# EXPLORING IDENTIFIABILITY AND STATUS AS DETERMINANTS OF INTERGROUP BEHAVIOURS IN VIRTUAL INTERACTION

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# Declaration

This dissertation is submitted in partial fulfilment of the requirements for the degree of Master of Social Science (Psychology - Research), in the Discipline of Psychology, University of KwaZulu-Natal, Pietermaritzburg, South Africa.

I, ……., declare that

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# Abstract

Identifiability to an audience is an integral part of social life. It has powerful effects on behaviour. Some authors have argued that "deindividuation", or a lowered sense of personal identifiability results in a loss of control over individual behaviour in a group situation. However, this has been contested. This study examines the Social Identity Model of Deindividuation Effects (SIDE) and reputational theory as alternatives to traditional models of deindividuation. The SIDE model argues that the salience of personal versus social identity – and therefore the salience of different sets of norms or standards – govern social behaviour, while in contrast, reputational theory suggests that behaviour is governed by a group heuristic which ensures individuals gain and maintain access to generalized systems of exchange. VIAPPL (see www.viappl.org) was used to investigate the effects of various conditions of identifiability on ingroup favouritism, selfishness and reciprocity in an interactive, virtual environment. The results were then examined in order to determine whether the SIDE model or reputational theory were supported.

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# Chapter 1: Introduction

Social scientists have been fascinated by the effects of "anonymity" or a lack of direct identifiability on individuals' behaviour within specific social situations. Deindividuation theories, developed from Le Bons ideas of crowd psychology, suggest that when immersed in groups, individuals' behaviours become disinhibited and they are more likely to partake in behaviour that is not aligned with their personal standards. However, such theories have been contested as they do not provide a sufficient explanation for behaviour.

Some theories have since become much more complex and sophisticated, suggesting that individuals do not, "lose their minds" or their inhibitions, but rather behave according to social norms and salient social identities. For example, the Social Identity model of Deindividuation Effects (SIDE) explores the idea that for members of social groups, the audience to whom they are visible becomes a strong determinant of how they choose to behave because it effects the salience of their two identities – personal and social (Reicher, Spears & Postmes, 1995).

An alternative explanation to the SIDE model is one which focuses on reputational factors within social situations. Yamagishi and Mifune (2008) suggest that social groups provide systems of generalized exchange, where individuals within the system can gain access to resources – provided they maintain a good reputation and are seen to cooperate with the group by other group members. This theory suggests that individuals behave according to a group heuristic, which is a default assumption or mental shortcut that individuals use which aids them in navigating social situations and prevents them from partaking in risky behaviours that could lead to exclusion from the exchange system. When they are visible to others and can be held responsible for their behaviours (and therefore can be treated in a particular way by other group members), they behave according to the group heuristic.

Both of the above theories provide explanations which are arguably more theoretically sound than traditional theorising about deindividuation or group mind – however, a review of the literature does not provide robust answers for which theory provides a *better* overall account of the determinants of behaviour in a social context.

The Virtual Interaction Application (VIAPPL) was used to examine how varying conditions of identifiability and status would affect participants behaviours –namely ingroup favouritism, selfishness and reciprocity – during a game-like token allocation experiment. This

experimental method allows for the study of behavioural norms as they emerge over time in interaction.

By analysing the interactive behaviours of participants, it was possible to compare the SIDE model and reputational theory as potential explanations for behaviour, in order to determine which of the two provided a more robust account. While various studies have employed the use of minimal groups to examine intergroup behaviour at its most basic level, the present study is unique in that it explores the effects of visibility to various audiences rather than just simply examining anonymity. Additionally, it provides an insight to the emergence of normative behaviours under such circumstances – something which has not been examined to date.

# Chapter 2: Literature Review

Identifiability and anonymity have been of interest to social psychologists for some time due to their interesting effects on the behaviours of individuals within social groups. According to Oxford's English Dictionary (2010), *identifiability* refers to the "quality of being *identifiable*" – which in turn means "able to be identified". The verb *identify* (in Oxford English Dictionary, 2010) is defined as "to ascertain or assert what a thing or who a person is". Therefore, identifiability could be defined as the quality of others being able to ascertain who a person is. In contrast, to be *anonymous* (Oxford English Dictionary, 2010), refers to being "generally unknown, unrecognized, or uncelebrated". Anonymity could then be defined as "unrecognizability" or "unknowability" – a situation where an identity cannot be attributed to a specific person – one does not know *who* they are. Identifiability and anonymity could be described as contrasting conditions, sitting on opposite poles of a spectrum which encompasses the visibility of an individual's personal identity to other people. While both have been studied fairly extensively in the social psychology literature, anonymity seems to be a hot topic due to its perceived role in more extreme or unacceptable forms of social behaviour. However, interestingly, there are some real-world examples which suggest that anonymity itself might not be a precondition for extreme behaviour.

On 16 August 2012, at the Lonmin mine, in South Africa, police opened fire on a group of protesting mine workers, in full view of the media (De Waal, 2012). Known as the Marikana Tragedy, this shooting resulted in the deaths of thirty-four mine workers, and the injury of seventy-eight (Twala, 2012). Makhetha (2018), a news journalist, suggests that it was "the single most lethal use of force by South African security forces against civilians since 1960". In this situation, the behaviour of the police officers involved – who were all personally identifiable and accountable for their actions – seems inconceivable, if anonymity is the factor usually leading to this kind of behaviour.

Three frameworks which theorise how anonymity shapes behaviour include traditional models of deindividuation (see review by Reicher & Levine, 1994), the social identity model of deindividuation effects (SIDE) (Reicher, Spears & Postmes, 1995) and the group heuristic model or reputational perspective (Yamagishi & Mifune, 2008). While there appear to be exemplars and evidence for all three theories, the literature is inconclusive about what social psychological processes are actually at play when it comes to behaviour in conditions of

anonymity. This thesis highlights why traditional models of deindividuation may be insufficient to explain why anonymity affects behaviour in the way that it does, then examines the two alternative theories which may offer answers – one from a social identity perspective, and the other from a reputational perspective.

## Deindividuation and accountability

Traditional models of deindividuation suggest that in many cases, individuals can be considered as anonymous members of a larger social group. It is suggested that often their behaviours reflect this – they lose their inhibition and act as group members rather than as individuals, partaking in behaviours that would usually be deemed unacceptable or inappropriate according to personal standards – a phenomenon termed "deindividuation" (Reicher & Levine, 1994).

Deindividuation refers to the lowered level of private self-awareness within a group situation, which then decreases an individual's self-regulatory functions, leading to disinhibited and often socially unacceptable behaviours. Deindividuation is often cited as an effect of group belonging, and various studies have been undertaken to determine whether it is indeed the causal explanation for disinhibited behaviour. Early theories argued that deindividuation as a phenomenon occurs as a result of various situational factors, including physiological arousal, anonymity, being part of a group and a lack of personal responsibility (Bovasso, 1997). In some situations, these factors interact and cause individuals to perform behaviours that they would not usually partake in if they were not part of a group.

According to Postmes and Spears (1997) traditional models of deindividuation suggest that when individuals are part of a crowd or group, "members do not pay attention to other individuals as individuals and do not feel scrutinized. Being unidentified and thereby unaccountable has the psychological consequence of reducing inner restraints and increasing behaviour that is usually inhibited" (p. 239).

This suggests that anonymity results in a lowered sense of personal identifiability which can lead to a loss of individual identity and therefore a loss of control over personal behaviour. This results in behaviours that are no longer governed by an individual's internal, personal standards. This loss of internal control is argued to be linked to the spread of violent or unruly behaviour that is sometimes experienced during events such as protest marches or riots. In other words, according to these traditional theories, because individuals see themselves as

anonymous members of a group, their behaviour becomes disinhibited and they are more likely to act in socially unacceptable ways due to the lack of fear of being held responsible for their actions. Therefore, whether one is identifiable to some authority or not has an impact on how an individual may choose to behave. This suggests that an individual's level of accountability for their behaviour is directly affected by whether they are identifiable and can be held responsible.

There are countless real-world examples where identifiability and anonymity appear to affect the behaviour of individuals within social situations. The media is rife with stories and videos going viral online of police violence at such events, with the dispersal of rubber bullets and teargas into the protesting crowd. The use of force by police officers often creates distrust of the authorities amongst members of the public, and for this reason it is becoming more common-place for police-officers to use body-worn cameras when on duty (Ariel, Farrar & Sutherland, 2015). Ariel et al.'s (2015) experimental study indicated that increasing identifiability and accountability for actions via the use of body-worn cameras acted as a deterrent to unacceptable behaviour for both police officers and members of the public, when compared to a control condition where no cameras were worn. Attempts such as this to control and inhibit peoples' behaviour through increasing their visibility to some kind of authority indicates that identifiability (or lack thereof) could indeed be a factor that may affect behaviours within specific situations or contexts.

Another situation which suggests that identifiability affects behaviour is in the use of flaming language on online discussion boards or media platforms. Flaming language refers to "hostile emotional expressions characterised by using insulting profane or offensive languages, which may inflict harm on a person or an organisation resulting from disinhibited behaviour" (Cho & Kwon, 2015, p. 364).

Flaming language – in the forms of racism, sexism and homophobia – is often seen in Computer-Mediated Communication (CMC), particularly where those who use pseudonyms or remain anonymous. Kling, Lee, Teich and Frankel (1999) argue that while anonymity allows for free speech, it also provides opportunities for individuals to take part in hate speech, deception and impersonation – usually without any repercussions for their actions. Often this leads to reciprocation of profanities and verbal attacks, creating what have been termed "flaming norms" in online communities (Cho & Kwon, 2015). In face to face interaction,

hostility and offensive language are generally frowned upon, and so it is interesting that these behaviours can be common in CMC.

