-esteem and self-esteem. Tajfel and Turner use the word "status" to describe the relative position of a social group, and they point out that the status of a group "reflects a group's relative position on some evaluative dimensions of comparison." (p.19) Therefore, it can be argued that when the "evaluative dimensions of comparison" is unique or commonly agreed upon, rank should be highly correlated with the extent to which people feel positive about their group.[7]

As a variable whose criteria are externally and socially determined, group rank and individual rank are easier to manipulate and observe and thus have been used by some

[7] For example, the rank of a soccer club in its national league is one of the evaluative dimensions of comparison that is commonly agreed upon, so it should be highly correlated with the extent to which people feel positive about the club.

economists to predict behavior. However, little has been done to investigate group-regarding behavior when *both* group rank and individual rank are taken into consideration. Economists have empirically investigated how group rank affects group-regarding behavior. There has been empirical evidence which demonstrates that members of high-ranking groups are more likely to take actions that either enhance the group's welfare or are the preferred actions of other group members. In one study, Charness et al. (2007) show that people with implicitly high group ranks tend to behave more aggressively in both the prisoner's dilemma and battle of sexes games in the hopes of earning more for their groupmates. In another study, Tsutsui and Zizzo (2014) show that high-ranking group members discriminate more than do low-status group members in deciding on how much to give between group members and outgroup individuals.[8]

Few studies in economics investigate how individual rank affects group-regarding behavior. Studies exploring the role of individual rank mainly focus on how it affects behavior *among different individuals*. These studies find that high-ranking individuals use their high ranks to their own advantage. Specifically, Hoffman et al. (1994) show that subjects tend to offer less money in an ultimatum game when they have earned the right to become first movers by performing well on an exam. This first-mover behavior in the treatment sessions may stem from a feeling that they have a higher rank than their counterparts. More recently, several laboratory experiments directly manipulate individual rank (e.g., "the winner" or highest score). Using this type of rank assignment, Ball et al. (2001) show that higher-ranking participants

[8] A number of other papers focus on how rank or status affects individual behavior. These studies find that people with high group rank are more likely to comply with social norms (Tanaka and Camerer, 2016; Butler, 2014; Bauer, 2020). There is also experimental evidence showing that people with a recent increase in status are less likely to trust both ingroup and outgroup members (Suchon and Villeval, 2019). Bhattacharya and Dugar (2014) find that people are more likely to collaborate with others who share the same social status.

earn more in a market setting. Ball and Eckel (1996, 1998) find that subjects offer more to higher-ranking counterparts in the ultimatum game, and Oxoby and Spraggon (2008) as well as Duffy and Kornienko (2005) show that a higher rank leads to more selfish choices in dictator games.[9]

In the next section, we extend Akerlof's theory by articulating how group-esteem and self-esteem affect the weights an individual puts on her social identity and individual identity in her utility function, which in turn determine the extent to which she is willing to engage in "we-thinking".

3. Theoretical Motivation

"We-thinking" is defined as "a mode of thinking in which an individual takes a group's goal as his own (Akerlof, 2016; p.1)." In Akerlof's we-thinking theory, an important premise is that self-esteem and group-esteem are first-order motives for behavior.[10] One important prediction of this theory is that, given a set level of self-esteem (group-esteem), people with higher group-esteem (self-esteem) are more (less) likely to engage in "we-thinking."

To map this model into an experimental setting, we characterize an actor's decision-

[9] Hong and Bohnet (2007) assign individual ranks based on subjects' relative performance in a calculation task, and they demonstrate that high-ranking individuals are more averse to being betrayed when they trust others. Additional literature examines the impact of ranks or status obtained or conferred outside the laboratory setting. For example, Kumru and Vesterlund (2010) find that overall donations are higher when potential donors first see high-status individuals donating. This suggests that low-status individuals tend to follow high-status individuals' donation behavior. There is also empirical evidence showing that feeling or being in high social ranks or status can impact performance. For example, Hoff and Pandey (2006) find that a low-caste Indian subject tends to perform worse on a given task when her caste is revealed to other subjects prior to the task. Bendersky and Shah (2010) find that employees whose rank is elevated during the course of their study perform worse than those who maintain high ranks throughout and no better than those who maintain low ranks. See also Koster and Aven (2018) who investigate how the individual rank and team performance of NBA players affects the number of teammates the players follow on Twitter. They find that high-ranking players (i.e., All-star players) on low-performance teams follow fewer teammates on Twitter than do their counterparts on high-performance teams.

[10] This premise is taken from the theory as developed by Tajfel and Turner (1979). In our study, we treat self-esteem and group-esteem as exogenous to a particular situation. They can be treated endogenously in a more general model, but this is not our focus here.

making behavior as facing a tradeoff between allocating resources to herself and allocating resources to her group. We begin by assuming that the individual has a preferred action that she would take absent any group considerations (i.e., if group information is not salient at the time of the decision). We further assume that there is an action that complies with the group norm.[11] We take x_i as a parameter that denotes the personally-preferred action and x_g^N as a parameter that denotes the action consistent with the group norm.

In our formalization of the model, actors are heterogeneous with respect to the value they place on actions that deviate from the group norm. We write an individual's utility function in the form of a weighted average:[12]

$$U = \frac{w(E_i)[-(x - x_i)^2] + w(E_g)[-\left(x - x_g^N\right)^2]}{w(E_i) + w\left(E_g\right)}. \quad (1)$$

In the above specification, an individual's chosen allocation to her group, x, represents the tradeoff between x_i and x_g^N. We assume that $x_i < x_g^N$ because allocating more resources to the group usually comes at the expense of individual benefits. $w(.)$ is the weight the individual places on adhering to x_i or x_g^N and is positively correlated with E_i or E_g (i.e., $w' > 0$). The negative quadratic form of (1) requires the individual to choose an x that balances the (weighted) distance between x and x_i and the (weighted) distance between x and x_g^N.[13] The first-order condition of the utility function identifies the individual's optimal action:

$$x^* = \frac{w(E_i)x_i + w\left(E_g\right)x_g^N}{w(E_i) + w\left(E_g\right)} \quad (2)$$

The central mechanism of "we-thinking" is that the weights are determined by an

[11] This assumption and its intuition closely follow that in Benjamin et al.'s work (2010). Performance here refers to any measurable and observable (to others) attribute that can be ranked.
[12] This utility function is adapted from Benjamin et al.'s model (2010).
[13] This captures the functional antagonism referenced by Self-categorization Theory (Turner and Oakes, 1986).

