

The Effects of Personality on Group Identity and Interaction

Anantha Natalegawa

Colgate University

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Author Note

Anantha Natalegawa, Department of Economics, Colgate University

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Correspondence concerning this research paper should be addressed to Anantha Natalegawa, Colgate University Box S4730, 13 Oak Drive, Hamilton NY 13346. Email: anatalegawa@colgate.edu

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Abstract

Previous literature has demonstrated that people display the tendency to favor their ingroup to the detriment of the outgroup. Given this pattern of behavior and its potential implications on interactions within a workplace, it is a worthwhile endeavor to recognize the type of person that is more likely to form a group identity and demonstrate a bias towards own group members. Using experimental data on a person's willingness to share knowledge with ingroup/outgroup members and self-reported personality traits, this research paper sought to address this very question. Via a regression-based analysis, this paper found that some personality traits were able to explain a person's tendency to share knowledge with ingroup and outgroup members, and provides a useful framework for future studies.

Keywords: Group Identity, Personality, Ingroup Favoritism, Knowledge Sharing

I. INTRODUCTION

There exists a growing body of literature that suggests that interactions that take place between people are in no way homogeneous. Oftentimes, the manner in which we behave towards other individuals depends upon whether they belong to the same social group. The tendency to favor the ingroup to the detriment of the outgroup has been observed in multiple scenarios, including token allocation games in which real monetary incentives were provided. As such, there are real economic consequences to ingroup favoritism. The present research paper seeks to determine whether personality traits are predictive of a person's tendency to form a group identity, an endeavor that should allow one to recognize the type of person who is more likely to demonstrate a bias towards their own group members.

Before exploring the topic of personality and its relationship with group identity formation and ingroup bias, it is important first to understand the literature that brought group identity to the forefront of contemporary economics. In their study on the effects of induced group identity on social preferences, Chen and Li (2009) sought to determine whether participants, when divided into two groups, were more likely to reciprocate positively towards ingroup members than outgroup members and whether participants were more likely to choose social welfare maximizing actions when paired with an ingroup member instead of an outgroup member. In this experimental study, participants were divided into two groups via the utilization of a minimal group paradigm, a methodology designed to test whether assigning people to meaningless groups would elicit pro-ingroup bias. More specifically, Chen and Li divided participants into two separate groups solely on the basis of each participant's preference for paintings produced by either Wassily Kandinsky or Paul Klee (Chen & Li, 2009, pg. 436). Following this group assignment, participants were given the opportunity to reinforce the

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induced group identities via an online chat task and were then subjected to a token allocation task, in which each participant was instructed to distribute a given number of tokens between two other participants, and a series of two-person sequential games in which one participant was tasked with deciding the payoffs given to both him or herself and another participant. Results from both the token allocation tasks and sequential games indicated that participants often favored ingroup members at the expense of outgroup members. When given the opportunity to allocate tokens to two other people, participants demonstrated the tendency to allocate tokens equally under circumstances when those that received the tokens were either both members of the allocator's ingroup or both members of the outgroup. When participants were asked to allocate tokens to either a member of their ingroup or a member of their outgroup, it was found that they were between 32.2 percent and 38.4 percent more likely to allocate to the ingroup member. Similarly, in the two-person sequential games, participants were more likely to reward an ingroup match than an outgroup match for good behavior, more likely to forgive misbehavior on the part of an ingroup match than an outgroup match, and also significantly more likely to choose social welfare maximizing decisions when paired with an ingroup member. Via these findings, Chen and Li (2009) make it clear that firms must be aware of the effects of group identities on workers, such that firms are able to address situations in which ingroup favoritism amongst some employees comes at a cost to other employees and the overall welfare of the company, or conversely, are able to attempt to induce a strong group identity amongst all workers in order to foster an environment in which positive reciprocity and welfare maximizing decisions are common.

Chen and Li (2009) is by no means the only study to demonstrate group identity formation and a bias towards ingroup members. Ahmed (2007) formed groups on the basis of

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assignment to either a *heads* or *tails* group (and also based on participant participation in one session instead of another session), and found that participants consistently showed favoritism towards their ingroup during simple money allocation tasks and via increased cooperation in games such as the Prisoner Dilemma and Stag Hunt. Utilizing naturally occurring groups (i.e. those based upon body type, political views, nationality and religion) as opposed to those that are weakly induced, Ben-Ner (2009) analyzed differences in participant behavior towards ingroup and outgroup others. In keeping with extant literature, it was found that participants were more likely to favor ingroup members than outgroup members when prompted with questions about who they would rather share office space, work on a project and commute to work with. Finally, Bernhard, Fehr & Fischbacher (2006) sought to analyze whether similar patterns in behavior could be found amongst two existing native tribes in Papua New Guinea, and determined that a person was far more likely to strictly punish another if the victim in a given scenario was an ingroup member, suggestive of ingroup favoritism. These results were replicated between randomly assigned platoons in the Swiss army during a four-week training program (Goette, Huffman & Meier, 2006). These studies provide convergent evidence with Chen and Li (2009), and indicate that group identity formation and ingroup favoritism are by no means isolated phenomena that occur within a limited subset of the population. Given that this is the case, the significance of recognizing the personality characteristics of people who are more likely to embrace group identities and become biased towards ingroup members becomes all the more apparent.

The Mechanism behind Ingroup Favoritism

There are multiple theories that seek to explain why it is the case that people so readily form group identities and bias their actions towards ingroup members and away from outgroup

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members. Of these theories, the first to gain support amongst social psychologists was the Realistic Group Conflict Theory (R.C.T), which essentially posited that the ease with which we develop group identities and bias behavior in favor of the ingroup is largely a function of opposed group interests in obtaining scarce resources. As explained in Sherif (1966), the need to compete for resources with other groups creates conditions under which intragroup cohesiveness and cooperation must develop in order to ensure success in obtaining said resources. Thus, when faced with conflict between groups, it is expected that one should not only develop an antagonistic relationship with those in the outgroup, but also form a positive attachment to the ingroup. Our behavioral tendency to favor the ingroup thus arises primarily due to this positive attachment that forms over the course of competing with an outgroup.

The Realistic Group Conflict Theory remained the most popular explanation for ingroup favoritism until 1979, when later studies that made use of the minimal group paradigm revealed that the existence of conflict, or intergroup competition, was not necessary in forming a group identity and demonstrating ingroup favoritism. As emphasized in Chen and Li (2009), it was not the case that two groups necessarily needed to be competing for any resource for participants to positively bias a number of social preferences towards ingroup members and away from outgroup members. Finding evidence of ingroup favoritism even when inducing weak group identities by assigning membership on the basis of preferences for one painter over another, and then giving participants no motives to seek to outperform the other group, seems to suggest that there must be an alternative explanation for the type of behavior demonstrated by participants in Chen and Li (2009).

Developed in part due to converging evidence suggesting that an overt source of conflict between two groups was not necessary in inducing group identity formation and creating ingroup

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bias amongst participants, Social Identity Theory (S.I.T.) provided the amendments to R.C.T. that better explained the observed behavior of participants in Chen and Li (2009). According to S.I.T., ingroup favoritism is explainable by the following mechanism: A person's social identity, or sense of self, is largely derived from their perceived membership in a social group. These social groups, and being a member of them, are associated with positive and negative value connotations and as such, a person's social identity can either be positive or negative depending upon the evaluations of their group. Furthermore, it is thought that the evaluation of one's own group is predominantly a function of comparing it to relevant outgroups. The more favorable a comparison that can be made between one's ingroup and a relevant outgroup, the more positive one's social identity and sense of self is likely to be. As it is the case that individuals strive to maintain and enhance positive social identity, thereby maintaining and enhancing self-esteem, individuals will take action in order to make their ingroup more positively distinct (Tajfel & Turner, 1979). Ingroup favoritism arises, according to S.I.T., not because of a conflict between groups over resources but instead due to a desire to improve social identity and self-esteem by making one's ingroup comparably better than an outgroup. The incentive to maintain or enhance positive social identity is so great that even when assigned to arbitrary groups, the tendency to favor the ingroup persists.