It has been suggested that identifiability may determine what kinds of behaviours individuals are willing to display when using these types of online forums. It seems that the less identifiable people are, the more disinhibited their behaviour becomes due to the absence of accountability for their actions (Cho & Kwon, 2015). Therefore, on an online discussion board, anonymous individuals may be more likely to partake in hate speech due to the absence of sanctions against their behaviour. It has also been suggested that different forms of online communication may differ in the amount and intensity of flaming language that occurs. Halpern and Gibbs (2013) found that Youtube contains significantly more flaming language than Facebook. Both Facebook and Youtube can be considered social media platforms, however their purposes are quite different and the level of personal information an individual discloses on each also differs. Most Facebook profiles divulge far more information than Youtube about a person's identity – such as their name, what they look like, where they live and who they have connections with – as it is a social networking site used to connect with friends and acquaintances. Youtube, on the other hand, allows for an individual to use pseudonym-type usernames which do not reveal anything about who they actually are – as the purpose of this platform is not necessarily to connect with people one knows, but rather to watch and comment on videos about whatever topic is of interest. While Youtube does allow for interaction, the level of personal identifiability of users is arguably somewhat less than that of Facebook. The authors suggest this heightened level of anonymity on Youtube could be a factor contributing to the differences in flaming language between the two platforms (Halpern & Gibbs, 2013).

In more of an everyday, common example of the effects of anonymity on behaviour, something that happens in various group contexts, from sports teams, to groups of students and groups within corporate organisations, is referred to as social loafing. Social loafing or free-riding refers to the reduction in the effort that individuals' put into a collective or group task (Gammage et al., 2001). Hogg (1992) suggests that a perception of personal identifiability leads to a decrease in social loafing due to the fact that one is more aware of potential evaluation by other members of the group. Because behaviour is directly attributable to the individual, they are more likely to work to their full potential than to make a half-hearted effort. In contrast, when an individual's inputs are anonymous, there is a lowered sense of personal identifiability – and it is suggested that this can result in increased social loafing.

While it seems to make sense that the lack of accountability which is so often associated with anonymity can affect the behaviour of individuals, recently the deindividuation model of mindless and disinhibited behaviour in the collective context has been disputed. There are various examples of individuals "behaving badly" despite being identifiable and accountable for their actions. For example, sometimes we see police brutality – despite there being surveillance, and despite the fact that arguably, they can be held accountable for their actions. When this happens, it seems that there is another underlying reason or motivation for their choice of behaviour.

Take for example the Marikana tragedy which occurred on 16 August 2012 at the Lonmin mine, in South Africa. In this particular event, the South African police fired at a crowd of striking mineworkers, killing thirty-four and wounding seventy-eight (Twala, 2012). The traditional model of deindividuation somehow fails to explain this particular event. Taking a life can be argued to be a much more extreme form of behaviour than acts of vandalism and the types of unruly behaviour that can occur during protests. Arguing that these officers simply behaved in a disinhibited way due to being part of a "crowd" simply doesn't add up. Furthermore, in this case both the striking miners and the police were aware of the presence of the media, due to the fact that the media were situated safely behind the lines of police, in view of the oncoming mineworkers (De Waal, 2012), suggesting they would be aware that there would be witnesses, as well as photographic and video evidence of the events that unfolded. Du Preez (2015) states that the images and video footage of the massacre were viewed worldwide. Therefore, the police's actions would be visible to various external audiences and open to interpretation – and they were aware of this.

The rationale behind Ariel et al.'s (2015) argument that visibility and identifiability will prevent individuals from behaving badly is therefore not supported by an example like the one above. It becomes clear then that theoretically, the deindividuation model of behaviour does not sufficiently explain events where individuals act in what would be deemed socially unacceptable ways despite being identifiable and accountable for their actions.

It is no surprise then, that Postmes and Spears (see review, 1997) argue that it has limitations. The main issue is that deindividuation theory appears to neglect the possibility that crowd behaviour may result from group norms within the social situation, rather than loss of control over behaviour. Distinguishing between general social norms and those behaviours normative to specific social situations is important. Postmes and Spears (see review, 1997) argue that

general social norms (such as always being polite to others or avoiding confrontation) may not apply in specific social contexts, for specific social groups. What might appear to be counter normative or irrational for a social group in one situation could actually be reasonable and normative behaviour when seen from the perspective of a member of a different group in a similar situation.

In line with these observations, social psychologists have provided alternative explanations for the causal effects of so-called "deindividuation" phenomena. One of these, named the social identity model of deindividuation effects (SIDE), considers the fact that certain norms may be salient in particular contexts (Reicher et al., 1995). This theory may provide explanations for phenomena that cannot be rationalised by traditional models of deindividuation.

## The Social Identity Model of Deindividuation Effects (SIDE)

The social identity model of deindividuation effects (SIDE) was developed in order to make sense of the way in which certain situational factors (or deindividuation manipulations) such as anonymity can result in a range of behaviours in group members, rather than in disinhibition only (Klein et al., 2007). The SIDE model challenges the logic of traditional models of deindividuation by arguing that there are specific features of situations (such as anonymity, being part of a social group, reduced accountability and physiological arousal) which can influence the relative salience of personal and social identities, depending on the social context (Reicher et al., 1995). Personal and social identity represent two dimensions of an indivdiuals self-concept. Personal identity refers to an individual's distinct identity, which allows them to see themselves as different or distinct from other individuals. Social identity, in contrast, refers to aspects of an individual's identity which define who they are in terms of how they categorize themselves at the social level, and aspects of their identity that make them similar to other individuals, allowing them to see themselves as part of a specific social group (Tajfel & Turner, 1979).

Reicher et al. (1995) highlight the idea that immersion in a social group can increase the salience of the social identity of that group. They suggest that there is not a loss of control over behaviour, but rather a shift with regard to the salience of standards or norms which govern behaviour in the particular context. In other words, when a specific social identity is salient, an individual will behave according to the norms of that social group, rather than according to

personal standards. This is known as depersonalisation – an impact of deindividuation manipulations which is argued to be the cognitive component of the SIDE.

Interestingly, while many deindividuation theorists seem to suggest that anonymity is mostly associated with extreme, negative forms of behaviour, Reicher et al. (1995) highlight that there are also cases where anonymity is actually followed by positive behavioural outcomes, for example, when good Samaritans help strangers who do not know them as individuals. To try and explain cases such as this by suggesting there is a "loss of control" over behaviour seems implausible.

Therefore, instead of suggesting that being an anonymous group member results in a lack of behavioural control, SIDE suggests that the identity which is salient is a key factor in determining what kinds of behaviours come to the fore. They suggest that the effect of anonymity on behaviour is dependent on identity salience in the specific social context. When group identity is highly salient, and individuals are immersed in the group, they are much more likely to display group normative behaviours. In contrast, when immersed in a group and group identity is not particularly salient for an individual, the display of group normative behaviour is much less likely. Therefore, the SIDE model suggests that anonymity and immersion in a group can have one of two effects on behaviour: "it may either enhance or attenuate social identity as a function of the context in which it occurs" (Reicher et al., 1995, p. 178), which will result in behaviours which are related to personal standards rather than the norms of the social group.

This idea of the salience of social identity being a key factor for determining behaviour is supported by several studies conducted by Reicher et al. (1995), which suggests that it could explain why anonymity doesn't always have the same, predictable behavioural outcomes.

Several studies have examined anonymity using the SIDE to explain behaviour. Postmes, Spears, Sakhel and de Groot (2001) conducted a study which examined whether anonymity promoted group normative behaviour in groups which had been primed for specific social behaviours. Postmes et al. (2001) found that anonymous groups displayed primed behaviours, whereas groups in which participants where made personally identifiable via digital pictures of themselves did not. This suggested that when participants are visually anonymous, they are more likely to behave according to social norms. Additionally, their study supported the suggestion that the effect of anonymity on behaviour was mediated by identification with the group.

Similarly, Chen and Wu (2015), conducted a study where they examined how anonymity facilitated cheating in online games. While cheating is seen as antinormative in most social situations, the authors suggest that it may actually be a normative behaviour within online gaming groups. Their study used the SIDE to interpret cheating behaviours which are so common online. They employed the use of a survey and focus groups which measured aspects such as gaming group identification, anonymity and cheating in games. They found that cheating in online games appeared to be normative in the gaming community. Regression analyses were conducted and the authors found that anonymity predicted cheating in games, and that group identification mediated the effect of anonymity on cheating. This supports the suggestion that ingroup identification, which is often used as a measure for salience of identity, could be a factor to consider when examining behaviours under conditions of anonymity.

Chan (2010) applied the SIDE model in a field setting, where he used computer mediated communication in the form of email to put out a call to action (a request for donations), and surprisingly, he found that low identifying group members who were anonymous and had been primed for the salience of group identity, were more responsive to the experimental manipulations than high identifying group members. In this study, those who were low identifiers were affected by the prime, and group salience became more important, leading them to respond affirmatively to the call to action.

While anonymity is clearly an important aspect of social life, so is visibility to specific audiences. A great deal of our social life is spent with our personal identity being visible to those around us, subjecting our actions to scrutiny as we can be held personally accountable for them. Additionally, we may be visible to several different audiences depending on the context we find ourselves in. Klein et al. (2007) suggest that whom we are visible to is an important feature, as it will ultimately determine what strategies we employ with regard to behaviour – and whether our behaviours will be in line with in-group norms.