individual's level of self-esteem or group-esteem, which she perceives based on a comparison between her own / group's performance and the performance of other reference individuals / groups.[14] Formally, a person i's group-esteem E_g is:

$$E_g = N(g) - \frac{1}{|F_G|}\sum_{g' \in F_G} N(g'), \tag{3}$$

where $N(g)$ denotes her absolute judgment of her group's performance and F_G denotes the set of all reference groups. This functional form suggests that her group-esteem reflects how positively she perceives her group performs compared with the average performance of all reference groups. Analogously, a person's self-esteem, E_i, is derived from a comparison between her own performance and that of other reference individuals:

$$E_i = N(i) - \frac{1}{|F_I|}\sum_{k \in F_I} N(k), \tag{4}$$

where $N(i)$ denotes her absolute judgment of her own performance and F_I denotes the set of all reference individuals. Her self-esteem reflects how positively she thinks of her own performance compared with the average performance of all reference individuals.[15]

Using the above specification, a change in E_i (E_g) alters the extent to which the individual is willing to choose the group norm compliant action (x_g^N). Taking the derivatives of x^* with respect to E_g and E_i from (2), we have:

$$\frac{\partial x^*}{\partial E_g} = \frac{w(E_i)\left(x_g^N - x_i\right)w'\left(E_g\right)}{\left(w(E_i) + w\left(E_g\right)\right)^2} > 0 \tag{5}$$

$$\frac{\partial x^*}{\partial E_i} = \frac{w\left(E_g\right)\left(x_i - x_g^N\right)w'(E_i)}{\left(w(E_i) + w\left(E_g\right)\right)^2} < 0. \tag{6}$$

Here, (5) and (6) imply that: a) holding self-esteem (E_i) constant, when E_g increases, x^* will

[14] How an individual determines reference groups and individuals is an interesting question but is not our focus in this paper.
[15] The expressions of E_g and E_i in (3) and (4) are adapted from Akerlof's model (2016).

also increase and thus move closer to x_g^N and b) holding group-esteem (E_g) constant, when E_i increases, x^* will decrease and thus move closer to x_i.

4. Experimental Design

To test the above predictions, we conduct a laboratory experiment consisting of sessions comprised of six subjects each.[16] We use z-Tree (Fischbacher, 2007) to program this experiment. In each session, subjects have the experimental instructions read aloud to them prior to completing each task.

The experiment consists of four stages. In Stage 1, subjects are assigned to two 3-person groups based on their indicated preferences among a series of paintings. In Stage 2, their group-esteem and self-esteem are manipulated by incentivized interpersonal and inter-group competitions. In Stage 3, they are asked to allocate a set number of tokens between their personal account and their group's account. In Stage 4, their feelings of group attachment, self-reported self-esteem, and self-reported group-esteem are measured by their responses to several 7-point Likert survey questions.

The experiment consists of two treatments: *TreatInfo* and *Control*. Subjects in the *TreatInfo* treatment receive information about their group ranks and individual ranks before being asked to allocate tokens between their personal and group's accounts. Subjects in the *Control* treatment do not receive any performance information prior to completing their allocations. Both treatments consist of the above four stages.

[16] Note that there were 12 subjects physically present in the laboratory at the same time for some of the sessions. However, these 12 subjects were randomly assigned to two independent 6-person sessions that did not change throughout the experiment. Furthermore, subjects were clearly informed that they would interact only with 5 other subjects in the same 6-person session.

Subjects receive an $8 show-up fee as well as a final payment based on the task outcome. To mitigate any potential income effect from Stage 2 (the incentivized interpersonal and inter-group competitions) that may affect allocation decisions in Stage 3, the computer randomly determines for each subject whether the outcome in Stage 2 or Stage 3 is used to determine her final payoff at the end of the experiment.

The following subsections describe the experimental procedures in each stage in detail.

4.1. Stage 1: Group assignment

In Stage 1, we assign subjects to different groups based on their indicated preferences for different paintings. The procedure in this stage mainly follows Chen and Li's design (2009) with a few changes to guarantee that the number of subjects in each group is the same.

In the group assignment stage, six subjects are assigned to one of two groups based on their reported preference regarding five pairs of paintings.[17] In each pair, there is one painting by Paul Klee and one painting by Wassily Kandinsky. Each subject independently chooses which painting she prefers in each pair without being told the artist of each painting. After all subjects make their decisions, the computer sorts the six subjects based on how many Klee paintings they prefer (if there are multiple subjects who prefer the same number of Klee paintings, then these subjects' orders are determined randomly). The first three subjects who prefer the most Klee paintings are classified into Group Klee. The other three subjects, who indicate a preference for Klee paintings less often, are classified into Group Kandinsky.

[17] The five pairs of paintings are: 1a—*Gebirgsbildung* (1924), by Klee; 1b—*Veiled Glow* (1928), by Kandinsky; 2a—*Dreamy Improvisation* (1913), by Kandinsky; 2b—*Warning of the Ships* (1917), by Klee; 3a—*Dry-Cool Garden* (1921), by Klee; 3b—*Landscape with Red Spots* (1913), by Kandinsky; 4a—*Gentle Ascent* (1934), by Kandinsky; 4b—*A Hoffmannesque Tale* (1921), by Klee; 5a—*Development in Brown* (1933), by Kandinsky; 5b—*The Vase* (1938), by Klee.

Subjects in Group Klee are privately told that all of their group members relatively prefer Klee paintings, compared with other subjects. Subjects in Group Kandinsky are privately informed that all of their group members relatively prefer Kandinsky's paintings.[18] Subjects do not receive information about any other subject's group membership. Groups remain the same for the entire experiment.

4.2. Stage 2: Interpersonal and intergroup competitions

In Stage 2, subjects in both treatments participate in a two-round competition in which they answer questions from an established IQ test. All the IQ test questions are selected from Raven's Standard Progressive Matrices (SPM Plus) (1998).[19] The first round of the game intends to vary their individual ranks and thus vary their self-esteem, while the second round intends to vary their group ranks and thus vary their group-esteem.

In the first round of the game,[20] all subjects are assigned into pairs in which the two subjects are from different groups (i.e., one subject is from the Klee group and the other is from the Kandinsky group). Each pair participates in a competition in which they are asked to solve as many questions as possible within five minutes. At the end of the first round, the subject who correctly solves more problems within each pair wins the first round of the game and receives a $2.50 bonus, while the subject who loses the first round receives $0. In the remainder of this paper, we call the first round of Stage 2 the "individual battle."

[18] Sorting subjects according to how many Klee's paintings they prefer and then classifying them into two groups is our deviation from Chen and Li's original design (2009). This is to guarantee that we have the same number of subjects in each group.
[19] The experimental instructions that introduce the Raven's Matrices are adapted from Falk and Szech (2019).
[20] We call the first round "Competition 1" and the second round "Competition 2" in the experimental instructions. This is to avoid possible confusion associated with the terms "Round" and "Stage."

In the second round of the game, each subject is again given five minutes to solve as many questions as possible. At the end of the second round, the computer calculates the total number of correct answers across all members of a three-person group. The group with the greater number of total correct answers wins the second round and each of the three group members receives a $2.50 bonus, while each of the three group members in the group that loses the second round receives $0. In the remainder of this paper, we call the second round of Stage 2 the "group battle."