Evidence in support of S.I.T. exists in experimental research undertaken by Turner, Brown & Tajfel (1979). Much like Chen and Li (2009), this study divided participants into groups on the basis of arbitrary preferences. Upon forming these groups, experimenters instructed participants to determine the payoffs (compensation for participating in the study) received by both their ingroup and an outgroup. Individual compensation was an equal share of the payoff awarded to his or her group, and as such, it was in each participant's self-interest to

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maximize ingroup profit. However, instead of pursuing the individually rational decision, participants demonstrated a tendency to select payoffs that maximized the difference in compensation received by the ingroup and the outgroup, even if it came a cost to their personal and ingroup gain. In exhibiting their willingness to sacrifice overall ingroup profit (and by extension, personal profit) in exchange for widening the gap between their ingroup and a relevant outgroup, participants engaged in behavior that confirmed the viability of the S.I.T.

At this junction of the research paper, it should be evident that group identity formation and the resulting ingroup favoritism is an oft-observed pattern of behavior that is explainable by S.I.T. In order to explore the possibility that differences in personality play a role in these tendencies, it is important first to discuss the existing literature on personality and group identity formation.

The Role of Personality?

Literature on the influence of personality on group identity formation is, at this moment in time, relatively sparse. In its research on the motives behind choosing to identify with groups and favoring in-group members, Weber, Johnson & Arceneaux (2011) grants some of the limited insight into the relationship between personality traits and the tendency to form a group identity. Unlike previously described literature that explained that group identity formation and ingroup favoritism is largely attributable to a need to maintain or enhance positive social identity and self-esteem, Weber, Johnson & Arceneaux (2011) sought to explain the extent to which the tendency to display these patterns of behavior were attributable to genetics. It was their anticipation that choosing to identify with a group is substantially influenced by genes and as such, a person's genetic make-up could predict their willingness to form a group identity and favor ingroup members. Crucially, the study also made an attempt to determine whether this

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expected genetic basis for group identification related behavior was shared with the genetic underpinnings of the Big Five personality traits, openness to experience, agreeableness, extraversion, neuroticism and conscientiousness. Using a Twin study, in which differences in similarity between monozygotic and dizygotic twins is thought to reveal the genetic heritability of a given trait or pattern of behavior, researchers found that individual differences in in-group orientation are largely attributable to genetic factors and that a large proportion of the variation in religious, ethnic and racial identification can be accounted for by genes. Particularly significant for the purposes of this research paper were further results that indicated that these genetic factors that account for in-group orientation were moderately associated with the genetic underpinnings of personality traits, and the conclusion that there exists a moderate influence of personality traits on the genetic variation in group identification tendencies.

Winterich, Mittal and Ross Jr. (2009) provide support for the idea that personality influences an individual in their decision to favor ingroup members. Like previous studies that attempted to determine the differences in money allocation dependent upon whether the recipient belonged to an ingroup or an outgroup, Winterich et al. (2009) explored the differences in participant donation behavior in response to a request for assistance from a Hurricane Katrina victim relief fund (Ingroup) or a relief fund for victims of the Indian Ocean Tsunami (Outgroup). Most importantly, the study also analyzed the effects of moral identity on participant decision-making and judgments, and found that female participants who scored highly on moral identity (and were thus individuals who viewed moral identity as being very important) were more likely to donate to the outgroup than the ingroup. In this instance, it can be seen that personality is correlated with a participant's willingness to favor one group over another. As such, there

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appears to be sufficient evidence to suggest that one can come to uncover the personality traits that correlate with a tendency to display ingroup favoritism after forming a group identity.

Based upon the findings of Weber, Johnson & Arceneaux (2011) and Winterich, Mittal and Ross Jr. (2009), this research paper hypothesizes that certain personality traits will correlate with the tendency to favor the ingroup. While previous experiments have revealed that people bias their actions towards ingroup members upon forming a group identity, none have sought to explore the type of person that is more inclined to engage in such actions. This research paper contributes to the literature by investigating potential relationships between personality traits and ingroup favoritism, thereby providing some understanding to the profile of individuals who exhibit the ingroup favoring pattern of behavior.

II. MODEL 1

Experimental Design

The experimental design addresses the following objectives: to determine the relationship between personality traits and the tendency to favor ingroup members. It is important to note that this experimental design was developed by Professor Takao Kato of Colgate University and Professor Marie Claire Villeval of the University of Lyon, to address the objective of determining whether group identity influences an individual's willingness to share knowledge with others. The original data set developed in addressing this original objective contains 2736 data points collected from a sample of 198 students. As such, conditions and details relevant to the original objective of the experimental design will not be elaborated upon in this description. For example, the original experimental design warranted the use of six separate treatments. In addressing its objective, this research paper only utilized data relevant to two of the treatments.

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As described above, this experiment had six treatments. Of these six, two will be analyzed in this section of the research paper. Both of these treatments involved a two-stage process. In the first stage of the experiment, participants were assigned to one of two groups. As was the case in Chen and Li (2009), the group assignment method involved the use of minimal group paradigm in which participants were instructed to view five pairs of paintings by Wassily Kandinsky and Paul Klee. Each pair consisted of one painting from each artist and participants were not informed as to which painting belonged to which artist. Participants were told to independently indicate which painting in each pair they preferred and on the basis of their reported preference for one artist's paintings over another, were separated into either a Klee or Kandinsky group. Two experimental treatments involved the assignment to a group based in painting preference (Painting Group Identity treatment, or PGI). Two other treatments did not include the group assignment stage and moved directly onto the second stage (No Group Identity Treatment, or NGI). The NGI Treatments were not included in the estimation of Model I. Finally, another two treatments were not analyzed in this model, namely, Country Group Identity Treatment, in which participants were divided into two groups on the basis of being a student either at the University of Lyon or Colgate University. Inherent differences in personality traits that may exist between students of these universities make it difficult to include these treatment types in the current analysis.

In the second stage of the experiment, participants were organized into triads. In the case of PGI treatments, a participant was either organized into triads with two ingroup members, two outgroup members or one ingroup and one outgroup member. Participants in each triad were anonymous to one another, and the only information that they were permitted to see about one another was membership to either the Klee group or Kandinsky group. Each participant in the

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triad was seated in front of a computer monitor and asked to complete a relatively simple task, namely, using the mouse to drag items on the monitor into a basket in the corner of the screen during a given period of time. The more items dragged into the basket, the higher a participant's score. Participants were informed that their compensation for taking part in the experiment was directly related to how highly they scored on this task. In every triad, two participants were given information pertaining to the existence of certain items on the monitor that could not be dragged into the basket (Role A participants). These participants were given the opportunity to share this knowledge, via computer interaction, with the third member of the triad (Role B participant), but only if they were willing to accept a penalty to their score for doing so. Sharing the knowledge with the other participant was expected to help them perform the task more effectively. Each participant took part in 12 sessions, stayed in the same role throughout each session, was not informed of their scores until experiment completion and interacted with different triad matches in each session. Finally, it should be noted that participant compensation was further determinant upon the type of pay scheme imposed. Under group incentive pay scheme, a participant's compensation was based upon the overall performance (score) of the triad. Under piece rate pay scheme, a participant's compensation was based on their individual performance. Half of the participants were exposed to six sessions of group incentive pay followed by six sessions of piece rate, and the other half were exposed to the opposite order. Given that group identity formation and ingroup favoritism tends to be masked by group incentive pay schemes, this research paper will focus more upon sharing behavior under piece rate.

Participants were also instructed to fill out a NEO-Five Factor Index questionnaire. This 60 item questionnaire was designed to test the extent to which a person can be said to be high or low on the Big Five Personality traits: openness to experience, agreeableness, extraversion,

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neuroticism and conscientiousness. Participants were asked to indicate the extent to which they disagree or agree with statements such as “I like to have a lot of people around me”. Their responses are coded and tallied into a score for each of the five personality traits. See Appendix A for a list of all 60 questions/statements, as well as the coding scheme used to calculate an individual’s score on each of the Big Five Personality Traits. Whilst these five personality traits do not account for all the variance in personality differences, it is generally accepted that they “represent broad domains” that “summarize the vast majority of subsidiary traits” (Weber, Johnson & Arceneaux, 2011; Mondak et al., 2010).

In sum, this research paper focuses upon data taken from the PGI treatments. In addressing the objective of this experimental design, the present study analyzed the relationship between participant scores on these personality traits and their propensity to share knowledge with ingroup or outgroup others during the item dragging task.