Klein et al. (2007) term this strategic component of SIDE, identity performance and suggest that it pertains specifically to social identity. Identity performance refers to actions that an individual takes in order to represent themselves as a group member, and the actions that are taken are dependent on whatever social identity is salient at the time. Klein et al. (2007, p. 30), refer to "the purposeful expression (or suppression) of behaviours relevant to those norms conventionally associated with a salient social identity" – highlighting that identity performance can also refer to avoiding specific behaviours that could be considered anti-

normative. The authors also suggest that identity performance is intentional – and does not include behaviours that are unconscious. It is this strategic side of the SIDE that is creative, and norm producing.

Identity performance has two main functions: identity consolidation (the securing of one's social identity within the group) and identity mobilisation (using social identity to achieve some kind of collective action), and each of these are related to the audience one finds oneself visible to. Therefore, when it comes to being identifiable to an audience, the behaviours expressed in the presence of the out-group may not be the same as those expressed when personal identity is visible to the in-group. Rather, the way in which they are displayed depends on what the individual is attempting to convince the audience to believe about their social group. For example, a student may portray a hard-working and studious part of their social identity to academic staff (the outgroup), but to other students, may display other aspects of their student identity related to social life and interests outside of their academic endeavours. Therefore, the audience to whom one's identity and behaviour are visible is crucially important in determining what actions are (or are not) taken. Additionally, identity performance in the within-group context may be different to that in the intergroup context.

Klein et al. (2007) suggest that an important moderator of how identity performance occurs within an intergroup context (i.e. when an outgroup is also involved) is the legitimacy of the groups' status within the social context. The legitimacy of group status has an impact on how individuals will enact identity performances to particular audiences. This in turn affects how norms evolve in the social situation, and whether this creates social change or maintains the social order.

**Group status and legitimacy**

According to Tajfel and Turner (1979), the legitimacy of the social status hierarchy is important when considering intergroup behaviour. Research has indicated that unstable and illegitimate inequality often gives rise to collective action by disadvantaged groups in order to improve their status position (Ellemers et al., 1993). This may result from the fact that the low-status group has suffered unfair treatment, and that the in-group *could* actually have favourable comparisons with the high-status out-group – however this potential isn't reached due to the existing social structure. The unjust treatment of the low-status group may also increase levels of solidarity which contributes to the potential of collective action being undertaken. This

increased level of solidarity further contributes to the members of the low-status group having a stronger in-group identity.

Therefore, it can be argued that group status affects the ways in which individuals will choose to behave, especially with regard to their identifiability to particular audiences. The reason that these behaviours are classified as identity performance, is that they are deliberate and strategically performed in order to achieve a particular goal within the intergroup context.

Klein et al. (2007) similarly support the suggestion that differences in group status, as well as the legitimacy of the status differential, could have important effects when it comes to the identity performance associated with visibility to either in or out groups.

**Visibility to In-group and Out-group Audiences**

Klein et al. (2007, p. 40) argue that "perceived visibility to an audience is a condition of any form of identity performance." They argue that the effects of visibility on behaviour also depend on several other variables, in complex relationships.

An important aspect of being a group member is being recognized as such by other members of the group. Acceptance into a group helps to integrate an individual's social identity into their self-concept. People often use self-presentations to establish positive interpersonal relationships with other individuals. The identity consolidation function refers to an individual's attempts to gain acceptance to a group thereby consolidating their self-concept and membership within the group, and providing them with verification of their social identity (Klein et al., 2007). When an individual is visible to other ingroup members, they will be likely to behave in ways that make them seem as though they are prototypical members of the group, in order to gain acceptance and affirmation as a group member.

Displaying normative group behaviour is a common way for individuals to gain better acceptance into the group (Noel, Wann & Branscombe, 1995). Jetten, Branscombe and Spears (2002) found that when an individual's identity was insecure, and they were peripheral ingroup members, they were more likely to display ingroup favouritism than those who were on the peripheral, but had a secure social identity. Similarly, Hohman, Gaffney and Hogg (2017) found that being self-uncertain about one's belonging in the group, and being a peripheral member, resulted in higher ingroup bias. They suggest that being uncertain results from not

being prototypical, and so behaving in group normative ways allows for the individual to feel as though they belong better in the group.

Showing ingroup prototypical behaviour serves to solidify or consolidate an individual's social identity. Furthermore, the level of identification with a particular in-group is important in identity performance. Thus, it can be expected that when personally visible to an in-group audience, an individual is likely to behave according to group norms, for example by displaying in-group favouritism.

But how does identifiability to the outgroup (without concurrent visibility to the ingroup) affect individual's behaviour? Klein et al. (2007) suggest that identity performance when exposed to the outgroup depends on aspects such as the group status hierarchy, whether behaviours are deemed to be punishable or not, and whether there is the possibility of communication with other ingroup members.

As an individual member of a group, expressing group normative behaviour in front of a powerful out-group can be risky when one is identifiable. If an individual behaves in a manner deemed unacceptable by the out-group, and is identifiable, they risk being punished. However, if behaviours are not punishable by the out-group, an individual may display them as an expression of their social identity. Therefore, it can be expected that when an individual is visible to the out-group, and there is a risk of sanction or punishment, the individual may behave according to out-group norms.

Klein et al. (2007) argue that the existence of a group, as well as its social identity for group members, depends on how out-groups treat it. Sometimes, an in-group may undertake identity performance to try and change the out-groups perceptions about them or treatment of them. In contrast, Spears et al. (2001, in Klein et al., 2007) argue that when there is a high-status out-group audience, the low-status in-group may display identity performance as an expression of resistance to the out-group, particularly when the social hierarchy is seen as illegitimate. By displaying in-group bias or in-group favouritism, a low-status group can demonstrate their resistance against the existing social order.

When one considers visibility to an out-group, if other in-group members are not mutually visible, an individual may conform to the norms of the more powerful out-group. However, when in-group members are mutually visible, they are seen as a support system and in-group normative behaviour may occur (Reicher, Levine & Gordijn, 1998). Additionally, when one is

visible to only other outgroup members, it is possible that social identity may become less salient than personal identity, reducing ingroup normative behaviours and standards.

For example, Reicher et al. (1998, Study 3) have used the SIDE model to examine how identifiability or visibility to the ingroup can affect participant's behaviours, especially in relation to a dominant out group. The authors conducted a study to examine how visibility to an ingroup could affect participants willingness to display ingroup normative attitudes which were perceived as punishable by the outgroup. They found that students were more willing to show ingroup normative attitudes that were punishable by academic staff in a condition where they were visible to other students when completing the questionnaire in the presence of other students, than in the condition where they were isolated from other students.

Reicher et al. (1998) suggest that the visibility of other ingroup members may increase the ingroups perceived power in relation to the outgroup, which affects the endorsement of ingroup normative attitudes, even in the presence of the dominant outgroup.

Spears, Lea, Corneliussen, Postmes, & Ter Haar (2002) confirmed these findings. However, they went a step further and indicated that even when members of a less powerful in-group were not mutually visible, resistance to the out-group was increased when they were able to communicate with one another via computer-mediated communication. Therefore, both visibility to and communication with other in-group members appear to be important factors when resisting powerful out-groups in an attempt to change the social hierarchy.

Visibility to the in-group audience allows for collective action to be seen as a pathway for resistance against powerful outgroups. This can be argued to be particularly relevant for groups who perceive their low-status to be illegitimate and may lead to an increase in displays of in-group favouritism among in-group members (Ellemers et al., 1993). In-group favouritism in this sense allows the low-status group to compete with the high-status group. A large number of studies have focused on the use of in-group favouritism as a means of social competition. However, a lesser considered possibility is that low-status groups may display in-group favouritism in order to establish equality with the high-status group. Rubin, Badea and Jetten (2014) used the minimal group paradigm to investigate the intergroup behaviour in low-status groups. The results of these studies indicated that illegitimate low-status groups not only show "competitive favouritism" when participating in allocation in order to achieve positive distinctiveness, but also display "compensatory favouritism" in order to achieve intergroup fairness.

Another way in which groups may attempt to use identity performance to upgrade their relative social position, is by encouraging a lack of opposition from out-groups (Klein et al., 2007). Social change becomes much easier to attain with either collaboration with, or lack of opposition from the out-group. Individuals may therefore use identity performance to modify the perceptions of out-group members regarding the in-group. Klein et al. (2007, p. 38) argue that "downplaying some aspects of in-group identity may in these cases serve to gain the trust of the out-group." Therefore, when identifiable to out-group members, it can be expected that an individual may refrain from displaying in-group promoting behaviours in order to make the out-group believe that it is not a group norm.

With regard to the interaction of visibility and punishable behaviour, if in-group norms are likely to be seen as unacceptable and punishable by the out-group, and the individual is anonymous, they are more likely to display in-group normative behaviour due to the fact that they are not identifiable and therefore will not face sanctions from the out-group. For example, displays of in-group bias may be seen as unacceptable by the out-group, and result in some form of sanction for individuals who are visible to them.

Similarly, out-group giving may be seen as unacceptable by the in-group, and if this behaviour is displayed while visible to the ingroup, it may result in ostracism or being shunned from the group. This highlights the effects that different audiences may have on the strategies which determine individual behaviour.

If one considers the effect of the audience on behaviour, and the Marikana tragedy with regard to the actions of the police officers on that day, perhaps what is important to note is not the fact that officers were on camera footage and were thus identifiable, but rather *to whom* they are identifiable, and thus accountable to, in that moment.

If the official account arguing that the police officers were acting in self-defence is to be believed, the audience to whom they were accountable was their fellow officers (or their in-group), in the situation, in that particular moment in time. Their behaviour could be considered a collective, sanctioned response to an illegitimate threat. Furthermore, if one considers that group normative behaviour is usually followed in the presence of in-group members (Klein et al., 2007), when one officer fired a shot in self-defence, it is possible that other officers would come to see this behaviour as normative and would follow suit.