After the second round of the game, each subject in the *Control* treatment receives a screen message indicating that Stage 2 is finished. By contrast, each subject in the *TreatInfo* treatment receives the screen message as well as information on whether she has won the individual battle and whether her group have won the group battle. However, she is not told the number of questions she or her group answered correctly nor other subjects' game results.

4.3. Stage 3: Modified dictator game

In both the *Control* and *TreatInfo* treatments, we elicit subjects' engagement in "we-thinking" in Stage 3. In this stage, we ask each subject to play a modified version of the dictator game in which she decides how to allocate six tokens between her personal account and her group's account. Each token allocated to her personal account is worth $1.00, while each token allocated to her group's account is worth $1.50. At the end of this stage, the computer randomly selects one subject in each group to determine the payoffs to the group. If a subject's decision is randomly selected to determine the group's payment, she receives all the money she allocates to her personal account, while the money she allocates to her group's account is evenly shared

by the three members of her group, herself included. In other words, this subject's payoff equals $1.00 * the number of tokens she allocates to her personal account + $1.50 / 3 * the number of tokens she allocates to her group's account. Each of the two other subjects in her group, whose decisions are not selected for payment, receive a payoff of $1.50 / 3 * the number of tokens the selected subject allocates to her group's account.

This modified dictator game has the following features. First, in determining the group payoff, the larger the number of tokens the selected subject allocates to the group, the greater the group's total payoff and the lower the payoff difference among the three group members. Thus, a selected subject who allocates all tokens to the group both maximizes the total payoff to the three group members and minimizes the payoff difference among the three group members. This feature of our design ensures that a subject who wants to adhere to the group norm (x_g^N in our model) will always allocate all tokens to the group's account, no matter whether she thinks that the group norm is "efficiency" (i.e., maximizing total payoffs) or "equity" (i.e., minimizing payoff differences).[21] Second, this is a non-strategic game. Compared with strategic games such as public good games, the main advantage of a non-strategic game is that subjects do not need to form beliefs about other group members' contributions when deciding their own group contributions.

4.4. Stage 4: Measures for self-reported group-esteem, self-reported self-esteem and group attachment

[21] Future studies might further investigate *which* norm (i.e., efficiency or equity) group members adhere to, as group-esteem and self-esteem differ. The present study is interested only in *whether* group members are willing to adhere to the group's norm.

In Stage 4, subjects are first asked to answer several 7-point Likert scale questions about the extent to which they feel attached to their groups.[22] Then we elicit their self-reported self-esteem and self-reported group-esteem through Likert scale questions which ask them to report the extent to which they feel good about their individual and group performance in Stage 2 of the experiment,[23] which are adapted from Li et al. (2017).[24, 25]

4.5. Final payoffs in the experiment

After subjects in both treatments finish Stage 4, they are shown a final screen which displays all the game results in Stage 2 (i.e., whether they win the individual battle and whether their group wins the group battle), Stage 3 (i.e., whether their decisions are randomly selected and their payoffs), and whether Stage 2 or Stage 3 has been selected to calculate their final payoffs from the experiment.

[22] These questions are adapted from Aron et al.'s (1992) *Inclusion of the Other in the Self* scale and Li et al. (2017).

[23] Note that each subject is only informed of whether she/her group wins the individual/group battle but not how many questions she/her group or other subjects/group correctly answers, so the individual/group rank is the only available information for esteem formation.

[24] For the sake of the completeness of adapting Li et al.'s Likert scale questions (2017), we also include another set of Likert scale questions which ask subjects to report the extent to which they take pride in their individual and group performance. However, although "pride" is presumably also associated with the extent to which people feel positive about their social/individual identity, we argue that it is less reliable in terms of measuring group-esteem and self-esteem defined in this study (i.e., the extent to which they feel positive about their social/individual identity *based on intergroup and interpersonal comparisons*), due to its ambiguous connotations. As Lea and Webley (1997) point out, pride is sometimes associated with the "seven deadly sins" and considered to be a synonym of narcissism or *groundless* sense of superiority. This connotation implies that the positive feelings derived from this type of pride is not based on one's evaluation of relative performance but on an *exaggerated* and *excessive* basis due to a pathological need for elevation of self-image, which is different from esteem defined in this study.

[25] We put the self-reported esteem elicitation questions after the modified dictator game to avoid an experimenter demand effect on subjects' allocation decisions. Since no subject receives any new information (other than their group ranks and individual ranks) about themselves or any other subject during the modified dictator game stage, the modified dictator game should not impose an information effect on subjects' self-reported esteem. In addition, we do not believe that subjects' self-reported esteem is affected by a self-justification effect from their allocation decisions in Stage 3. We have two pieces of evidence to support this claim. First, the self-reported esteem manipulation check results in Section 6.2.1 show that there is a strong and significant correlation between group (individual) rank and self-reported group-esteem (self-esteem). This implies that group (individual) rank should be the main source of self-reported group-esteem (self-esteem). Second, we do not find a significant correlation between the extent to which subjects take pride in their group (individual) performance and the number of tokens allocated to the group. As we argue in Footnote 24, these pride questions are associated with but not fully consistent with esteem defined in this study. If a self-justification effect were present, then subjects would focus on the association between pride and esteem but ignore the inconsistent part between them to self-justify their allocation decisions when answering the pride questions, and we would find a *significant* correlation between their responses to pride questions and tokens allocated to the group.

4.6. Summary

A total of 162 subjects participate in the experiment in the School of Information Behavioral Laboratory at the University of Michigan, including 132 subjects in *TreatInfo* and 30 subjects in *Control*. All subjects are students from the University of Michigan. They are recruited via the online recruitment platform ORSEE (Greiner, 2015). Each subject is allowed to participate in only one session. The average payoff of subjects is $10.40, which includes the $8.00 show-up fee. Each session lasts for 40 minutes on average.

5. Main Hypotheses

Our discussion in Section 3 concludes that a person's engagement in "we-thinking" should be positively (negatively) correlated with group-esteem (self-esteem), holding self-esteem (group-esteem) constant. Since we use group rank (individual rank) and self-reported group-esteem (self-reported self-esteem) as proxies for group-esteem (self-esteem) in the experiment, we should have the following experimental hypotheses.

Holding individual rank constant, we expect that subjects with higher group rank allocate more tokens to their group's account. We further expect that, holding group rank constant, subjects with higher individual ranks allocate fewer tokens to their group's account. In the context of our experiment, each subject's group rank and individual rank are both binary: Subjects who win (lose) the group battle are considered to have a high (low) group rank, and subjects who win (lose) the individual battle are considered to have a high (low) individual rank. Therefore, we expect that subjects with high group rank and low individual rank

(hereafter, (Hg, Li) subjects) allocate the largest number of tokens to the group's account, and that subjects with low group rank and high individual rank (hereafter, (Lg, Hi) subjects) allocate the smallest number of tokens to the group's account. Subjects with both high (low) group rank and high (low) individual rank (hereafter, (Hg, Hi) and (Lg, Li) subjects) should allocate fewer tokens than (Hg, Li) subjects do and more tokens than (Lg, Hi) subjects do. Breaking down the relationship between these 4 categories of subjects, we have the following hypotheses:

Hypothesis 1.1: (Hg, Li) subjects allocate more tokens to the group's account than (Hg, Hi) subjects do.