Model Specification:

In order to reveal the relationship between the Big Five personality traits and the propensity to share knowledge with ingroup/outgroup others, the following probit regression equation was utilized. The dependent variable in this regression, knowledge sharing, or *send*, is dichotomous, where *send* = 1 if the participants shared knowledge and 0 if otherwise.

$$\Pr(\textit{send})_i = \beta_0 + \beta_1 \textit{Payscheme}_i + \beta_2 \textit{OrderofPayscheme}_i + \beta_3 \textit{Gender}_i + \beta_4 \textit{GroupMembershipofOther}_i + \beta_5 \textit{Age}_i + \beta_6 \textit{PersonalityTrait}_i + U_i$$

Four dummy variables are presented as explanatory variables; *PayScheme*, where *PayScheme* = (piecerate-1)*-1, *OrderofPayScheme*, where *OrderofPayScheme* = (pieceratefirst-1)*-1, *Gender*, where *Gender* = 1 if the participant is a male and 0 if otherwise, and

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GroupMembershipofOther, where *GroupMembershipofOther* = 1 when the recipient of the knowledge is in the same group as the participant and 0 if otherwise. The relationship between knowledge sharing and personality traits is captured by the explanatory variable *PersonalityTrait*, where a participant's score on the Neo-Five Factor Index on a given trait was entered. Separate probit regressions were performed for each of the five personality traits.

The preceding paragraph described the variables of interest in Model I. Prior to discussing the results of the estimation of Model I, it is important to take note of the summary statistics of said variables of interests. The summary statistics presented in Table 1 (see page 38) provide a point of reference that allows for easier interpretation of the magnitudes of effect that the explanatory variables have on the probability of sharing knowledge.

III. RESULTS

This section analyzes the relationship between participant scores on the Big Five personality traits and their propensity to share knowledge with ingroup or outgroup others during the item dragging task. The null hypothesis in pursuing this analysis is that there is no statistically significant difference in personality trait scores of participants who decided to share knowledge with their ingroup and those who did not share knowledge with their ingroup. Similarly, the null hypothesis predicts that there is no statistically significant difference in personality trait scores of participants who decided to share knowledge with their outgroup and those who did not share knowledge with their outgroup. For all results presented in this section, a 5 percent statistical significance level is used as the threshold to establish the significance of effect. Table 2 presents the results of a probit regression that included neuroticism as its explanatory personality trait variable.

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As can be seen in Table 2, neuroticism does not account for a significant portion of the variation in knowledge sharing, with a statistically insignificant ($p = 0.12$) estimated coefficient of -0.023 . Furthermore, the marginal effect of neuroticism after probit (dy/dx) is equal to -0.008 , indicating that $Pr(\text{Send})$ decreases by 0.008 probability points per unit increase in reported neuroticism scores. Similarly insignificant results are demonstrated in each of the separate probit regressions with different explanatory personality traits, as demonstrated in Table 3.

In all of the regressions, the majority of the variability in knowledge sharing can be attributed to the type of pay scheme and the order in which the pay scheme type was presented to participants. As is demonstrated in Table 2, results indicate that when under conditions of group incentive pay, participants are more likely to engage in knowledge sharing with others than when under conditions of piece rate. This finding is not surprising given that under group incentive pay schemes it is in the participant's personal interest to share knowledge with others in his/her triad, as doing so allows for greater efficiency in completing the dragging task, which in turn should improve overall group score and thus increase individual compensation (a function of overall group score under group incentive pay conditions). Theoretically, under piece rate participants have no incentive to share knowledge. All regressions demonstrated a marginally significant (at the 10% level) relationship between the order of pay scheme participants were exposed to and tendency to share knowledge, in that participants that were exposed to piece rate prior to group identity pay were more likely to share knowledge than those that were exposed to the opposite order.

This research paper demonstrated that in all regressions, the membership of the knowledge recipient did not account for a statistically significant proportion of the variance in the probability of sharing knowledge. In the case of the regression that included neuroticism

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scores as an explanatory variable, the fact that the recipient was an ingroup member increased Pr (Send) by .027 probability points as compared to if the recipient was an outgroup member. Similar results were demonstrated across all five personality traits, suggesting that a person's level of neuroticism, agreeableness, openness to experience, conscientiousness and extraversion plays no significant role in their decision to favor the ingroup and form group identity. It is important to note that in general, no ingroup favoritism was displayed amongst participants in the Klee and Kandinsky groups, as demonstrated in the lack of a significant correlation between the group membership of the knowledge recipient and the tendency to share knowledge (see Table 4), even when personality traits are not taken into consideration.

The results of the regression-based analysis are not in keeping with t-tests performed to demonstrate the differences in personality traits between those who decided to share knowledge and those who didn't. Performed as a preliminary test of the relationship between personality traits and sharing behavior, these t-tests took into consideration all data points regardless of treatment type and found that there were significant differences in neuroticism scores between those who shared knowledge ($M=33.79$, $SD= .19$) and those who didn't share knowledge ($M=33.21$, $SD = .16$), $t(1582) = 2.28$, $p = 0.026$. There was also significant difference in openness to experience between those who shared knowledge ($M=36.43$, $SD=.15$) and those who didn't ($M=37.17$, $SD=.12$).

IV. MODEL II

In response to the robust effect of pay scheme on an individual's decision to share knowledge, this research paper sought to establish a new model capable of determining if taking into consideration only one pay scheme would reveal a significant relationship between

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personality traits and knowledge sharing. Preliminary t-tests on the entire dataset containing 2736 observations seemed to suggest that differences in personality traits would correlate with differences in knowledge sharing behavior. As with the previous model, the analysis was based upon the data set from the work of Professor Takao Kato and Professor Marie Claire Villeval. However, in order to ensure that the role of the type and order of the pay scheme played in the knowledge sharing decision was mitigated, only the observations made under piece rate conditions were analyzed. In dropping all the instances in which participants were subjected to group pay scheme from the data set, half of the observations were no longer taken into consideration. This, in conjunction with dropping all observations in which the participant played role B and thus was the receiver of knowledge instead of the sender, resulted in a total of 528 observations to be analyzed by this particular model.

Prior to performing any regressions using the revised model (Model II), this study first made use of descriptive statistics to determine whether or not the newly constructed sample of 528 observations was worth analyzing. To do this, t-tests on the differences in mean personality traits scores between individuals who shared and individuals who didn't share were performed. As can be seen in Table 5, there exists a significant difference in scores on four of the five personality traits between individuals who decided to share knowledge and those that didn't. As such, it would appear as if this sample is suggestive of inherent differences in personality between people who decide to share and those that don't and based upon this preliminary finding, this research paper concluded that it was a worthwhile endeavor to pursue the estimation of Model II to discover whether the effect of personality on knowledge sharing differs depending upon the group membership of the knowledge recipient.

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Returning to the description of the model specification and the sample from which the model is to be estimated, it is important to note that unlike this research paper's initial regression, Model II utilized four of the different treatment types in order to compensate for the loss of observations brought about by dropping all the group pay scheme data. It was previously described in Section II that treatments that involved a division into groups on the basis of being a student either at the University of Lyon or Colgate University might be difficult to analyze given that there may exist inherent differences in personality traits and sharing tendencies between students of these universities. In order to take this into consideration, the second model introduced a dummy variable *University*, where $University = (Lyon - 1) * -1$, and thus $University = 1$ when the participant is a Colgate student and $University = 0$ when the participant is a University of Lyon student.

In sum, this revised model focuses upon data taken from four treatments under only piece rate conditions. Group incentive pay schemes were no longer included in the analysis, primarily because under said pay scheme the participant's motivation to share is likely directly related to increasing their own level of compensation and as such, focusing on only piece rate observations should allow one to reveal the relationship between personality traits and the propensity to share knowledge with ingroup and outgroup others under conditions when they should have no incentive to share knowledge. Under piece rate pay schemes, any sharing that takes place is thus more likely to be a function of differences in personality traits and ingroup favoritism than is the case under group pay schemes, where sharing may largely be a function of trying to accrue the greatest personal gain. Upon running a preliminary regression to determine whether an analysis of only piece rate observations demonstrated a significant relationship between personality traits

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and knowledge sharing tendencies, a *University* dummy variable was introduced, resulting in the following probit regression equation:

$$\text{Pr}(\text{send})_i = \beta_0 + \beta_1 \text{University}_i + \beta_2 \text{PersonalityTrait}_i + \beta_3 \text{Gender}_i + \beta_4 \text{Age}_i + \beta_5 \text{GroupMembershipofOther}_i + U_i$$

As with the previous model, the dependent variable in this regression is knowledge sharing, where $\text{send} = 1$ if the participants shared knowledge and 0 if otherwise. It can also be seen that the previously used dummy variable *Payscheme* was no longer included in the regression because it no longer applied to a sample in which only one type of pay scheme (piece rate) was observed and taken into consideration. Once again, the relationship between knowledge sharing and personality traits is captured in the *PersonalityTrait* variable, where a participant's score on the Neo-Five Factor Index on a given trait was entered. The summary statistics of the variables of interest used in Model II can be seen in Table 6.