However, recently evidence has come to light which appears to contradict the official account of what happened during the massacre. The stories of survivors of the ordeal, as well as some damning video evidence shot during the massacre indicate that police seemed to have killed some of the striking miners in cold blood, without provocation (Crawford, 2016).

Arguably, the SIDE model could still provide an explanation for such chilling events – if the shooting of the striking mine workers in order to end the strike had been planned, it is possible that the police officers involved behaved according to their salient social identity (being a police officer and upholding the law) and believed that the striking mine workers constituted a threat to their and others safety. After all, in the Marikana Commission of Inquiry's report, it was indicated that there had been significant violence and aggression on the part of striking mine workers prior to the events of 16 August 2012 (Farlam, Hemraj & Tokota, 2015).

Furthermore, the police officers may have only felt accountable and identifiable to a particular audience – their superiors who gave the orders to end the strike. It is possible that at the scene where miners were allegedly shot in cold blood, external audiences such as the media and the public were not psychologically present for the officers at that moment in time, whereas their in-group was (i.e. other police officers, as well as their superiors within the South African Police Services). Psychological presence of a particular audience is a general condition for specific, strategic identity performance to take place, as is the belief that one is visible to the audience (Klein et al., 2007). It is even possible that the police officers did not think that their actions would ever be made visible to the public.

On the basis of the SIDE it becomes clear that audiences, identifiability and anonymity are important considerations in understanding individual's behaviour within intergroup situations. The SIDE indicates that human beings use identity performances in particular ways not only with regard to following normative behaviour, but also to create new norms within social contexts. This means that the strategic side of SIDE is not only concerned with norm following behaviour, but also with norm making behaviour, and these norms are what define the intergroup situation.

The study of normative behaviour within and between groups has been an interest of social psychologists, and in-group favouritism has been extensively researched, particularly within minimal group situations. A classic example of studies conducted within a minimal group paradigm are those of Tajfel, Billig, Bundy and Flament (1971), which examined the effects of social categorisation on intergroup behaviour. It was found that even in circumstances where

there was minimal in-group affiliation, no conflict of interests, and no previous hostility between groups, in-group favouritism existed. Subjects mostly behaved in terms of their trivial in-group membership and due to group categorisations. This behaviour was more often in favour of the in-group, despite the fact that alternative, fairer and more economically advantageous options were available to them. In these minimal group studies, it appears that simple awareness of the existence of an out-group was enough to create in-group favouritism. This purely social psychological root of behaviour has however been contested, with theories that suggest that there is an alternative, strategic basis underlying such choices, which hinges on systems of generalized exchange within groups.

## Reputation as a mechanism for determining behaviour within groups

Yamagishi and Mifune (2008) suggest that one of the important functions of social groups is that they can be used as a platform for generalised exchange or resource sharing amongst individuals who belong to them. Within social dilemmas or situations, there is often interdependence with other group members. Yamagishi, Jin and Miller (1998) argue that when individuals face a group situation, they are likely to follow particular norms or social rules with regard to decision making in terms of these systems of generalised exchange. The authors suggest that this behaviour is the result of a default assumption rather than a conscious strategy. This group heuristic acts as a behavioural guideline (or mental shortcut) for individuals to avoid being excluded from the group, and thus to be able to access shared resources.

Should individuals ignore this group heuristic, and behave selfishly instead of sharing their resources with other in-group members, it is likely to be noticed and may lead to a risk of developing a bad reputation (Yamagishi & Mifune, 2008). Furthermore, it may even lead to a risk of being excluded from the group, preventing access to shared group resources. Therefore, Yamagishi and Mifune (2008) argue that to minimise the risk of being excluded from a group, or incurring a bad reputation among other in-group members, individuals are by default likely to behave in a cooperative or altruistic way toward the in-group. Even if there is only a very small risk of detection of selfish behaviour, individuals will still refrain from attempting to 'free-ride' in the system of generalised exchange, for fear of exclusion. In conditions where individuals are anonymous and not identifiable to other ingroup members, it would be much more difficult for their ingroup members to hold them accountable for their behaviours and to exclude them from systems of exchange, based on their "bad reputation". In such a situation, selfishness or non-altruistic behaviour is less risky, and even risk-free, so therefore presumably more likely to occur. Conversely, when individuals are identifiable to the in-group audience,

they are more likely to cooperate than to behave in a selfish manner. Cooperation with in-group members is referred to by the authors as an "ecologically rational strategy for those whose livelihood depends so much on generalised exchange" (Yamagishi & Mifune, 2008, p. 8).

Generalized exchange systems depend on expectations of reciprocity. Yamagishi and Kiyonari (2000) have indicated that reciprocity can be distinguished into two different categories – direct and indirect. A study was conducted where the results of a simultaneous one-shot Prisoners Dilemma (PD) game were compared with those of a sequential PD game, in order to determine whether expectations of in-group reciprocity could have had a causal effect on in-group favouritism, rather than it being caused by simply identifying with the in-group. It was hypothesised that in the simultaneous PD game, where participants were not aware of the choice of their partner, there would be increased reciprocity towards the in-group, based on expectations that other in-group members would cooperate. This expectation is based on the above-mentioned group heuristic (Yamagishi & Mifune, 2008). In contrast, in the sequential game, where the one player makes a choice, and only then does the second player – after knowing what the first's choice is – make their play, it was hypothesised that the first player would be more likely to cooperate with the second player – regardless of that players group membership – due to the first player knowing that their choice may have an effect on the choice of the second player.

The results of their experiment supported their hypotheses, and it was shown that in a simultaneous PD game, players showed more in-group favouritism, and there was an expectation of indirect reciprocity from other in-group members. In the sequential game, an expectation of direct reciprocity was apparent, and controlling for the effect of expectations of reciprocity reduced the effects of in-group identification on cooperation.

Yamagishi and Mifune (2008) therefore suggest that common or unilateral knowledge of group membership also plays a role in behaviour. The authors suggest that in conditions where only one participant is aware of group membership – i.e. unilateral conditions – ingroup bias disappears because the participant can no longer expect that they will receive indirect benefits from their ingroup member, as there is no common knowledge of group membership. However, in conditions where group membership is common knowledge, and all participants are aware of their group members actually being part of the ingroup, ingroup bias is likely to occur based on expectations of indirect benefit.

While Yamagishi and Mifune (2008) suggest that reputational concerns may prevent individuals from behaving greedily due to fears of exclusion, no follow-up studies to date have attempted to examine whether personal identifiability or anonymity (in terms of being personally identifiable to others) within the ingroup could contribute to ingroup bias or greed. However, Mifune, Hashimoto and Yamagishi (2010) did conduct a study which examined the effects of an image of eyes on altruistic behaviour towards ingroup members. The authors suggested that exposure to an image of eyes caused participants to have higher public self-awareness, as the image served as a cue to the presence of monitoring by the community. The study indicated that when exposed to an image of eyes, participants showed higher levels of altruism towards their ingroup members. Mifune et al. (2010) suggest that being monitored by community members causes participants to have concerns about their reputation, and so they are more likely to behave according to social norms. From this, it could be suggested that when participants are anonymous, their behaviour is not being monitored or specifically attributed to them – and so their concerns about reputation should be lessened.

There have been several studies which have examined reputational concern with regard to behaviour. Nakai (2014) conducted a study which used agent-based evolutionary simulations for behaviour that demonstrated the emergence of ingroup favouritism, and the study indicated that reputation can affect how other ingroup members react to a player. In this study, reputation was operationalized by manipulating how cooperative or uncooperative an agent was within a group. Specifically, when players do not cooperate with the group, other group members stop cooperating with the defecting group member – and the author refers to this as the "in-groups' revenge". Nakai (2014) further suggests that reputation is something which is created and shared within the group context. From this we can expect that reputation is an important factor in determining behaviours in the group context.

One study even compared reputation-based theories and social identity theory. Romano, Balliet and Wu (2017) examined whether ingroup favouring behaviour was a result of high levels of social identification, or due to reputational concerns. They conducted 5 studies which examined whether cooperation was affected by cues of indirect benefits within the group context. Reputation was operationalized by making participants decisions private or public – where it was expected the cooperation would be more likely when decisions were public, than when they were private. The authors found that reputational concerns mediated ingroup favouritism, and more interestingly, found that reputation promoted cooperation with both ingroup and outgroup members, suggesting that the effect does not only occur for behaviour

within the ingroup. Additionally, the study found no support for the idea that social identification could be responsible for ingroup favouritism.

In line with Yamagishi and Mifune's (2008) argument that reputation is a major factor in social behaviour, De Cremer and Bakker (2003) argue that in social dilemmas, when an individual's decisions or actions are public (not anonymous – the individual is identifiable and linked to their actions), the social consequences of such decisions are likely to influence the type of behaviour engaged in. When an individual's actions are made accountable to them, "this accountability activates concerns about one's reputation" (De Cremer & Bakker, 2003, p. 156). However, they suggest that accountability only influences decision-makers to the extent that they believe other group members are aware of the social norm of cooperation. What becomes important then, is what the norms of the audience they are accountable to are – i.e. is cooperation normative for the group in question.