Hypothesis 1.2: (Hg, Li) subjects allocate more tokens to the group's account than (Lg, Li) subjects do.

Hypothesis 1.3: (Lg, Hi) subjects allocate fewer tokens to the group's account than (Hg, Hi) subjects do.

Hypothesis 1.4: (Lg, Hi) subjects allocate fewer tokens to the group's account than (Lg, Li) subjects do.

We also expect that subjects with higher self-reported group-esteem allocate more tokens to the group's account, holding self-reported self-esteem constant, and that subjects with higher self-reported self-esteem allocate fewer tokens to the group's account, holding self-reported group-esteem constant.

Hypothesis 2.1: Subjects with higher self-reported group-esteem allocate more tokens to the group's account, holding self-reported self-esteem constant.

Hypothesis 2.2: Subjects with higher self-reported self-esteem allocate fewer tokens to the group's account, holding self-reported group-esteem constant.

6. Results

6.1. How group rank and individual rank affect "we-thinking"

We first examine the relationship between group/individual ranks and engagement in "we-thinking".

Figure 1 shows the means of tokens allocated to the group for each rank category of *TreatInfo* subjects as well as the results from a set of one-sided t-tests comparing the means between subjects with the same group or individual rank.[26]

[26] Notes: (1) The side of each one-sided t-test is determined by our hypotheses. (2) Only significant results ($p<0.1$) are presented in the figure. (3) The test results are similar if we use a one-sided permutation test: the only significant difference is between *(Hg, Li)* and *(Hg, Hi)* subjects ($p=0.025$).

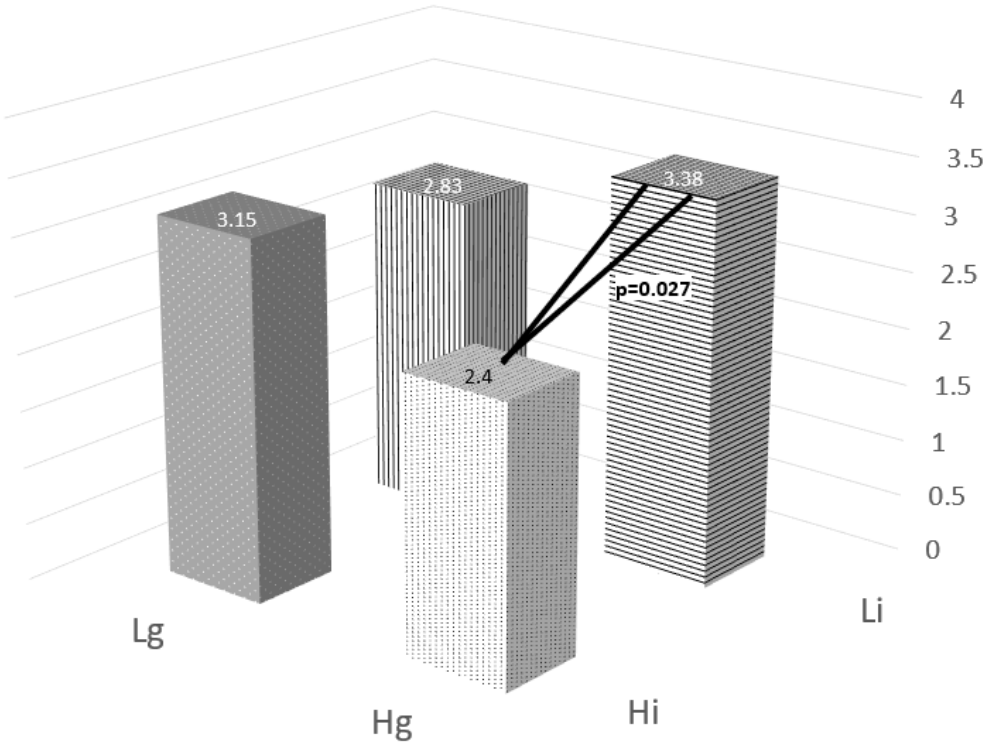

Fig. 1: Average tokens allocated to the group's account for each rank category (*TreatInfo* subjects only)

From the results in Figure 1, we see that (Hg, Li) subjects allocate 3.38 tokens to the group's account on average (56.6% tokens), while (Hg, Hi) subjects allocate 2.40 tokens to the group's account (40% tokens), a difference which is statistically significant (p=0.027). This supports Hypothesis 1.1.

Result 1: (Hg, Li) subjects allocate significantly more tokens to the group's account than (Hg, Hi) subjects do.

We also see that (Hg, Li) subjects on average allocate more tokens to the group's

account than do (Lg, Li) subjects, who on average allocate 2.83 tokens (47.2% tokens), but this difference is statistically insignificant. Examining the results further, we see that (Lg, Hi) subjects allocate 3.15 tokens to the group's account on average (52.5% tokens), which is more than the number allocated by (Hg, Hi) subjects and directionally inconsistent with Hypothesis 1.3. On average, (Lg, Hi) subjects allocate more tokens than (Lg, Li) subjects do, which is directionally inconsistent with Hypothesis 1.4. Therefore, we do not find strong support for Hypotheses 1.2, 1.3 or 1.4. [27]

To conclude, we find that (Hg, Li) subjects allocate significantly more tokens to the group's account than (Hg, Hi) subjects do. In other words, when group rank is high, individual rank is significantly negatively correlated with engagement in "we-thinking". (Hg, Li) subjects allocate more tokens to the group than (Lg, Li) do, but this difference is statistically insignificant. Therefore, when group rank is low, individual rank is not significantly negatively correlated with engagement in "we-thinking". In addition, we do not find a significant correlation between group rank and engagement in "we-thinking", holding individual rank constant. [28]

6.2. How self-reported group-esteem and self-esteem affect "we-thinking"

[27] From an affective perspective, we also investigate the relationship between group rank and self-reported group attachment (its value ranges from 1 to 7: 1 indicates the lowest level of self-reported group attachment, while 7 corresponds to the highest level). We find that when individual rank is low, group rank is significantly positively correlated with self-reported group attachment (Question 1 (relation): 4.15 vs. 3.25, p=0.006; Question 2 (identify): 5.12 vs. 3.80, p<0.001; Question 3 (sense of belonging): 3.81 vs. 2.75, p=0.001; All tests are one-sided t-tests). When individual rank is high, group rank is marginally positively correlated with self-reported group attachment (Question 1: 4.08 vs. 3.38, p=0.052; Question 2: 4.83 vs. 4.23, p=0.081; Question 3: 3.15 vs. 2.58, p=0.076; All tests are one-sided t-tests).