As an aside, one might notice that *OrderofPayScheme* was also no longer included in the regression, as the primary concern of this research paper was to determine the effect of personality traits on knowledge sharing and any differences in knowledge sharing between ingroup and outgroup others. With that said, this research paper recognizes that *OrderofPayScheme* may continue to influence participants even if all participants being analyzed were completing the task under piece rate pay scheme conditions, in that being exposed to group incentive pay scheme before the piece rate may result in different sharing tendencies than not being exposed to the group incentive pay scheme prior to the piece rate conditions. Thus, after the initial estimation of Model II, this research paper included *OrderofPayScheme* in the regression to observe whether or not results changed significantly. It was found that the effect of personality traits on knowledge sharing was not sensitive to *OrderofPayScheme*, and as such, the

results from the initial estimation without *OrderofPayScheme* are presented in the following section.

After running this regression for each of the personality traits, a further splicing of the data set took place to establish knowledge sharing tendencies when specifically interacting with either an ingroup or outgroup other. The previous regressions sought to determine the relationship between knowledge sharing behavior and personality traits. In order to understand whether these relationships differed depending upon the group membership of the knowledge recipient, two separate regressions were performed for each personality trait. In one of these regressions, all observations in which the knowledge recipient was a member of the outgroup were dropped from the data set, thus creating a model in which a participant's tendency to share knowledge with ingroup members is observable. Similarly, in the other regression, all observations in which the knowledge recipient was a member of the ingroup was dropped from the data set, thus creating a model in which a participant's tendency to share knowledge with outgroup members is observable. In both cases, a total of 264 observations (half of the 528 observations utilized in Model 2) were analyzed.

V. RESULTS II

As previously described, this research paper sought to analyze the relationship between participant scores on the Big Five personality traits and their propensity to share knowledge with ingroup or outgroup others during the item dragging task, under conditions of piece rate. As such, a preliminary regression in which group pay scheme observations were dropped from the data set and pay scheme variables were thus no longer included/necessary was performed for each of the five personality traits. Table 7 presents the results of a probit regression that included

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neuroticism as its explanatory personality trait variable. As can be seen in Table 7, neuroticism accounts for a significant portion of the variation in knowledge sharing, with a statistically significant ($p = 0.03$) estimated coefficient of .027.

This finding is in contrast to the results of the initial model (Model I), which demonstrated an insignificant relationship between the same personality variable and knowledge sharing. With that said, the marginal effect of neuroticism after probit (dy/dx) is still relatively small (.008), indicating that on average the probability of sharing knowledge increased by 0.008 probability points per unit increase in reported neuroticism scores. A similar trend is visible in each of the separate probit regressions with different explanatory personality variables, as is demonstrated in Table 8.

With the exception of conscientiousness and extraversion (which has a marginally significant relationship with knowledge sharing, $p = .10$), the personality traits demonstrate a significant relationship with the probability of knowledge sharing. More specifically, a participant that self reports high neuroticism is significantly more likely to share knowledge. The same can be said of participants who self report high agreeableness. Furthermore, there exists a significant negative relationship between openness to experience and knowledge sharing tendencies, such that the higher one's self reported openness to experience is, the lower the probability that one shared knowledge ($p = .00$). Based upon these promising preliminary findings, there exists a substantial incentive to further explore the differences in knowledge sharing based upon personality traits. Before analyzing the effects of knowledge sharing dependent on whether the recipient was an ingroup or outgroup other, it was important to first address the possibility that differences in sharing tendencies might be explainable by inherent differences between the students of Colgate University and the University of Lyon. As such, the

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University dummy variable was introduced and as with before, the resulting neuroticism regression will be used as an example, demonstrated in Table 9.

As can be seen in Table 9, the introduction of the *University* variable rendered the effect of neuroticism on knowledge sharing marginally significant (estimated coefficient = .020, $p = 0.10$). Much like the robust effect of pay scheme on knowledge sharing probability in the original model and set of regressions, of the explanatory variables, a participant's university affiliation accounted for the majority of the variation in knowledge sharing tendencies. Based upon the reported marginal effects (dy/dx) of *University*, being a student at Colgate as opposed to being a student at the University of Lyon increased the probability of a participant sharing knowledge with another by .287 probability points. In other words, there was on average a .287 probability point difference in the knowledge sharing tendencies of Colgate and Lyon students. Similar patterns of results were found with the other Big Five personality traits, as demonstrated in Table 10.

With the exception of extraversion ($p = 0.03$), none of the personality traits accounted for a significant proportion of the variance in knowledge sharing when *University* was introduced as an explanatory variable. In all of the regressions, the majority of the variability in knowledge sharing can be attributed to university affiliation. As demonstrated in Table 9, participants from Colgate University were more likely to share knowledge with others in his/her triad during the item-dragging task than their counterparts at the University of Lyon. With that said, the marginally significant nature of the effect of neuroticism ($p = 0.10$) and openness to experience ($p = 0.12$), and the statistically significant relationship of extraversion on knowledge sharing tendencies, such that the more extraverted a participant self reports being, the lower their probability of sharing knowledge with others, seem to suggest that there exists merit and purpose

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in seeking to further distinguish whether these relationships differ depending upon the group membership of the knowledge recipient. In other words, this research paper hoped to determine whether, for instance, a statistically significant relationship between a personality trait and the propensity to share knowledge only exists when a participant is sharing with an ingroup member. Table 11 details the results of a probit regression in which participants were given the opportunity to share knowledge with ingroup members, and a separate probit regression in which participants were given the opportunity to share knowledge with outgroup members.

There are several interesting results demonstrated in Table 11. Firstly, when separating observations on the basis of the knowledge recipient's group membership, neuroticism exhibits a significant positive relationship with knowledge sharing probability even when including the *University* explanatory variable. This significant positive relationship, which seems to dictate that participants with higher levels of neuroticism were significantly more likely to share knowledge holds true both in scenarios when they were sending the knowledge to ingroup members and also when they were sending the knowledge to outgroup members. From this, one can posit that while neuroticism plays a significant role in knowledge sharing tendencies, it is not significantly related to the development of ingroup favoritism. In other words, being highly neurotic doesn't predispose an individual to share with an ingroup more than an outgroup, it simply predisposes an individual to share more in general.

Furthermore, Table 11 demonstrates that there exists a significant relationship between openness to experience and knowledge sharing tendencies only when a participant is sharing with his/her ingroup. In other words, when sharing knowledge with others, an individual's level of openness to experience becomes a significant factor if making the decision to share with an ingroup member. Results indicate that a participant who scored highly on the openness to

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experience is less likely to share knowledge with an ingroup member than a participant who scored low on the same measure. A similar, though only marginally significant relationship was demonstrated when participants needed to decide whether to share knowledge with outgroup members. As a brief aside, one might wonder as to how the openness to experience variable had a significant effect on knowledge sharing with ingroup others, and a marginally significant effect on knowledge sharing with outgroup others, when it had been previously shown to have no significant effect on knowledge sharing when the sample of 528 observations had not yet been spliced (see table 10). The intuition behind this type of a finding is relatively straightforward. When the 528 observations are separated into two separate groups, one in which participants interacted with ingroup members and the other in which participants interacted with outgroup members, one observes a significant negative relationship between openness to experience and knowledge sharing in each of the two groups. However, when these groups are observed together and the sample of 528 observations is used in the model estimation, the combination of data points from the two sample groups demonstrate a more scattered pattern that renders the significant negative relationship observed separately, insignificant. In other words, an aggregation of the significant negative relationships between openness to experience and knowledge sharing in the ‘interact with ingroup other’ and ‘interact with outgroup other’ subsamples results in a flatter regression line that is suggestive of an insignificant effect of openness to experience on knowledge sharing. The fact that in Table 10, the direction of the relationship between openness to experience and knowledge sharing is negative seems to indicate that this reasoning is correct.