Therefore, it can be expected that when individuals know that their actions are being evaluated by others with whom they are interdependent, they are more likely to maintain cooperation due to feeling accountable for their actions. In contrast, when their actions are anonymous, it is possible that cooperation will decrease due to a lack of accountability and a lack of concern about reputation. Self-regulation of particular behaviours occurs as a function of the audience to whom one is identifiable and accountable. So, one can argue that when one is anonymous, the only audience one is accountable to is the self, and thus selfish behaviour may occur. However, there could be other explanations for selfishness according to deindividuation theory and the SIDE model. Deindividuation theory would argue that rather than reputation playing a role, anonymity could instead cause a loss of inhibition, leading to selfishness. This contrasts with the SIDE model, which suggests that anonymity can enhance the salience of social identity, making one behave according to group norms rather than individual norms – in this case, if selfishness becomes a group norm, group members will be more likely to act selfishly if they see other members doing so.

Similarly, Tennie, Frith and Frith (2010) state that reputation is an important feature of gaining cooperation and thus reciprocation from others. They argue that when an audience is present, individuals are more likely to behave in a way that enhances their reputation, not only because there are observers present who judge their behaviour, but also because these observers may spread the news about an individual's behaviour. In contrast, when no audience is present (or when individuals are anonymous), individuals are more likely to take part in 'reputation-

diminishing behaviour' such as cheating, exploitation, or selfishness, as there is no risk of detection (Tennie et al., 2010).

After reviewing deindividuation theory, the SIDE model and reputational theory focused on systems of generalized exchange, it becomes clear that the three theories provide contrasting explanations for certain behaviours. Below, I outline how these theories differ from one another in this regard.

## Contrasting theoretical explanations for behaviour under specific conditions of identifiability

Deindividuation theory, the SIDE model and reputational theory provide differing theoretical accounts for individuals' behaviour within the social context. Based on the literature, there is significant evidence which supports the theory that reputational concerns could be a mediator for ingroup cooperation and the adherence to group normative behaviour. However, there also appears to be some evidence for the theory that social identity could provide an explanation for behaviours such as ingroup favouritism and selfishness.

If one considers Yamagishi and Mifune's (2008) suggestion that within social groups there are systems of generalised exchange, it makes sense that groups can be seen as a vehicle for individual benefit in that participants are reliant on one another to be able to gain access to resources – and for this reason it is in their best interest to cooperate with other group members and uphold their good reputation if they want to be able to benefit.

The SIDE model (Reicher et al., 1995) also provides a strong theoretical base for understanding decision-making in social situations. These decisions are very much dependent on the conditions which surround the social situation. When faced with conflicting demands (for example, having the option to choose fairness versus in-group favouritism in a situation), individuals have to make careful decisions regarding what the best way forward would be, and they will do this according to whatever social identity is salient for them. It is in these types of situations that norms begin to emerge and evolve, and where the strategic side of identity performance comes into play.

All three theories suggest that the state of identifiability (or anonymity) to an audience will have an impact on an individual's actions, however the reasoning behind each theory regarding these behaviours differs. Each theory can be considered in terms of the state of identifiability, and the behaviour which could be observed within a state of identifiability. For example, an

individual may be anonymous, identifiable to either an ingroup or outgroup only, or completely visible to anyone in the social context. In each of these conditions, the individual would behave in specific ways. In some contexts, the behaviours which can be predicted by the theories may be the same, and in other contexts, the predicted behaviours will differ. However, even when the predicted behaviour is the same, the underlying explanation for it will differ according to which theory is applied.

For example, when an individual is anonymous, both deindividuation theory and reputational theory suggest that an individual may behave in ways that would usually be deemed inappropriate, such as behaving selfishly. While deindividuation theory suggests this is due to the individual's behaviour becoming disinhibited as a result of being anonymous, reputational theory would argue that it instead occurs as a result of the lack of concern for personal reputation, as the individual cannot be held to account for their behaviour. In contrast, the SIDE model suggests that anonymity can result in increased salience of social identity, and that group normative behaviour is more likely to occur. In this case, the behaviour which occurs would depend on group norms, and could range from ingroup favouritism to selfishness, depending on what norms evolve in the situation.

When visible to the ingroup, both the SIDE model and reputational theory suggest that an individual will cooperate with other ingroup members. However, the two theories do not agree on the explanation for this behaviour. The question, then, could be posed as follows: Do participants cooperate with other ingroup members because their social identity is salient and it is normative for them to do so, or because they are concerned that their reputation is at stake? Arguably, if they are concerned with their reputation, it could be more about personal identity and not wanting to look bad because it would be personally damaging to them in terms of economic benefit. In contrast, if behaviour is due to a salient social identity, there is more concern about the standing of the group as a whole, because the social group contributes to the individual's self-concept.

For both the SIDE model and reputational theory, visibility to the outgroup would be expected to result in behaviours that may be less ingroup cooperative. From the perspective of the SIDE model, this would result in social identity becoming less salient, and personal identity driving behaviour instead. Alternatively, even if social identity is more salient, visibility to the outgroup could cause an individual to avoid displaying ingroup favouring behaviours in order to prevent the outgroup from competing with the ingroup. Reputational theory, in contrast,

would explain a lack of ingroup cooperation as being driven by a reduction in concern for one's reputation. Instead, because the individual is visible to the outgroup, they are also accountable to the outgroup and so behaviour may actually cause individuals to cooperate with outgroup members instead. When an individual is visible to all others in a social context, reputational theory suggests that individuals will likely cooperate with all individuals in the exchange system, in order to maintain their reputations within and access to the system of exchange. According to deindividuation theory, if an individual is visible to others, their behaviour will become inhibited and controlled by their personal standards, resulting in behaviours that are considered appropriate. It could be expected, then, that individuals will cooperate with those who interact with them. From the perspective of the SIDE model, behaviour when visible to all others in the social context will depend on which is more salient at the time – social or personal identity. If social identity is highly salient, an individual will behave according to group norms, however if personal identity is highly salient, an individual will be more likely to behave according to personal standards. With whom one cooperates will therefore depend on whether social or personal identity is more salient.

The SIDE model (Reicher et al., 1995) suggests that strategic side of identity performance is linked to the ways in which norms begin to evolve. Often, this strategic side is what spurs on the creation and emergence of new norms within a social situation, and rather than following existing rules or norms, individuals deliberately use different forms of identity performance during interaction to create new norms and persuade other members of their group to follow them. In contrast, Yamagishi and Mifune (2008) suggest that behaviours are governed by concerns for an individual's reputation, and that group members behave according to a group heuristic which ensures that they cooperate with other group members in order to avoid being excluded from generalized systems of exchange, which are inherent in all types of group interaction. In reputational theory, normative behaviour is perceived as static – group members behave according to a group heuristic in order to gain access to exchange systems. Contrastingly, the SIDE model treats normative behaviour as an evolving phenomenon.

If one is able to put a system of exchange into place, it is possible to conduct an analysis of behaviour in various conditions of identifiability, making hypotheses based on the above theories. The Virtual Interaction Application (VIAPPL) – a software designed for experimental study of social interaction – provides an opportunity to study such systems of exchange. Using this platform, it is possible examine how players behaviour under specified conditions and what kinds of norms emerge.

## The Virtual Interaction Application as an experimental platform for the study of norm emergence and the evolution of behaviour

Due to the extensive research conducted using the minimal group paradigm, normative behaviour in minimal group situations is fairly well understood in the laboratory context. While the use of the traditional minimal group paradigm allows for the researcher to inhibit interaction and have more control over the variables, it doesn't take the interactive nature of the intergroup situation into account. In reality, norms do not remain static and human beings do not exist in a social vacuum. Rather, norms change over time due to the interaction that takes place between individuals.

Traditional minimal group paradigms do not allow for the phenomena that contribute to in-group favouritism to be seen in their true interactive form. Fu et al. (2012, p. 1) argue that "the dynamic nature of bias results from complex social network interactions which play a central role in human societies" and that "the multi-faceted, dynamic and emergent nature of group identity is central to bias." Therefore, it appears that an interaction itself can have significant effects on how phenomena evolve, and that if the interaction is repeated it may not produce the same result.

The VIAPPL platform allows for the study of emergent norms and interactions as they evolve and emerge over the course of a game (Durrheim, Quayle, Tredoux, Titlestad & Tooke, 2016). Token allocation by participants over a series of rounds is used as a means by which norms evolving in interaction can be studied. The VIAPPL platform has been used to test levels of in-group favouritism in both individual and group conditions. While the experimenters impose specific conditions in the first round of the game, whatever happens in subsequent rounds is completely determined by the participants in interaction with one another. This means that norms will not only change according to the inter-group situation, but also according to interactions that take place. The VIAPPL platform allows for the dynamic nature of intergroup relations to be studied in an experimental context.

Durrheim et al. (2016) used the VIAPPL platform to conduct two studies which investigated ingroup favouritism and its evolution under a variety of conditions: including individuality versus groupness; equal status versus unequal status; and a no norm versus fairness versus competition condition. Based on social identity theory, Durrheim et al. (2016) hypothesized

that firstly, categorization of players into groups would promote group-based behaviours such as ingroup favouritism, and secondly, that implementing a social hierarchy based on unequal status relations between groups would result in low status group members partaking in ingroup favouring behaviours, whereas high status group members would partake in outgroup compensatory giving. The results from both studies that were conducted provided support for the hypotheses, and also indicated that the VIAPPL platform was successfully utilized to manipulate the experimental conditions and test the hypotheses.

Due to the argument that identifiability to specific audiences has a significant effect on the ways in which individuals choose to behave, the VIAPPL platform makes it possible to experimentally test how different audiences may affect individual's token allocation and the subsequent evolution of norms in the situation. By manipulating the participants' identifiability to specific audiences in the game, it is possible to test the resulting change in their behaviours during interaction over time. By examining exactly which behaviours exist in actual interactions between participants, we can make extrapolations as to which psychological processes may be at play – those related to social identity or those related to reputational concern. The VIAPPL platform allows for the observation of how group norms become relevant and change over time, specifically with regard to the audience to whom one is identifiable and accountable.