[28] One possible concern in using Stage 2 to manipulate subjects' group and individual ranks is that subjects' intelligence levels might confound the relationship between ranks and their subsequent allocation of tokens. Since subjects in the *Control* treatment do not know the game results in the individual battle or the group battle before the allocation task in Stage 3, we test whether intelligence is a confounding factor by examining the correlation between the number of correct answers solved by each subject in the *Control* treatment and the number of tokens they allocate to her group. The regression results (see Table A.1 in Appendix A) show no significant correlation between the number of correct answers and subsequent token allocations.

In Section 6.2, we focus on the relationship between subjects' self-reported group/self-esteem[29] and engagement in "we-thinking".

6.2.1. Manipulation checks on the correlation between rank and self-reported esteem

Before we check the correlation between self-reported esteem and token allocation, we first do a manipulation check on the relationship between group (individual) rank and self-reported group-esteem (self-reported self-esteem) to examine whether subjects' self-reported group-esteem and self-reported self-esteem are mainly based on their group and individual ranks respectively.

Table 1: Correlation between self-reported group-esteem and group rank

VARIABLES	*GFeelGood*
Hg	2.470***
	(0.234)
Constant	3.045***
	(0.186)
Observations	132
R-squared	0.461

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes:
(1) *Hg* is a dummy variable whose value is 1 when group rank is high and 0 otherwise.
(2) *GFeelGood* indicates subjects' responses to the question about the extent to which they feel good about their group's performance in the group battle. 1 indicates that a subject strongly disagrees with the statement that she feels good about her group's performance in the group battle in Stage 2; 2 corresponds to "disagree"; 3 corresponds to "somewhat disagree"; 4 corresponds to "neutral"; 5 corresponds to "somewhat agree"; 6 corresponds to "agree"; and 7 corresponds to "strongly agree".

Results in Table 1 demonstrate that the self-reported extent to which subjects feel good

[29] The value of self-reported group/self-esteem ranges from 1 to 7: 1 indicates that a subject strongly disagrees with the statement that she feels good about her group's/own performance in the group/individual battle in Stage 2; 2 corresponds to "disagree"; 3 corresponds to "somewhat disagree"; 4 corresponds to "neutral"; 5 corresponds to "somewhat agree"; 6 corresponds to "agree"; and 7 corresponds to "strongly agree".

about their group's performance is significantly positively correlated with their group rank. Specifically, the reported extent of feeling good from group performance of a subject with a high group rank is 2.470 units (41.2% of the 1-7 range) higher than that of a subject with a low group rank on average.

Table 2: Correlation between self-reported self-esteem and individual rank

VARIABLES	*IFeelGood*
Hi	2.076***
	(0.290)
Constant	2.742***
	(0.193)
Observations	132
R-squared	0.283

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Notes:
(1) *Hi* is a dummy variable whose value is 1 when individual rank is high and 0 otherwise.
(2) *IFeelGood* indicates subjects' responses to the question about the extent to which they feel good about their individual performance in the individual battle. 1 indicates that a subject strongly disagrees with the statement that she feels good about her own performance in the individual battle in Stage 2; 2 corresponds to "disagree"; 3 corresponds to "somewhat disagree"; 4 corresponds to "neutral"; 5 corresponds to "somewhat agree"; 6 corresponds to "agree"; and 7 corresponds to "strongly agree".

Results in Table 2 show that the self-reported extent to which subjects feel good about their individual performance is significantly positively correlated with their individual rank. Specifically, the self-reported extent of feeling good from individual performance of a subject with a high individual rank is 2.076 units (34.6% of the 1-7 range) higher than that of a subject with a low individual rank on average.

These strong and significant correlations between self-reported group-esteem (self-esteem) and group rank (individual rank) demonstrate that their self-reported group-esteem

(self-esteem) is mainly manipulated through their group rank (individual ranks).[30]

6.2.2. The relationship between self-reported group/self-esteem and "we-thinking"

We then investigate the relationship between self-reported group/self-esteem and we-thinking. We check the correlation between the self-reported extent to which they feel good about their group/individual performance and the number of tokens they allocate to the group's account.

Table 3: Correlation between the self-reported group/self-esteem and token allocation

VARIABLES	Tkn passed
$GFeelGood$	0.220**
	(0.108)
$IFeelGood$	-0.230**
	(0.0991)
Constant	2.800***
	(0.504)
Observations	132
R-squared	0.046

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 3 demonstrates that a one-unit increase in the self-reported extent to which subjects feel good about their group performance is significantly correlated with 0.220 more tokens they allocate to the group's account on average, holding the self-reported extent to which they feel good about their individual performance constant.[31] It also shows that a one-unit

[30] As we have indicated in Footnote 25, this result is also evidence against the possible concern that subjects' self-reported group- and self-esteem might be affected by a self-justification effect from their allocation decisions in Stage 3.

[31] This implies that a 6-unit increase (from 1 to 7) in the extent to which subjects feel good about their group performance is significantly correlated with allocating 1.32 more tokens (22% tokens) to the group's account, holding the extent to which they feel good about their individual performance constant.

increase in the self-reported extent to which subjects feel good about their individual performance is significantly correlated with 0.230 fewer tokens they allocate to the group's account, holding the self-reported extent to which they feel good about their group performance constant. [32] These results support Hypotheses 2.1 and 2.2.[33]

> **Result 2.1:** The self-reported extent to which subjects feel good about their group performance is significantly positively correlated with the number of tokens they allocate to the group's account, holding the self-reported extent to which they feel good about their individual performance constant.
>
> **Result 2.2:** The self-reported extent to which subjects feel good about their individual performance is significantly negatively correlated with the number of tokens they allocate to the group's account, holding the self-reported extent to which they feel good about their group performance constant.

7. Discussion

Our experimental results provide evidence that is consistent with our predictions regarding the relationship between rank and "we-thinking": The self-reported extent to which subjects feel good about their group (individual) performance is significantly positively

[32] This implies that a 6-unit increase (from 1 to 7) in the extent to which they feel good about their individual performance is significantly correlated with allocating 1.38 fewer tokens (23% tokens) to the group's account, holding the extent to which subjects feel good about their group performance constant.

[33] We also investigate the relationship between self-reported group-esteem and self-reported group attachment. We find that the self-reported extent to which subjects feel good about their group performance is significantly positively correlated with the self-reported extent to which they feel attached to the group, holding the self-reported extent to which they feel good about their individual performance constant. See Table A.3. in Appendix A for the detailed regression results.

(negatively) correlated with their engagement in "we-thinking", holding constant the self-reported extent to which they feel good about their individual (group) performance. Individual rank is also significantly negatively correlated with engagement in "we-thinking" when group rank is high, but the correlation becomes insignificant when group rank is low and there is no significant correlation between group rank and engagement in "we-thinking".