Finally, the findings in Table 11 seems to suggest that there exists some difference in the significance of agreeableness on knowledge sharing tendencies depending upon whether the

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participant was sharing with an ingroup or outgroup other. Whilst an extremely significant relationship is achieved in neither of the two scenarios, a marginally significant ($p = 0.06$) relationship between agreeableness and the probability of sharing knowledge was observed when participants were sharing with ingroup members. In short, a participant who scored highly on agreeableness was marginally significantly more likely to share with an ingroup member. The same cannot be said about sharing with outgroup members. An even more stark difference in the role of personality traits on knowledge sharing between ingroup and outgroup sharing scenarios can be seen in the conscientiousness results. When sharing with ingroup members, the role of conscientiousness level on the propensity to share knowledge is extremely insignificant ($p = 0.99$), whereas when sharing with outgroup members, the role of conscientiousness level on the propensity to share knowledge is insignificant, but to a much smaller extent ($p = 0.18$). In any case however, the lack of significant results for these variables doesn't allow this research paper to conclude whether or not the existence of a difference in the extent of insignificance points to a differing importance of a personality trait level on knowledge sharing dependant upon the group membership of the recipient. For example, one cannot claim that a person's conscientiousness level is relatively more important when he/she must decide to share with an outgroup other, based upon the findings in Table 11.

In sum, Table 11 demonstrates two definite significant results: 1. Neuroticism is significantly related to knowledge sharing behavior and this relationship is essentially the same regardless of the group membership of the recipient. 2. An individual's openness to experience is significantly related to their tendency to share knowledge with another, but only when that other person is an ingroup member.

VI. MODEL III

Having previously found in Model II that there exists some evidence to suggest that differences in some of the Big Five Personality Traits can explain a significant portion of the variation in knowledge sharing with ingroup or outgroup others, this research paper explores one final avenue in seeking to comprehensively uncover the relationship between personality and group identity formation. More specifically, it may be the case that the Big Five personality traits mediate other variables that influence group identity formation and ingroup bias. To explore whether or not this is true, some tentative work was undertaken. A preliminary regression was performed to analyze whether other personality-related traits such as trust could explain the variation in knowledge sharing behavior, and it was found that trust accounted for a significant proportion of said variation in a person's tendency to share knowledge (estimated coefficient from the probit regression = .102, $p < 0.0001$, $dy/dx = .0284$). In this data set, trust was coded on a scale of 1 to 10, in which 1 corresponded to a response indicative of a belief that "most people cannot be trusted" and 10 corresponded to a response indicative of a belief that "most people can be trusted". As the magnitude of the effect of trust on the probability of sharing knowledge with others was far greater than that of the effect of any of the Big Five personality traits, there exists reason to believe that the true effect of personality on knowledge sharing with ingroup or outgroup others occurs via its mediation of trust. Model III tests this idea by including an interaction term between one of the Big Five personality traits and the trust variable in a probit regression in which the dependent variable is the propensity to share knowledge with others. As such, the specific regression model is defined by the following equation:

$$\Pr(\text{send})_i = \beta_0 + \beta_1 \text{University}_i + \beta_2 \text{Gender}_i + \beta_3 \text{Age}_i + \beta_4 \text{Trust}_i + \beta_5 \text{PersonalityTrait}_i + \beta_6 (\text{PersonalityTrait} * \text{Trust})_i + U_i$$

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The model equation is similar to that which was used in Model II, with the exception that the *trust* variable and an interaction of personality trait by trust variable were added. As previously mentioned, a participant's *trust* score was determined via a self-report response in which on a scale of 1 to 10, the lower the score, the less trusting of others the participant was. A separate regression was performed for each of the five personality traits, and as such the interaction term took on the form of *agreeableness*trust*, *extraversion*trust*, *conscientiousness*trust*, *openness to experience*trust* or *neuroticism*trust*. The 'stand-alone' personality trait included in the model (β_5 *PersonalityTrait*) was always the same as the Big Five personality trait that was used in the interaction term. For each of these five variations of Model III, two initial regressions were performed; one regression to test ingroup knowledge sharing and the other to test outgroup knowledge sharing. To test whether personality traits mediated the effect of trust on group identity formation and ingroup bias, the differences in the effect of the interaction term on knowledge sharing with ingroup others and knowledge sharing with outgroup others were examined. A total of 264 observations were analyzed in each of these regressions. Finally, this study also performed an estimation of this model on the entire sample of participants who were asked to complete the computer task under a piece rate pay scheme (n = 528), to serve as point of reference for the other regressions. As this sample includes both ingroup and outgroup scenarios, the *GroupMembershipofOther* variable was reintroduced for this particular estimation.

VII. RESULTS III

As previously explained, the purpose of Model III was to determine whether or not the Big Five Personality traits mediate the effect of trust on group identity formation and ingroup bias. Being able to draw a conclusion in regards to this notion is dependent upon the nature of

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the effect of the interaction term (personality trait*trust) on the propensity to share knowledge, and whether this effect differs when the knowledge is shared with either outgroup or ingroup others. Table 12 presents the results of the estimation of Model III when the entire sample of piece rate pay scheme was included in the analysis. These results can be thought of as determining the effect of the interaction terms on knowledge sharing probability, without taking into consideration who the knowledge is being shared with. Having already determined whether each of the Big Five personality traits and *trust* has a significant marginal effect on the probability of sharing knowledge with another person, the results in Table 12 focus only upon the interaction terms.

As can be seen in Table 12, only two of the five interaction terms, *openness to experience*trust* and *conscientiousness*trust* are statistically significant (assuming that alpha = 0.05), both with p values of .003. Thus, when analyzing the effects of an interaction between Big Five personality traits on knowledge sharing when taking the entire sample of piece rate pay participants into consideration, it would appear as if only *openness to experience* and *conscientiousness* significantly influence the effect of trust on knowledge sharing. In Section V, it was determined that the negative effect of openness to experience on knowledge sharing probability was marginally significant (p value = .12) when the sample was not divided to separate Ingroup sharing scenarios and Outgroup sharing scenarios, and extremely significant when just taking into consideration sharing with Ingroup others (p value = .03). This study previously explained that a person who scores highly on the *openness to experience* measure is less likely to share with others, particularly when the other is an Ingroup member. At the same time, when a person scores highly on *trust*, they are more likely to share with Ingroup and Outgroup others. To interpret the interaction between the two variables, one must taken into

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account that when including this interaction term, the marginal effect of trust on the probability of sharing knowledge is given by (assuming that the model is given by the equation presented in Section VI):

$$\frac{\delta \Pr(\text{Send})}{\delta(\text{Trust})} = \beta_4 + \beta_6(\text{PersonalityTrait}),$$

We know from previous analysis that there exists a positive relationship between trust and knowledge sharing probability, and would thus expect that in most regressions, the coefficient on the *trust* variable to be positive. Though not reported in Table 12, this was the case for each of the regressions with different personality traits and *PersonalityTrait*trust* interactions. Given that Beta4 (the coefficient on *trust*) is positive, when Beta6 (the coefficient on the interaction term) is negative an increase in the personality trait is expected to decrease the marginal effect of trust on knowledge sharing probability. To a person who is very open to new experiences, trust is relatively less important to their decision to share or withhold knowledge, compared to a person who is extremely cautious, and less open to experiences.

A similar result was found in the regression including *conscientiousness* as its Big Five personality trait of interest, (coefficient on *conscientiousness*trust* = -.028). As such, one can conclude that to a person who scores highly in conscientiousness, trust is relatively less important to their decision to share or withhold knowledge, compared to a person who has a low conscientiousness score.

Beyond these initial findings on the effect of interaction terms on the entire sample of participants who were subjected to a piece rate pay scheme, this study hoped to determine whether or not these interaction terms influenced the probability of sharing knowledge

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differently when either sharing knowledge with Ingroup others or Outgroup others. Table 13 demonstrates the results of estimating the interaction term inclusive model when separately analyzing those who interacted with Ingroup members and those who interacted with Outgroup members.

Table 13 presents several interesting findings. First and foremost, it can be seen that in terms of economic significance, the interaction of the personality trait and trust tends to have a slightly smaller effect on the probability of sharing knowledge than the un-interacted personality trait variable. In Table 8, with the exception of conscientiousness in the sharing with Ingroup others condition, the personality traits have a magnitude of effect ranging from -.011 to .007. As can be seen in Table 10, the magnitude of effect of the interaction terms on knowledge sharing range from -.003 to .005.