## Aims and Rationale

The aim of the following study was to examine whether participant behaviours (namely ingroup favouritism, self-giving and reciprocation) within a virtual, intergroup environment were affected by identifiability (anonymity versus being identifiable to various audiences) and status (being part of equal, high or low status groups). The following objectives were identified:

1. To determine whether anonymity results in participants partaking in self-giving behaviour, or contrastingly, in group normative behaviour, such as ingroup favouritism.

2. To determine whether visibility to the ingroup results in participants partaking in ingroup favouring behaviour.

3. To determine whether visibility to the outgroup results in lower levels of ingroup favouritism, and higher levels of direct reciprocation.

4. To determine whether visibility to all players results in high levels of direct reciprocation, or high levels of ingroup favouritism.

5. To determine whether being visible to those with whom one has interacted with results in high levels of direct reciprocation.

6. To examine whether being part of a low status group results in high levels of compensatory ingroup favouring behaviour.

## Hypotheses and expectations

There are several hypotheses that can be made based on the three theoretical frameworks – namely traditional models of deindividuation, the SIDE model, and reputational theories – outlined in the literature review:

> $H_1$: The SIDE model(Reicher et al., 1995), suggests that conditions of anonymity can either accentuate or attenuate group normative behaviours such as ingroup favouritism, such that anonymity may increase the salience of social identity and result in higher ingroup favouritism, or it may result in heightened personal identity which could result in behaviours related to personal standards rather than group norms. If social identity was salient, it would be expected that ingroup favouritism would increase when anonymous. Contrastingly, based on reputational theory, it can be hypothesized that when an individual is anonymous and cannot be held directly accountable for their actions, they may be more likely to behave in ways that would usually be deemed inappropriate in the group context – such as behaving selfishly. Similarly, deindividuation theory suggests that anonymity causes disinhibited behaviour, and so it could be expected that individuals will also be more likely to display selfishness in an anonymous state.
>
> $H_2$: When visible to the in-group only, in-group favouritism will increase. In this instance, Yamagishi and Mifune (2008) suggest that when an individual is being monitored by other ingroup members, they are more likely to take note of the group heuristic and behave in an altruistic fashion towards in-group members in order to avoid being excluded due to uncooperative behaviour. This would also support the SIDE model (Reicher et al. 1995), as it suggests that identifiability to the in-group may lead to an increase in group-normative behaviour – in-group favouritism – due to the increased salience of ingroup social identity.
>
> $H_3$: Based on Yamagishi and Mifune's (2008) reputational theory, when visible to the out-group only, in-group favouritism should decrease. This is because the individual is

not identifiable to their in-group, there is no risk of detection or exclusion when they do not behave altruistically toward their in-group. This would also support the SIDE (Reicher et al., 1995) as when identifiable to the out-group, the individual may wish to downplay any expectations for in-group favouritism in order to prevent the out-group from thinking it is taking place. This may prevent the out-group from competing with the in-group. It is also possible that being visible to only outgroup members would result in personal identity becoming more salient, highlighting the fact that one is visible as an outgroup individual rather than an ingroup member – increasing the perception of commonalities with individual members of the outgroup. This would result in allocations being made based on personal preferences rather than group norms. Additionally, direct exchange may occur as the game progresses (Yamagishi and Kiyonari, 2002), thus a norm of reciprocation could emerge for players who are visible to the outgroup. As the VIAPPL platform is not a "one-shot" type of software, an experiment is conducted over a series of several rounds. Therefore, participants are aware that their decisions and behaviours can affect those of other participants. This may result in a reduction of in-group favouritism when only visible to the out-group, due to participants having an expectation of direct exchange with the participants that they are visible to, rather than generalised exchange, as they are not identifiable nor accountable to their own in-group.

$H_4$: Deindividuation theory suggests that being personally visible to others (i.e. both the ingroup and the outgroup) results in individuals inhibiting their behaviour and acting in socially acceptable ways, and it could be expected that if deindividuation theory were supported, participants in this condition would show direct reciprocation with those they received tokens from. When visible to both in-group and out-group, the SIDE model suggests that behaviour will depend on whether personal or social identity is more salient. If social identity is more salient, a participant will be likely to behave in group normative ways, and show higher ingroup favouritism. If personal identity is more salient, behaviour will be less likely to be group normative, and ingroup favouritism would decrease. According to the reputational theory (Yamagishi and Mifune, 2008), participants in this condition will be more likely to indirectly reciprocate with all other participants in order to avoid being excluded from the system of exchange. In this case, we would expect that there would be a reduction in group favouritism due to the system of exchange including both in and outgroups.

$H_5$: When visible only to individuals one receives from and gives to, participants will be more likely to directly reciprocate. When involved in a system of generalised exchange (Yamagishi and Mifune, 2008), to avoid being excluded and to gain access to shared resources, one must cooperate and behave altruistically towards other members of the system. Therefore participants are more likely to behave altruistically towards and cooperate with those whom they receive tokens from. In this condition, direct exchange will be more likely to occur.

$H_6$: When belonging to a group that is less powerful, and where the inequality is perceived as illegitimate, participants are more likely to display in-group favouritism. In order to change the illegitimate power hierarchy, a weaker group must express resistance to a more powerful group, and one way of doing this is by members uniting in order empower the group as a whole.

$H_7$: The SIDE model suggests that normative behaviour emerges over time as individuals make decisions about how to behave. It can be expected that ingroup favouritism, self-giving and reciprocation will emerge and change over time.

# Chapter 3: Methodology

## Experimental platform: The Virtual Interaction Application (VIAPPL)

The Virtual Interaction Application (VIAPPL) platform is an experimental software that allows for the observation of social interaction as it takes place within a game-like environment (Durrheim et al., 2016). This platform allows researchers to manipulate the social conditions surrounding interaction, and in turn evolving norms, networks and social identities can be observed in action.

Participants are represented as avatars on the screen, and interact by allocating tokens to one another over a series of rounds, situated within a single game. Researchers are able to manipulate key variables such as whether participants are playing as individuals or as members of a group, the number of groups involved in the interaction, the size of groups, and starting token balances of groups.

Additionally, researchers are able to manipulate features of the social environment, such as legitimacy of status and the meaning of exchanges (e.g. tokens representing money). This allows for full manipulation of the social context in which exchanges will take place, and allows researchers to observe how norms evolve under specific conditions.

## Research Design

### Experimental design and behavioural measurement

The present study employed a quantitative experimental design, involving both within and between-subjects factors. This type of design allows for the objective observation of individual's behaviour as it takes place in the experimental intergroup context.

The within-subjects factor was time. There were (n=40) rounds of token allocations (tokens were monetary) nested in the game. This allowed for the observation of behavioural changes in the game over time.

There were two between-groups factors. The first factor was status which involved manipulating the levels of equality and inequality among the groups by varying the token balances of groups. This independent variable had three levels: equal status, high-status and low-status. In equal status conditions, participants all began the game with twenty tokens. In the inequality status conditions, high-status participants began the game with thirty tokens, and low-status participants began the game with ten tokens. Inequality was illegitimate, and was

manipulated by randomly assigning participants to two groups, with one group receiving more tokens than the other. Participants were randomly assigned to a group by the software. However, to manipulate the perceived legitimacy of their status, participants were asked to complete a dot estimation task (see Appendix 1) and were informed that they had been placed in a group with players who had similar estimates to their own. Due to there being no reason for one group receiving more tokens, it was expected that participants would perceive the status situation to be illegitimate or unfair.

The second factor, the identifiability of participants to both in- and out-group members was also manipulated. Identifiability of participants was achieved by taking webcam photographs of them prior to the start of their participation. These photographs were used as their avatars when their identifiability was manipulated.

Participants were required to take a webcam photograph after registering and logging into the experiment. The webcam was fixed on the screen of the computer, and aimed at the participants face. The photograph capability was built into the software for the game (see figure 1), and participants were required to take and approve their photograph before being able to begin the game. Players were always able to see their own photograph as their avatar.

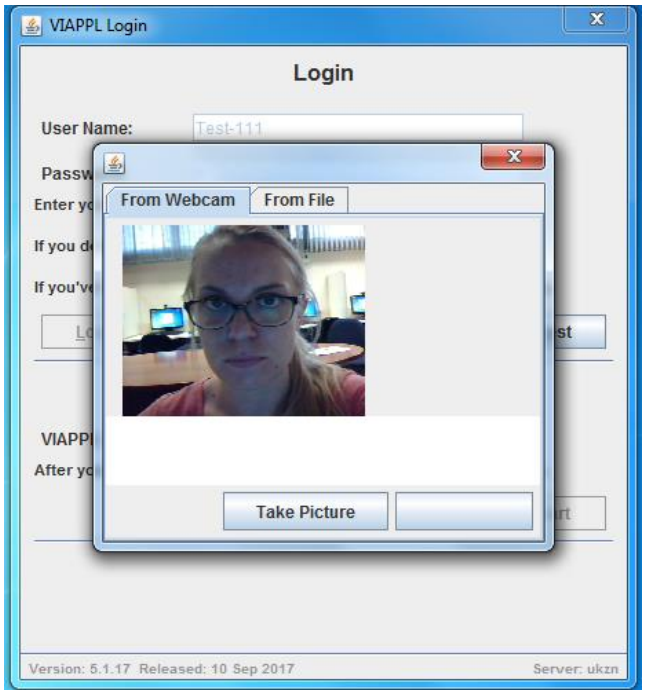



**Figure 1: Webcam photographs were taken and used as avatars. This functionality was built into the VIAPPL software.**

There were six levels of identifiability.