In order to investigate why rank and self-reported esteem predict engagement in "we-thinking" differently, we construct a measure of the difference between the group-esteem proxy and self-esteem proxy. Specifically, we take the *difference* between the self-reported group-esteem and self-reported self-esteem (i.e., $\Delta FeelGood \equiv GFeelGood - IFeelGood$) and we also take the difference between group and individual rank (i.e., $\Delta Rank \equiv group\ rank - individual\ rank$). We then test whether the sign of $\Delta FeelGood$ is the same as the sign of $\Delta Rank$. [34] If these variables are similarly good proxies for group-esteem and self-esteem, then $\Delta FeelGood$ and $\Delta Rank$ should have the same signs depending on how subjects did in the individual and group performance tasks. Specifically, we expect that (Hg, Hi) and (Lg, Li) subjects, whose $\Delta Rank$ is 0, should have a $\Delta FeelGood$ around 0. The (Hg, Li) subjects, whose $\Delta Rank$ is positive, should have a positive $\Delta FeelGood$, while the (Lg, Hi) subjects, whose $\Delta Rank$ is negative, should have a negative $\Delta FeelGood$.

[34] An advantage of focusing on the *differences* in self-reported group/self-esteem and group/individual ranks is that they reduce the dimension of variables from two to one. Recall that our predicted correlations between group rank and "we-thinking" and that between self-reported group-esteem and "we-thinking" are both positive. Our predicted correlations between individual rank and "we-thinking" and that between self-reported self-esteem and "we-thinking" are both negative. The opposite directions of correlations imply that the *difference* between group rank and individual rank and the *difference* between self-reported group-esteem and self-reported self-esteem should both have a positive correlation with engagement in "we-thinking". Our experimental results confirm that $\Delta FeelGood$ is significantly positively correlated with the number of tokens allocated to the group (See Table A.4 in Appendix A for the regression results).

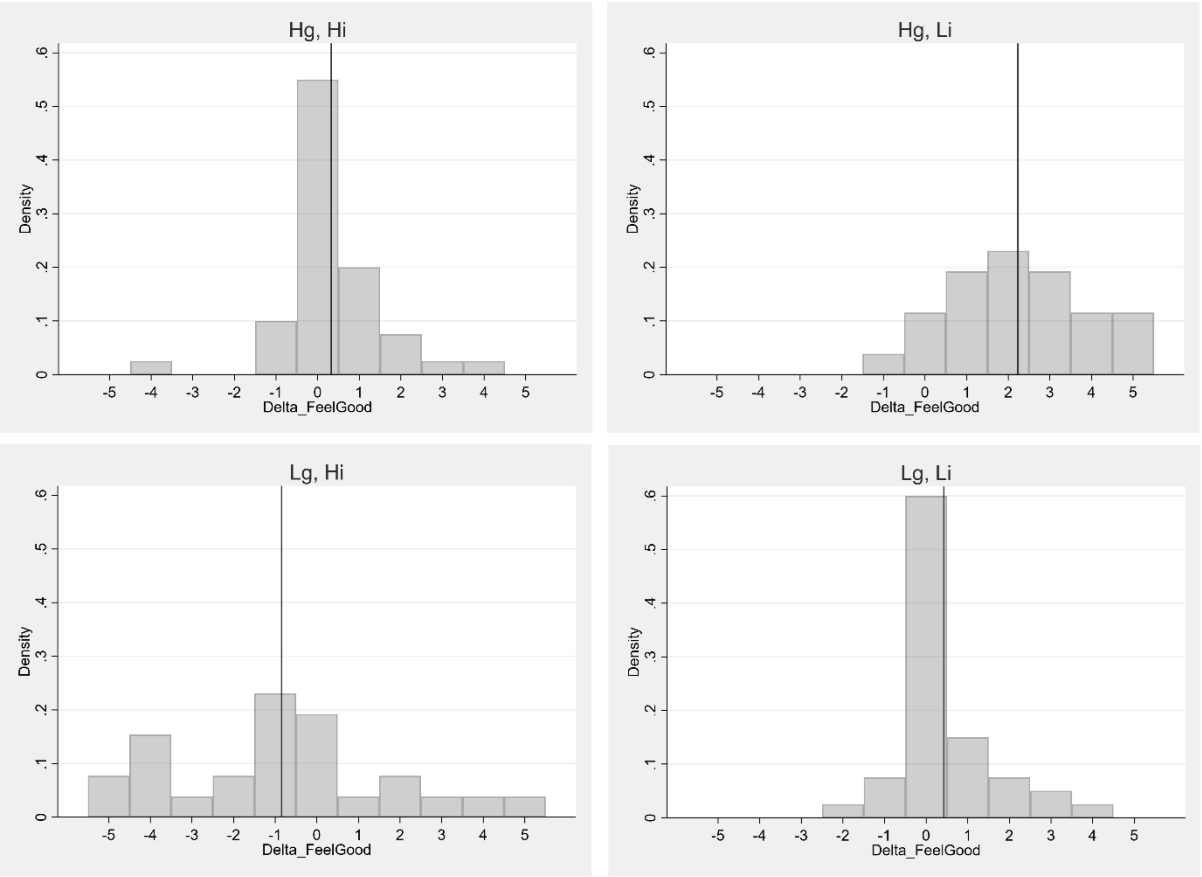

Fig. 2: Distribution of $\Delta FeelGood$ for different group and individual ranks

Note: The long dark vertical line in each graph shows the mean of $\Delta FeelGood$.

Figure 2 demonstrates the distribution of $\Delta FeelGood$ for each rank category. We see that most (Hg, Hi) and (Lg, Li) subjects report a $\Delta FeelGood = 0$; about 85% of (Hg, Li) subjects report a $\Delta FeelGood > 0$; and less than 5% report a $\Delta FeelGood < 0$. The distribution of $\Delta FeelGood$ for (Lg, Hi) subjects, however, shows more heterogeneity. Here, about 20% of (Lg, Hi) subjects report a $\Delta FeelGood = 0$, and around 20% of them report a $\Delta FeelGood > 0$ even though their group ranks are relatively low compared to their individual ranks. For those 40% of (Lg, Hi) subjects with a $\Delta FeelGood \geq 0$, their self-reported group-esteem is not lower than their self-reported self-esteem even though their group ranks are lower than their individual ranks.

The above results demonstrate that $\Delta Rank$ matches $\Delta FeelGood$ in general. However,

we also observe greater heterogeneity of $\Delta FeelGood$ among (Lg, Hi) subjects. Recall from Figure 2 that it is also (Lg, Hi) subjects whose numbers of tokens allocated to the group deviate most from our predictions. Thus, a possible reason for the different correlations produced by group/individual rank and self-reported group-/self-esteem, is that for (Lg, Hi) subjects, their $\Delta FeelGood$ shows more heterogeneity. This, in turn, increases the standard deviations of these subjects' token allocation.

Finally, though not anticipated by our design or prior readings, we note that there is research which suggests that when individual status is high, then people may exhibit some form of *noblesse oblige* (Homans, 1950). When a subject's individual rank stands out relative to her group rank, she is more likely to feel "noble" about herself and thus regard her personal achievement as part of her group's achievement. This might explain why there are some (Lg, Hi) subjects whose $\Delta FeelGood$ tend to be more positive than we predict.