Though several of these effects of the interaction term on knowledge sharing are statistically significant, the lessened (or at the least comparable) economic significance that occurs in conjunction with using interaction terms seems to dispel the notion that the **primary** way in which the Big Five personality traits affect group identity formation and ingroup bias is through mediating trust. In other words, personality traits seem to account for as much as if not more of the variation in knowledge sharing with ingroup or outgroup others when they are included in the regression model independently as opposed to being included in an interaction term with another variable (*trust*).

With that said, there are significant results in this model that are worth discussing. The interaction term *agreeableness*trust* had a statistically significant (at the 5% level) positive relationship with knowledge sharing, and this relationship was more or less identical between the

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Outgroup and Ingroup sharing conditions. The positive coefficient on the interaction term in both the outgroup and ingroup conditions suggests that to a person that is extremely agreeable, trust is relatively more important to their decision to share or withhold knowledge, compared to a person who doesn't score as highly on the agreeableness measure. This conclusion implies that the effects of agreeableness and trust on the propensity to share knowledge are complementary, such that having high scores on these measures simultaneously increases the probability of knowledge sharing above and beyond the increase expected from the robust positive effect of being trusting and the marginally significant positive effect of being agreeable independently have on knowledge sharing. At the same time, however, agreeableness does not seem to impact the effect of trust on ingroup bias and group identity formation, in that the interaction of *agreeableness*trust* has a similar effect on knowledge sharing in both the ingroup and outgroup sharing conditions.

Finally, Table 13 demonstrates that the effect of an interaction between *neuroticism* and *trust* on knowledge sharing probability differs depending upon whether the knowledge was being shared with ingroup or outgroup others. When knowledge is being shared with ingroup others, there is a statistically significant positive effect of *neuroticism*trust* on knowledge sharing, such that a one unit increase in this interaction term is associated with a .003 increase in the probability of sharing knowledge. There is no statistically significant (at the 5% level) effect of this interaction term when knowledge is being shared with outgroup others ($p = .106$). As such, the impact of *neuroticism* on *trust* is only apparent when the participant is sharing knowledge with ingroup others. For a person who is extremely neurotic, trust is relatively more important to their decision to share or withhold knowledge, compared to a person who is less neurotic and is more emotionally secure and confident.

VI. CONCLUSION

It its inability to demonstrate that personality traits account for a significant proportion of the variance in a participant's tendency to share knowledge, this initial findings of this research paper were unable to reject the null hypothesis. In truth, the findings of this research paper are not in keeping with previous literature that suggests that people demonstrate group identity formation and ingroup favoritism when assigned to arbitrary groups.

In the case of Model I, the lack of an effect of personality on knowledge sharing can largely be explained by the robust effect of pay scheme on knowledge sharing decisions. The incentive to either share or not share knowledge, depending upon whether doing so came at a gain to personal compensation seems to have overpowered any effects of group identity formation, and the personality traits that may predict a person's tendency to form said group identity. Unlike Chen and Li (2009) and Turner, Brown & Tajfel (1979), participants in the present study did not demonstrate a preference for one group over another, and were predominantly motivated by the strategy that resulted in the greatest amount of personal compensation (i.e. sharing more under group incentive pay). Perhaps, if group identities were more strongly induced and participants were given the chance to reinforce group identities via an online chat task similar to Chen and Li (2009), this experimental study would have yielded different results. Allowing participants to reinforce their identities as members of either the Klee or Kandinsky group might have created an incentive to associate with their ingroup and display ingroup favoritism capable of overpowering the motive to achieve maximum personal profit. In turn, a more clearly pronounced tendency to favor the ingroup might allow for an identification of the personality traits that predict this pattern of behavior. As such, this research paper found it

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particularly difficult to identify the personality traits predictive of ingroup favoritism because no ingroup favoritism was demonstrated by the experiment's participants.

In order to address the overwhelming effects of Payscheme on an individual's knowledge sharing decision, Model II focused entirely upon a single pay scheme, namely, piece rate and as such did not need to include the pay scheme related variables into subsequent regression equations. Upon adding a variable to address the possibility of inherent differences in knowledge sharing behavior between students of Colgate University and the University of Lyon there was only one significant relationship (extraversion) between the Big Five personality traits and knowledge sharing behavior.

However, upon performing regressions to specify whether the knowledge was being shared with an ingroup or outgroup member, this research paper was able to identify that neuroticism is significantly related to knowledge sharing tendencies. More specifically, the higher a person's self reported neuroticism scores, the more likely they are to share knowledge. This finding seems intuitive, in that psychological literature has defined neuroticism to be a trait indicative of a person's level of emotional adjustment, and has indicated that those who score highly on the measure tend to have more anxiety (Weber, Johnson & Arceneaux, 2011). Participants in this study who were more neurotic than others were perhaps more anxious of others' perception of them, and as such experienced a desire to share to create a positive self-image. Individuals of higher emotional stability and lower neuroticism are more secure in their self-image and perhaps are thus less likely to feel motivated to share with others. Most importantly, the results indicate that neuroticism influences knowledge sharing tendencies both when interacting with an ingroup and outgroup other. As such, being highly neurotic has not

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been demonstrated to relate to sharing more often with one group instead of another. Instead, being highly neurotic is related to being more likely to share in general.

This research paper also demonstrated that an individual's openness to experience is significantly related to their probability of sharing knowledge with another person, but only when that other person is a member of the ingroup. More specifically, it was found that a participant who scored highly on the openness to experience trait was significantly less likely to share knowledge with ingroup members. Based upon a psychological definition of openness to experience which explains that individuals who score highly on this factor tend to be attracted to new modes of thinking and are less rigid in their worldviews (Weber, Johnson & Arceneaux, 2011), this finding also seems intuitive. If a person scores highly on the openness to experience trait, it may be the case that they are less likely to view an outgroup as a collection of people entirely different to the ingroup. Certainly, it has previously been suggested that individuals who score highly on this measure tend to expose themselves more to different groups (Weber, Johnson & Arceneaux, 2011). It thus makes sense that those who score highly on openness to experience are less likely to share with the ingroup, as perhaps they are less subject to conforming to the rigid expectation that ingroup members should favor one another. With that said, there was no evidence to suggest that scoring highly on this measure was related to an increased propensity to share with outgroup members. In any case, it would appear as if a person's level of openness to experience is particularly important when interacting with ingroup members and less so when interacting with outgroup members. As such, one can posit that individuals who score extremely low on openness to experience are very likely to share with ingroup members, and thus this trait might be predictive of an individual's tendency to favor ingroup members.

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Finally, this study sought to examine whether or not the Big Five personality traits primarily influence knowledge sharing via an interaction with a variable that was shown to have a more robust effect on the propensity to share knowledge with others. It was hypothesized that when making the decision to share or withhold knowledge from others, a person's trust of others (measured by the *trust* variable) was one of the main drivers behind making this decision. It followed from that general hypothesis that perhaps the true effect of the Big Five personality traits was their potential interaction with *trust*. Results indicate that when taking the entire sample of piece rate pay scheme participants as a whole, for individuals who are extremely open to experience, the extent to which they trust others is relatively less important than it is for individuals who are less open to experience and are thought to be more conventional in their world views. *Conscientiousness* had a similar influence upon the effect of trust on knowledge sharing probability. Upon performing separate analyses for participants in the ingroup condition and those in the outgroup conditions, this study found that regardless of the group membership of the knowledge recipient, the more agreeable a person was, the more important the extent to which that person trusts others was to their decision to share or withhold knowledge. *Agreeableness* and *trust* are thus thought to have a complementary effect on the probability of sharing knowledge, regardless of whether the participant was sharing with ingroup or outgroup others. It was also determined that trust was more important in making the decision to share knowledge for participants who scored highly on *neuroticism*, but only when the participant interacted with ingroup others. With all this said, the magnitude of the effects of the *PersonalityTrait*trust* terms on the probability that a person shared knowledge was slightly less than the magnitude of the effects of the independent *PersonalityTrait* terms. This finding seems

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to dispel the notion that the primary way in which the Big Five personality traits affect group identity formation and ingroup bias is through mediating/influencing trust.