1) Anonymity (see figure 2) – participants were only visible to themselves on the screen. In this condition, participants avatars stayed fixed in one place on the screen throughout the game.

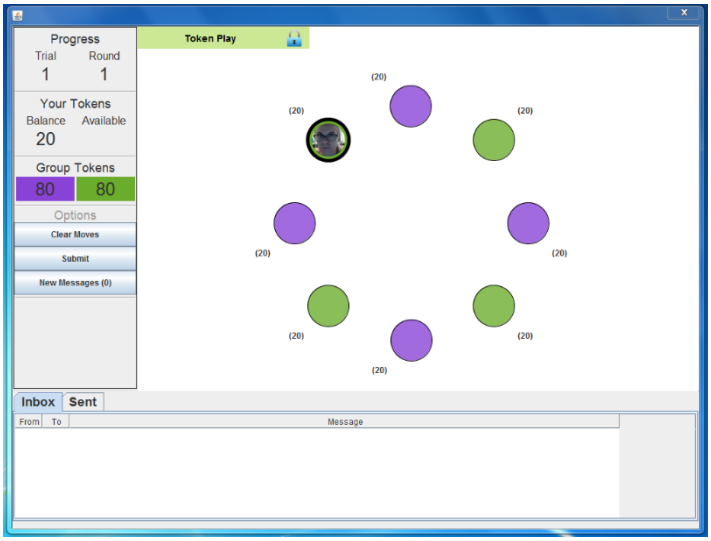



**Figure 2: Anonymity condition – visible only to oneself**

2) Complete anonymity (see figure 3) – in this condition, participant's avatars were also only visible to themselves. However, unlike the anonymity condition, in each round, the participant's avatar moved to a different position on the screen. This meant that there was complete anonymity, as one would not be able to work out who had moved where on the screen.

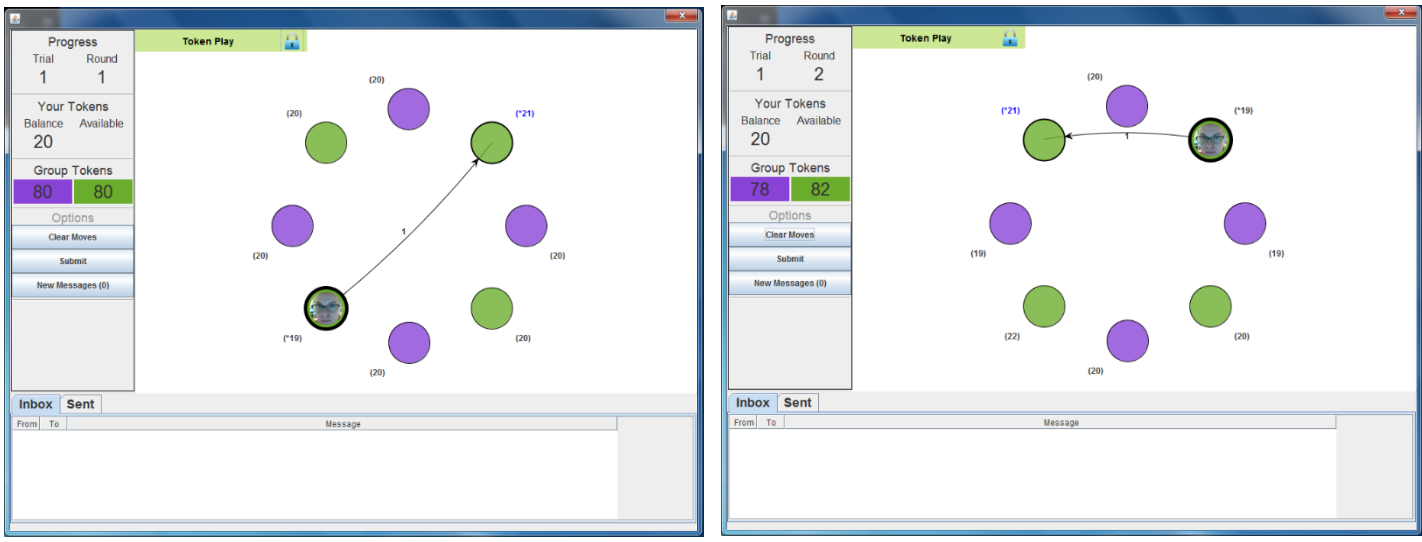



**Figure 3: Complete Anonymity Condition – note the change of geographical position in the arena between round 1 and round 2**

3) Visibility to in-group only (see figure 4) – participant's avatars were only visible or identifiable to themselves and members of their in-group.

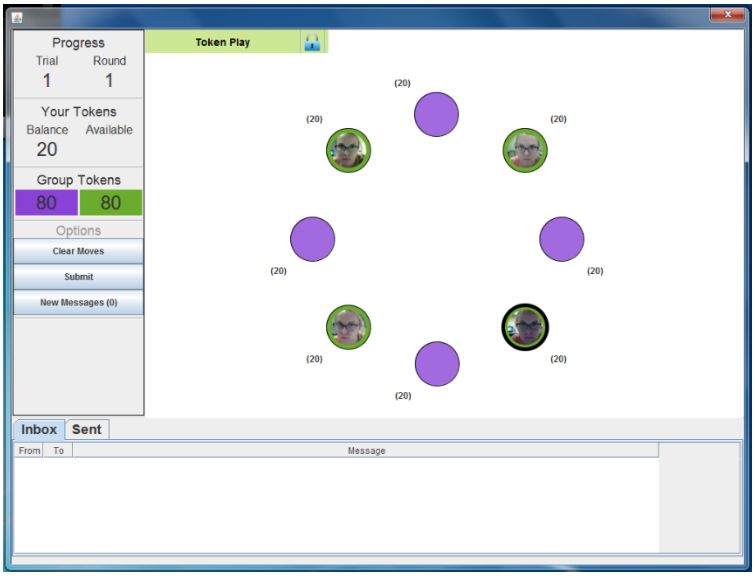



**Figure 4: Visible to the ingroup**

4) Visibility to out-group only (see figure 5) – participant's avatars were only visible or identifiable to themselves and members of the out-group.

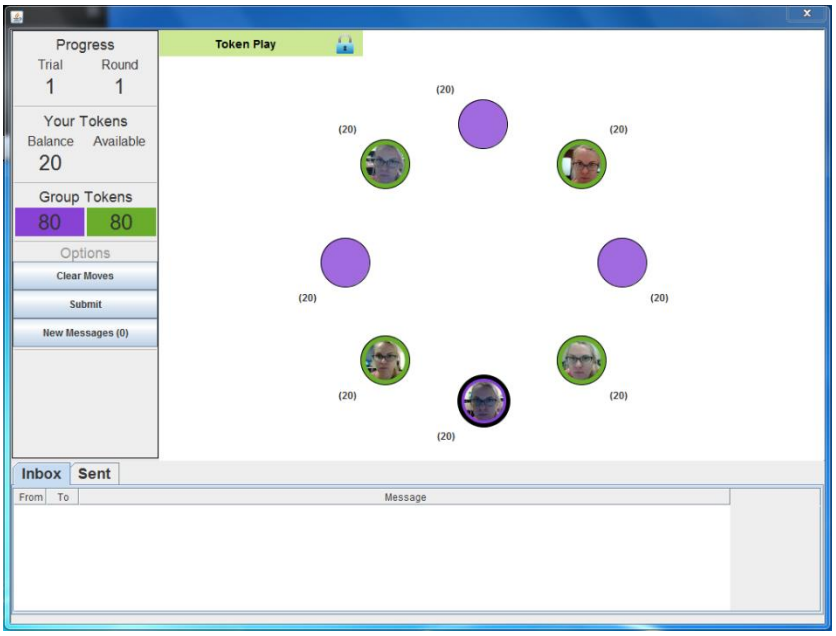



**Figure 5: Visible to the outgroup**

5) Visibility to both ingroup and outgroup (see figure 6) – participants avatars were visible to themselves and members of both in- and out-groups.

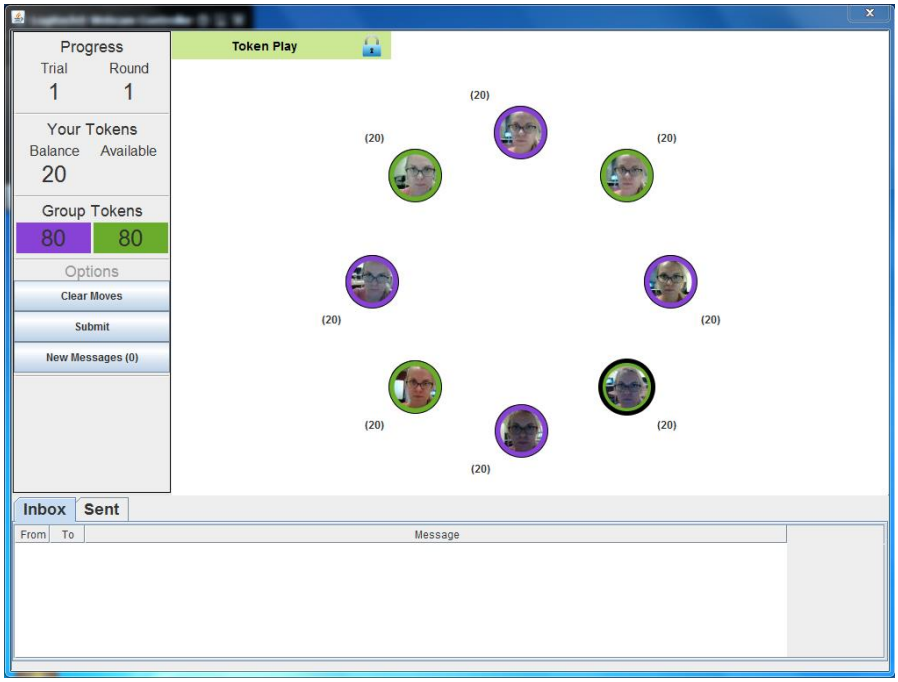



**Figure 6: Visible to all players**

6) Visibility to ties (see figure 7) – only visible to individuals from whom participants receive tokens and those who they give tokens to.