Thus, one might conclude that the correlation between self-reported esteem and "we-thinking" is closer to our theoretical predictions because our Likert-scale questions about self-reported esteem are a direct elicitation of the esteem we defined in our theoretical model. As such, it does a better job of capturing some psychological factors than ranks do.

8. Conclusion

In this study we test a determinant of *when* social identity motivates "we-thinking". We extend the group/individual payoff model of R. Akerlof (2016) and test whether group-esteem and self-esteem impact an individual's willingness to maximize her group's payoff. Our model predicts that people with higher group-esteem (self-esteem) are more (less) likely to maximize

their group's payoff, holding self-esteem (group-esteem) constant. We proxy for group-esteem and self-esteem using rank-based measures and self-reported measures. The experimental results using self-reported esteem are consistent with our prediction: Subjects with higher self-reported group-esteem (self-reported self-esteem) allocate more tokens to their group, holding self-reported self-esteem (self-reported group-esteem) constant. As for the rank-based measures we find weaker support: Individual rank is significantly negatively correlated with the number of tokens allocated to the group when group rank is high, but this correlation is no longer significant when group rank is low. We present some evidence to reconcile the weaker finding from rank-based measures and argue that self-reported esteem may be doing a better job capturing the psychological concept that constitutes the esteem defined in our theory.

Our study contributes to the literature of social identity and group behavior by showing when "we-thinking" is more likely to happen by using group-esteem and self-esteem, factors that are more stable and enduring than other previously explored channels such as priming or common interest/experience. Moreover, from a management perspective, our observed positive correlation between self-reported group-esteem and "we-thinking" implies that providing opportunities for groups to experience moments of positive feelings from their group membership is an effective way to motivate them to take on group or organizational goals as their own. Our finding of a negative correlation between self-reported self-esteem and "we-thinking" further suggests that it may be possible to identify group members who may be less likely to take on group goals. Moreover, when self-reported esteem is difficult to elicit, group rank and individual rank can also assist in predicting which group members are more likely to be "group-oriented". These insights can provide guidance for the optimal composition of

groups in organizations and are a direction for future work in exploring reliable mechanisms that generate esteem for these groups.

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Appendix A: Additional Tables

Table A.1: Correlation between test score and token allocation

VARIABLES	Tkn passed
score	0.0152
	(0.134)
Constant	2.580**
	(1.109)
Observations	30
R-squared	0.001

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A.2: Correlation between the self-reported extent to which they take pride in their group/individual performance and their allocation

VARIABLES	Tkn passed
$GPride$	0.0548
	(0.110)
$IPride$	-0.0755
	(0.0952)
Constant	2.927***
	(0.494)
Observations	132
R-squared	0.005

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A.3: Correlation between the self-reported group/self-esteem and self-reported group attachment

VARIABLES	(1) Relation	(2) Identify	(3) Belonging
$GFeelGood$	0.314***	0.346***	0.328***
	(0.0818)	(0.0861)	(0.0878)
$IFeelGood$	-0.115	0.00525	-0.0918
	(0.0747)	(0.0790)	(0.0883)
Constant	2.796***	2.955***	1.989***
	(0.342)	(0.380)	(0.328)
Observations	132	132	132
R-squared	0.103	0.160	0.126

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A.4: Correlation between $\Delta FeelGood$ and allocation

VARIABLES	Tkn passed
$\Delta FeelGood$	0.226***
	(0.0864)
Constant	2.758***
	(0.175)
Observations	132
R-squared	0.046

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

For Online Publication

Appendix B: Experimental Instructions

[Screen 1] Introduction 1/2

Thank you for participating in this study.

This is a study in the economics of decision making. If you follow the instructions carefully, you may earn money. You will be paid your show-up fee and your earnings in cash privately, immediately after the experiment. We ask that you do not talk to any other participant during the experiment or you may be asked to leave the lab.

[Screen 2] Introduction 2/2

This experiment consists of 4 stages. At the beginning of each stage, we will walk you through the instructions of that stage.

You will be randomly assigned to interact with 5 other participants in this room today. These are the only participants you will interact with for the duration of the experiment. Therefore, when we use the word "others" or "other participants" during the experiment, we are only referring to those other 5 participants.

You will make decisions in Stage 2 and 3 that will affect your payoffs. At the end of the experiment, the computer will flip a virtual coin to determine whether your earnings from Stage 2 or Stage 3 will be used to pay you. There is a 100% chance that you will get paid, but we will use either your choice in Stage 2 or 3. This means that you should make every decision count.

[Screen 3] Stage 1: Instructions

In this stage, you will be assigned to a group. Everyone will be shown 5 pairs of paintings by two artists. You will be asked to choose which painting in each pair you prefer. You will then be classified into one of 2 groups, based on which artist you relatively prefer, compared with other people. Each group will have 3 members.

The participants you are grouped with will be the same for the rest of the experiment.

[Screen 4] Stage 1: Choose a painting 1/5

(Painting 1a) (Painting 1b)

[Screen 5] Stage 1: Choose a painting 2/5

(Painting 2a) (Painting 2b)

[Screen 6] Stage 1: Choose a painting 3/5

(Painting 3a) (Painting 3b)

[Screen 7] Stage 1: Choose a painting 4/5

(Painting 4a) (Painting 4b)

[Screen 8] Stage 1: Choose a painting 5/5

(Painting 5a) (Painting 5b)

[Screen 9] Group Assignment Result

Based on your choice, you are assigned to Group Klee/Kandinsky.

All of the 3 group members in your group relatively prefer paintings by Klee/Kandinsky, while all of the 3 members in the other group relatively prefer paintings by Kandinsky/Klee.

[Screen 10] Stage 2: Instructions

In Stage 2, you will be taking part in an exercise where you will answer questions from an intelligence test. The questions you will answer come from a test that is part of an established technique to measure the intelligence quotient (IQ).

Generally, intelligence is correlated with many factors of success in a person's life. These comprise, among other things, educational success and average life income.

Each person in the room will attempt the same test questions.

This stage consists of two competitions:

In Competition 1, each of you will be paired with a participant from the other group. You will have 5 minutes to correctly solve as many questions as you can. Within each pair, the participant who correctly solves more questions within 5 minutes wins Competition 1. If there is a tie, then the winner will be determined randomly.

In Competition 2, you will not be paired against a participant, but your Klee/Kandinsky group will compete against the Kandinsky/Klee group. You will again have 5 minutes to correctly solve as many questions as you can. At the end of Competition 2, the computer will calculate the total number of questions correctly answered by all the 3 members in each group. The group with more total correct answers wins Competition 2. If there is a tie, then the winning group will be determined randomly.

Later, you will learn whether you won or lost Competition 1 and whether your Klee/Kandinsky group won or lost Competition 2.