Beyond these results, this paper makes a significant contribution to economic literature in its development of a framework by which to determine the personality traits associated with a willingness to form a group identity and favor ingroup members. The potential implications for organization design of better understanding the ‘type’ of person that is more susceptible than others to this pattern of behavior are worth noting. Via the administration of a brief measure of personality during recruitment, firms can minimize or maximize (depending on their preferences) the likelihood of group identities forming amongst their employees. If a firm wishes to induce an ingroup identity that encapsulates the entirety of the organization, in an effort to maximize positive reciprocity and social welfare maximizing decisions, findings based upon this framework may enable them to increase the chances of hiring workers more prone to embracing a group identity. Taking into consideration the significant results of this research paper, firms that wish to increase knowledge sharing within their workforce may wish to screen for high neuroticism scores. Similarly, firms that wish to increase the chances of developing ingroup favoritism exhibited via increased knowledge sharing between ingroup members may wish to high workers low on the openness to experience measure. Conversely, to avoid instances of collaboration between ingroup members that may be harmful to overall productivity or output, firms may want to avoid people who score low on the openness to experience trait, who have been demonstrated to be more likely to share with others only in situations when that other person is an ingroup member.

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Tables

Table 1: Summary Statistics of Variables of Interest, Model 1

	Mean	Standard Deviation	N
Send	.306	.461	480
Type of Payscheme	.500	.500	480
Age	22.5	4.097	480
Male	.550	.498	480
Group Membership of Other	.500	.500	480
Agreeableness	34.500	4.054	480
Conscientiousness	41.250	3.459	480
Extraversion	39.750	4.222	480
Neuroticism	34.075	4.745	480
Openness to Experience	38.350	3.384	480

Table 2: Probit Regression Results, Effects of Changes in Explanatory Variable on DV

Model 1 (DV = Probability of Sending Knowledge)		
	Coefficient	Marginal Effect
Neuroticism	-.023 (.015)	-.008
Pay Scheme	.743*** (.126)	.251
Order of Pay Scheme	-.289* (.152)	-.103
Male	-.099 (.134)	-.034
Age	.020 (.016)	.007
Group Membership of Recipient	.079 (.124)	.027
Intercept	-.339 (.577)	-
N	480	
Pseudo R Squared	.070	

Note: Significance at 1% level indicated by ***. Significance at 5% level indicated by **. Significant at the 10% level is indicated by *. For each of the parameter estimates, standard error is presented immediately below in brackets. Pay Scheme is a dummy variable which equals to one if participants took part in group incentive pay scheme and zero if piece rate pay scheme. Order of Pay scheme is a dummy variable which equals to one if participants engaged in group incentive pay scheme then piece rate and zero if the opposite was true.

Table 3: Probit Regression Results, Effects of Changes in Personality Traits on DV

Model 1 (DV = Probability of Sending Knowledge)		
	Coefficient	Marginal Effect
Neuroticism	-.023 (.015)	-.008
Openness to Experience	-.027 (.019)	-.009
Extraversion	-.002 (.016)	.001
Agreeableness	.026 (.016)	.009
Conscientiousness	.016 (.018)	.006
N	480	

Note: Significance at 1% level indicated by ***. Significance at 5% level indicated by **. Significant at the 10% level is indicated by *. For each of the parameter estimates, standard error is presented immediately below in brackets. The results presented above are a summary of five separate regressions performed for each personality trait.

Table 4: Results Probit Regression excluding *Personality Trait* variable, effects of changes in explanatory variables on DV

Model 1 (DV = Probability of Sending Knowledge)		
	Coefficient	Marginal Effect
Pay Scheme	.732*** (.125)	.248
Order of Pay Scheme	-.265* (.151)	-.095
Male	-.036 (.127)	-.012
Age	.012 (.015)	.004
Group Membership of Recipient	.086 (.124)	.029
Intercept	-.987*** (.400)	-
N	480	
Pseudo R Squared	.007	

Note: Significance at 1% level indicated by ***. Significance at 5% level indicated by **. Significant at the 10% level is indicated by *. For each of the parameter estimates, standard error is presented immediately below in brackets. Pay Scheme is a dummy variable which equals to one if participants took part in group incentive pay scheme and zero if piece rate pay scheme. Order of Pay scheme is a dummy variable which equals to one if participants engaged in group incentive pay scheme then piece rate and zero if the opposite was true.

Table 5: Differences in Personality Trait scores between Participants who shared knowledge and those who did not, Model 2

	Shared Knowledge	Did not Share Knowledge	T-Test Statistic (Absolute Value)
Agreeableness	36.922 (.391)	35.303 (.231)	3.360***
Conscientiousness	41.259 (.416)	41.410 (.166)	0.390
Extraversion	39.836 (.404)	40.556 (.201)	1.653*
Neuroticism	34.388 (.468)	33.483 (.252)	1.686*
Openness to Experience	35.991 (.334)	37.473 (.189)	3.722***
N	116	412	-

Note: Significance at 1% level indicated by ***. Significance at 5% level indicated by **. Significant at the 10% level is indicated by *. For each of the parameter estimates, standard error is presented immediately below in brackets

Table 6: Summary Statistics of Variables of Interest, Model 2

	Mean	Standard Deviation	N
Send	.220	.414	528
University	.273	.446	528
Age	21.489	3.516	528
Male	.500	.500	528
Group Membership of Other	.500	.500	528
Agreeableness	35.659	4.629	528
Conscientiousness	41.375	3.632	528
Extraversion	40.398	4.148	528
Neuroticism	33.682	5.114	528
Openness to Experience	37.148	3.834	528

Table 7: Probit Regression Results, Effects of Changes in Explanatory Variable on DV

Model 2 (DV = Probability of Sending Knowledge)		
	Coefficient	Marginal Effect
Neuroticism	.027** (.012)	.008
Male	.176 (.124)	.052
Age	-.031 (.019)	-.009
Group Membership of Recipient	.059 (.122)	.018
Intercept	-1.146** (.549)	-
N	528	
Pseudo R Squared	.015	

Note: Significance at 1% level indicated by ***. Significance at 5% level indicated by **. Significant at the 10% level is indicated by *. For each of the parameter estimates, standard error is presented immediately below in brackets.

Table 8: Summary of Separate Probit Regression Results, Effects of Changes in Personality Traits on DV

Model 2 (DV = Probability of Sending Knowledge)		
	Coefficient	Marginal Effect
Neuroticism	-.027** (.012)	.008
Openness to Experience	-.060*** (.017)	-.017
Extraversion	-.024* (.015)	-.007
Agreeableness	.045*** (.014)	.013
Conscientiousness	-.006 (.016)	-.002
N	528	

Note: Significance at 1% level indicated by ***. Significance at 5% level indicated by **. Significant at the 10% level is indicated by *. For each of the parameter estimates, standard error is presented immediately below in brackets. The results presented above are a summary of five separate regressions performed for each personality trait.

Table 9: Results of Probit Regression including *University*, Effects of Changes in Explanatory Variable on DV

Model 2 (DV = Probability of Sending Knowledge)		
	Coefficient	Marginal Effect
Neuroticism	.020* (.012)	.006
University	.892*** (.157)	.287
Male	.269** (.129)	.076
Age	.034* (.020)	.010
Group Membership of Recipient	.058 (.126)	.017
Intercept	-2.64*** (.575)	-
N	528	
Pseudo R Squared	.073	

Note: Significance at 1% level indicated by ***. Significance at 5% level indicated by **. Significant at the 10% level is indicated by *. For each of the parameter estimates, standard error is presented immediately below in brackets.

Table 10: Summary of Results of separate Probit Regressions including *University* variable, Effects of Changes in Personality Traits on DV

Model 2 (DV = Probability of Sending Knowledge)		
	Coefficient	Marginal Effect
Neuroticism	.020* (.012)	.006
Openness to Experience	-.029 (.019)	-.008
Extraversion	-.033** (.016)	-.009
Agreeableness	.019 (.015)	.005
Conscientiousness	-.010 (.017)	-.003
N	528	

Note: Significance at 1% level indicated by ***. Significance at 5% level indicated by **. Significant at the 10% level is indicated by *. For each of the parameter estimates, standard error is presented immediately below in brackets. The results presented above are a summary of five separate regressions performed for each personality trait.

Table 11: Summary of results of separate Probit Regressions: Effects of Changes in Personality Traits on DV when interacting with either Ingroup or Outgroup others

	Interact with Ingroup Other		Interact with Outgroup Other	
	Coefficient	Marginal Effect	Coefficient	Marginal Effect
Neuroticism	.027** (.014)	.007	.029** (.014)	.007
Openness to Experience	-.041** (.019)	-.011	-.036* (.019)	-.009
Extraversion	-.020 (.015)	-.005	-.019 (.016)	-.005
Agreeableness	.029* (.015)	.008	.023 (.016)	.006
Conscientiousness	.000 (.017)	.000	-.023 (.018)	-.006
N	264	-	264	-

Note: Significance at 1% level indicated by ***. Significance at 5% level indicated by **. Significant at the 10% level is indicated by *. For each of the parameter estimates, standard error is presented immediately below in brackets.

Table 12: Summary of Results of separate Probit Regressions: Effects of Interaction terms on DV in Piece Rate Pay Sample

Model 3 (DV = Probability of Sending Knowledge)		
	Coefficient	Marginal Effect
Neuroticism*Trust	.008 (.005)	.002
Openness to Experience*Trust	-.022*** (.007)	-.006
Extraversion*Trust	-.003 (.007)	-.001
Agreeableness*Trust	.005 (.006)	.001
Conscientiousness*Trust	-.028*** (.010)	-.008
N	528	

Note: Significance at 1% level indicated by ***. Significance at 5% level indicated by **. Significant at the 10% level is indicated by *. For each of the parameter estimates, standard error is presented immediately below in brackets. The results presented above are a summary of five separate regressions performed for each personality trait.

Table 13: Summary of results of separate Probit Regressions: Effects of Interaction Terms on DV, when interacting with either Ingroup or Outgroup others

	Interact with Ingroup Other		Interact with Outgroup Other	
	Coefficient	Marginal Effect	Coefficient	Marginal Effect
Neuroticism*Trust	.012** (.006)	.003	.009 (.006)	.002
Openness to Experience*Trust	-.011 (.008)	-.003	-.012 (.008)	-.003
Extraversion*Trust	-.005 (.007)	-.001	-.002 (.007)	-.001
Agreeableness*Trust	.020*** (.006)	.005	.015** (.006)	.004
Conscientiousness*Trust	-.007 (.008)	-.002	-.008 (.008)	-.002
N	264	-	264	-

Note: Significance at 1% level indicated by ***. Significance at 5% level indicated by **. Significant at the 10% level is indicated by *. For each of the parameter estimates, standard error is presented immediately below in brackets.

Appendix A: NEO Five Factor Questionnaire Items

1. I am not a worrier.
2. I like to have a lot of people around me.
3. I don't like to waste time daydreaming.
4. I try to be courteous to everyone I meet.
5. I keep my belongings clean and neat.
6. I often feel inferior to others.
7. I laugh easily.
8. Once I find the right way to do something, I stick to it.
9. I often get into arguments with my family and co-workers.
10. I'm pretty good about pacing myself so as to get things done on time.
11. When I'm under a great deal of stress, sometimes I feel like I'm going to pieces.
12. I don't consider myself especially "light-hearted."
13. I am intrigued by the patterns I find in art and nature.
14. Some people think I'm selfish and egotistical.
15. I am not a very methodical person.
16. I rarely feel lonely or blue.
17. I really enjoy talking to people.
18. I believe letting students hear controversial speakers can only confuse and mislead them.
19. I would rather cooperate with others than compete with them.
20. I try to perform all the tasks assigned to me conscientiously.
21. I often feel tense and jittery.
22. I like to be where the action is.
23. Poetry has little or no effect on me.
24. I tend to be cynical and skeptical of others' intentions.
25. I have a clear set of goals and work toward them in an orderly fashion.
26. Sometimes I feel completely worthless.
27. I usually prefer to do things alone.
28. I often try new and foreign foods.
29. I believe that most people will take advantage of you if you let them.
30. I waste a lot of time before settling down to work.
31. I rarely feel fearful or anxious.
32. I often feel as if I'm bursting with energy.
33. I seldom notice the moods or feelings that different environments produce.
34. Most people I know like me.
35. I work hard to accomplish my goals.
36. I often get angry at the way people treat me.
37. I am a cheerful, high-spirited person.
38. I believe we should look to our religious authorities for decisions on moral issues.
39. Some people think of me as cold and calculating.
40. When I make a commitment, I can always be counted on to follow through.
41. Too often, when things go wrong, I get discouraged and feel like giving up.
42. I am not a cheerful optimist.
43. Sometimes when I am reading poetry or looking at a work of art, I feel a chill or wave of excitement.
44. I'm hard-headed and tough-minded in my attitudes.
45. Sometimes I'm not as dependable or reliable as I should be.
46. I am seldom sad or depressed.
47. My life is fast-paced.
48. I have little interest in speculating on the nature of the universe or the human condition.
49. I generally try to be thoughtful and considerate.
50. I am a productive person who always gets the job done.
51. I often feel helpless and want someone else to solve my problems.
52. I am a very active person.
53. I have a lot of intellectual curiosity.
54. If I don't like people, I let them know it.
55. I never seem to be able to get organized.
56. At times I have been so ashamed I just wanted to hide.
57. I would rather go my own way than be a leader of others.
58. I often enjoy playing with theories or abstract ideas.
59. If necessary, I am willing to manipulate people to get what I want.
60. I strive for excellence in everything I do.

NEO Five Factor Coding Scheme



NEO-FFI-R
Institut de Psychologie

Dépouillement

La réponse "Fortement en désaccord" correspond à une marque de 0 ; la réponse "En désaccord" correspond à une marque de 1 ; la réponse "Neutre" correspond à un marque de 2 ; la réponse "D'accord" correspond à un marque de 3 et la réponse "Fortement d'accord" correspond à un marque de 4. Les items marqué par un "*" sont inversés. Pour obtenir les scores aux différentes dimensions, il faut additionner les scores aux différentes questions.

Névrosisme
Questions : 1*, 6, 11, 16*, 21, 26, 31*, 36, 41, 46*, 51 et 56.

Extraversion
Questions : 2, 7, 12*, 17, 22, 27*, 32, 37, 42*, 47, 52 et 57*.

Ouverture
Questions : 3, 8, 13, 18*, 23*, 28*, 33*, 38, 43, 48*, 53 et 58.

Agréabilité
Questions : 4, 9*, 14*, 19*, 24*, 29, 34, 39*, 44*, 49, 54* et 59*.

Conscience
Questions : 5, 10, 15*, 20, 25, 30*, 35, 40, 45*, 50, 55* et 60.

1.	4 3 2 1 0	16.	4 3 2 1 0	31.	4 3 2 1 0	46.	-4 3 2 1 0
2.	0 1 2 3 4	17.	0 1 2 3 4	32.	0 1 2 3 4	47.	0 1 2 3 4
3.	0 1 2 3 4	18.	4 3 2 1 0	33.	4 3 2 1 0	48.	4 3 2 1 0
4.	0 1 2 3 4	19.	4 3 2 1 0	34.	0 1 2 3 4	49.	0 1 2 3 4
5.	0 1 2 3 4	20.	0 1 2 3 4	35.	0 1 2 3 4	50.	0 1 2 3 4
6.	0 1 2 3 4	21.	0 1 2 3 4	36.	0 1 2 3 4	51.	0 1 2 3 4
7.	0 1 2 3 4	22.	0 1 2 3 4	37.	0 1 2 3 4	52.	0 1 2 3 4
8.	0 1 2 3 4	23.	4 3 2 1 0	38.	0 1 2 3 4	53.	0 1 2 3 4
9.	4 3 2 1 0	24.	4 3 2 1 0	39.	4 3 2 1 0	54.	4 3 2 1 0
10.	0 1 2 3 4	25.	0 1 2 3 4	40.	0 1 2 3 4	55.	4 3 2 1 0
11.	0 1 2 3 4	26.	0 1 2 3 4	41.	0 1 2 3 4	56.	0 1 2 3 4
12.	4 3 2 1 0	27.	4 3 2 1 0	42.	4 3 2 1 0	57.	4 3 2 1 0
13.	0 1 2 3 4	28.	4 3 2 1 0	43.	0 1 2 3 4	58.	0 1 2 3 4
14.	4 3 2 1 0	29.	0 1 2 3 4	44.	4 3 2 1 0	59.	4 3 2 1 0
15.	4 3 2 1 0	30.	4 3 2 1 0	45.	4 3 2 1 0	60.	0 1 2 3 4

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