If Stage 2 is selected for payment, then you will receive $2.50 for each competition where you or your group won. In other words, if you won Competition 1, you will receive $2.50. If your Klee/Kandinsky group won Competition 2, then each of the 3 members in your Klee/Kandinsky group (including you) will receive $2.50. Your earnings from Competition 1 and Competition 2 will be added.

The questions you will see are part of a test used to measure a person's overall intelligence. In general for this test, the more questions you answer correctly, the higher is your measured intelligence quotient.

If you are ready to answer the test questions, please click "OK".

[Screen 11] Stage 2: Test (Competition 1)

In Competition 1, you are competing against a participant from the other group.

(Subjects finish some selected questions from Raven's Standard Progressive Matrices Test)

[Screen 12] Stage 2: Task (Competition 2)

In Competition 2, your Klee/Kandinsky group is competing against the Kandinsky/Klee group.

(Subjects finish some selected questions from Raven's Standard Progressive Matrices Test)

[Screen 13] Stage 2: You have finished Stage 2

[Control]

You have finished Stage 2.

[TreatInfo]

You have finished Stage 2.

Whether you won or lost Competition 1 against your opponent	Won/Lost
Whether your Klee/Kandinsky group won or lost Competition 2 against the Kandinsky/Klee group	Won/Lost

[Screen 14] Stage 3: Instructions

In Stage 3, you will be asked to allocate 6 tokens between your personal account and your group's account.

You can allocate all 6 tokens to your personal account, allocate some to your personal account and some to your group's account, or allocate all 6 tokens to your group's account. Please note that the value of each token you allocate to your personal account and the value of each token you allocate to your group's account are NOT the same. Each token allocated to your personal account is worth $1, while each token allocated to your group's account is worth $1.5. The money in your group's account will be evenly shared by the 3 members in your group.

After all your decisions have been submitted, we will randomly determine whether your decision or one of your 2 groupmates' decision counts. 1/3 of the time your decision will be used to determine the earnings in your group.

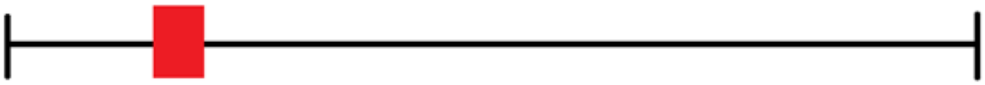
For example, if you decide to allocate 2 tokens to your personal account and 4 tokens to your group's account and your decision is randomly chosen, then you will receive 2 * $1 = $2 from your personal account and 4 *$1.5 / 3 = $2 from your group's account, which means that your total earnings in Stage 3 will be $2 + $2 = $4. Each of your two groupmates will receive 4 * $1.5 / 3 = $2 from the group's account.

If either of your 2 groupmates' decision is randomly chosen (let's call this groupmate A), then you and the other groupmate B will receive 1/3 of the money A allocates to the group's account, and A will receive 1/3 of the money he/she allocates to the group's account plus all the money he/she allocates to his/her personal account.

If you are ready, please click the "OK" button.

[Screen 15] Stage 3: Decision

Please drag the slider below to determine how many tokens you would like to allocate to your personal account and how many tokens you want to allocate to your group's account.



6 tokens to my personal account
0 tokens to my group's account

0 tokens to my personal account
6 tokens to my group's account

Number of token(s) I allocate to my personal account: 5
Number of token(s) I allocate to my group's account: 1

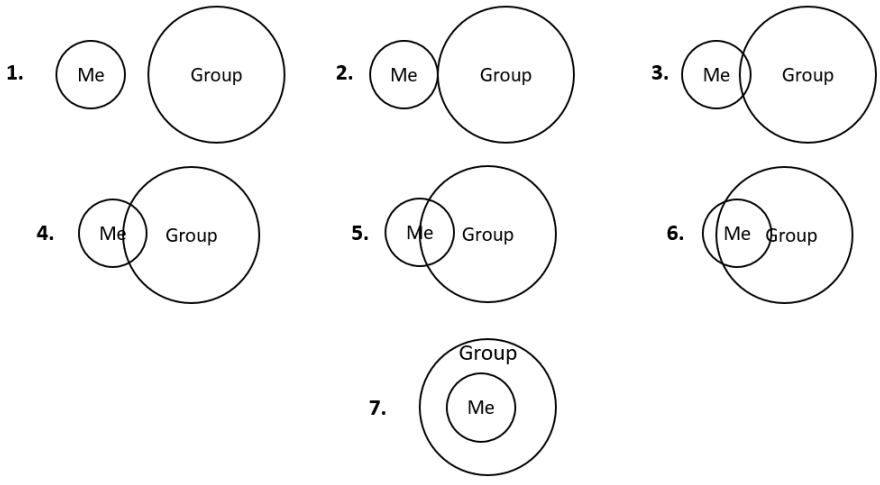
If my decision is randomly selected to determine my group's payoffs:

My payoff from my personal account ($): 5.0
My payoff from my group's account ($): 0.5
My total earnings ($): 5.5

Each groupmate's total earnings ($): 0.5

[Screen 16] Stage 4: Survey 1/3

Please indicate how you feel about the relationship between yourself and your Klee/Kandinsky group.



Please indicate how much you agree or disagree with each of the following statements. (1=strongly disagree, 2=disagree, 3=somewhat disagree, 4=neutral, 5=somewhat agree, 6=agree, 7=strongly agree)

I identify with being a member in the Klee/Kandinsky group.

I have a strong sense of belonging to the Klee/Kandinsky group.

[Screen 17] Stage 4: Survey 2/3

Please indicate how much you agree or disagree with each of the following statements. (1=strongly disagree, 2=disagree, 3=somewhat disagree, 4=neutral, 5=somewhat agree, 6=agree, 7=strongly agree)

I take pride in my performance in Competition 1 of Stage 2 (Intelligence Test).

I feel good about my performance in Competition 1 of Stage 2 (Intelligence Test).

[Screen 18] Stage 4: Survey 3/3

Please indicate how much you agree or disagree with each of the following statements. (1=strongly disagree, 2=disagree, 3=somewhat disagree, 4=neutral, 5=somewhat agree, 6=agree, 7=strongly agree)

I take pride in my Klee/Kandinsky group's performance in Competition 2 of Stage 2 (Intelligence Test)

I feel good about my Klee/Kandinsky group's performance in Competition 2 of Stage 2 (Intelligence Test).

[Screen 19] Final payment

In Stage 2, You won/lost Competition 1 against your opponent. Your Klee/Kandinsky group won/lost Competition 2 against the Kandinsky/Klee group.

In Stage 3, you/one of your groupmates' decision is randomly chosen to determine your group's payment. You/Your groupmate allocate(s) XX tokens to your/his/her personal account and XX tokens to the group's account.

Your payoff in Stage XX [2 or 3] is randomly selected.

Based on the results in Stage XX [2 or 3], your payoff in this experiment is $XX.

The show-up fee is $8.00.

Your final payoff in this experiment is $XX.