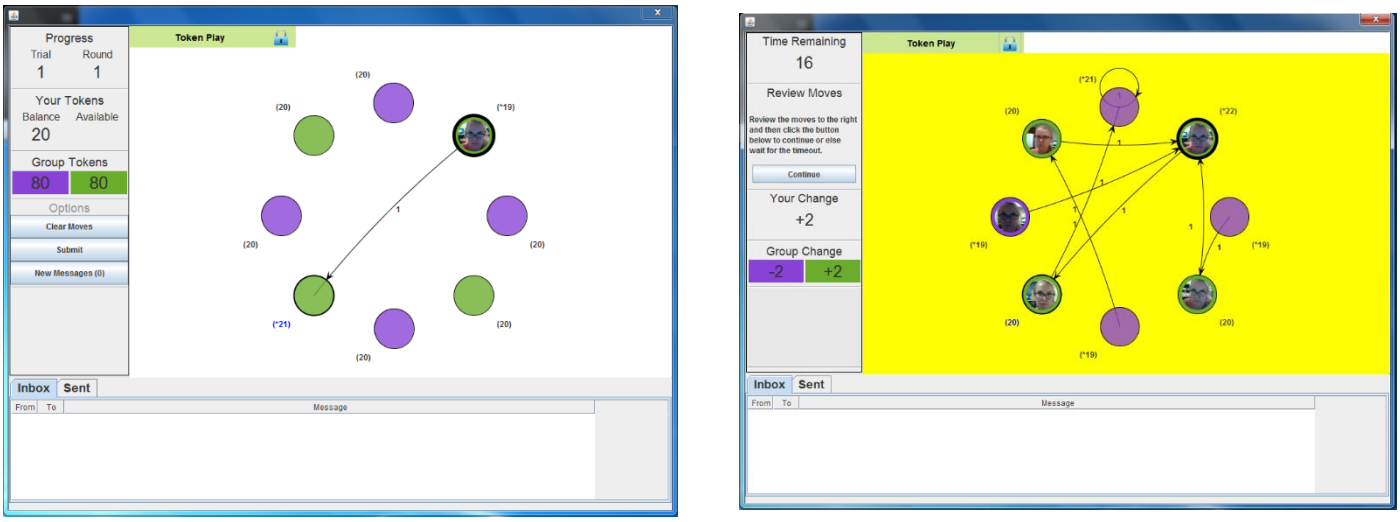



**Figure 7: Visible to ties – note that after submitting their allocation, the player is able to see those they received from and gave to on a review screen for the previous round.**

**Sampling**

The sample consisted of *n* = 480 participants. Participants' ranged in age from 18 years old to 38 years old. The mean age of participants was *M*= 21.33 (*SD* = 2.79). Of these, *n* = 302 were female participants (62.9%) and *n* = 176 (36.7%) were male participants. Of the total number of participants, *n* =458 (95.4%) were Black, *n* = 10 (2.1%) were Coloured, *n* = 8 (1.7%) were Indian and *n* = 2 (0.4%) were White. Missing demographic data was noted for two of the 480 participants. These two cases were dropped from the analysis for demographic information.

The chosen sampling method was a non-probability, convenience sample. This was due the large population of students available, as well as the main aim of this study not being generalisability, but rather the observation of consistency in behaviour of the participants when placed under specific experimental conditions within the game.

**Psychometric measurement**

Demographic data were obtained through the use of LimeSurvey, which is an online tool for conducting surveys. The VIAPPL software allows for LimeSurvey questionnaires to be integrated into specific parts of a game. LimeSurvey is used to obtain demographic information and to conduct manipulation checks. The only manipulation check which was included

determined whether participants had been successfully placed into the two different groups. A binomial test was conducted on the manipulation check for group belonging. In the first group (purple), 100% (240 of 240) of the participants answered correctly and in the second group, 98% (236 of 240) of the participants answered correctly.

**Variables**

The independent variables were thus:

- Group status - consisting of three levels: equal, high and low-status.
- Identifiability – consisting of six conditions: Complete anonymity, anonymity, visible to ingroup, visible to outgroup, visible to ties, and visible to all.
- Time

***Time***

As time consisted of 40 rounds of play, it would be difficult to use in in its original form for comparative purposes, due to the very large number of fixed effects this would create in the models. For this reason, the time variable was grouped into several waves, which each consisted of a number of rounds. The waves were then used for comparative purposes. The models for ingroup favouritism and reciprocation treated time as a factor with 5 waves (levels), each of which included 8 rounds of play.

Due to the extensive zero-inflation and increase of self-giving over time, the self-giving models treated time as a factor which included 4 waves (levels), each of which consisting of 10 rounds. This was done to further decrease the number of fixed effects for the models, in order to ensure the models would converge.

The dependent variables were:

**Ingroup favouritism**

Ingroup favouritism was modelled using the nlme and lme4 packages in R. Ingroup favouritism could be best described as a group-favouring strategy. Ingroup favouritism was operationalised by using the proportion of tokens given to the ingroup over the sum of tokens given to both ingroup and outgroup:

$$Ingroup\ favouritism = \frac{Ingroup\ giving}{Ingroup\ giving + Outgroup\ giving}$$

This allowed for the ratio of ingroup giving to be compared to the sum of giving to both groups. This ratio could then be examined to see if it increased or decreased over time across experimental conditions. Ingroup, outgroup and self-giving were count variables which could each range from 0 to 8 (and jointly summed up to 8) in each wave.

**Self-giving**

Self-giving was collected as a separate variable from ingroup giving and was modelled using the lme4 package in R. Self-giving could be best described as a self-favouring strategy. Self-giving was operationalised by determining the proportion of the number of tokens allocated to self over 4 experimental time waves – each of which included 10 rounds of play.

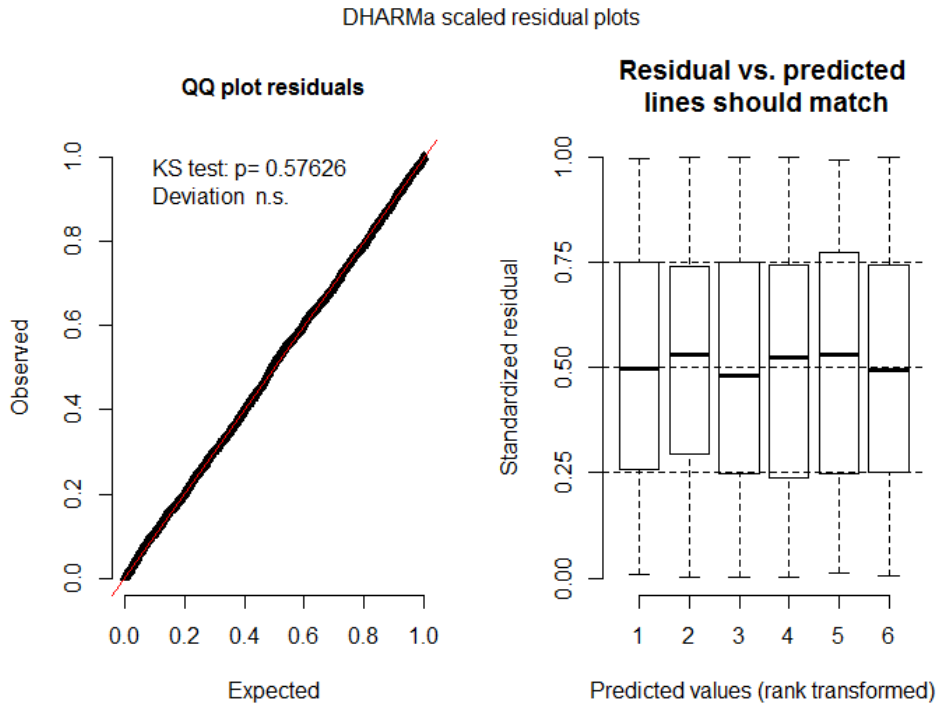
$$Self\text{-}giving = \frac{Tokens\ to\ self}{Number\ of\ rounds\ (10)}$$

Therefore, the total proportion of self-giving over each wave could be examined, and the proportions compared to see if there was an increase or decrease over time across the experimental conditions.

**Reciprocation**

Reciprocation could be best described as an exchange favouring strategy. To model reciprocation, a binary variable was created where if a participant received a token from the person whom they gave a token to in the previous round, reciprocation would be a 1, and if not, it would be a zero. In order to do this, the data was lagged. A generalised linear mixed-effects model was run via the glmer() function with a binomial distribution for these data. The residuals from the model were difficult to interpret. For this reason, the DHARMa package in R was used to assess model fit. The DHARMa package produces a quantile to quantile plot in order to detect overall deviations from the expected distribution, as well as a plot of the residuals against predicted values (Hartig, 2017). The scaled residual plots which were produced by the DHARMa package, based on the glmer() model showed that the model fitted the data well (Figure 8).

**Figure 8: DHARMa scaled residual plot of reciprocation model using glmer()**



Creating variables for ingroup favouritism, self-giving and reciprocation allowed for the operationalisation of the behaviours which could be expected from the different conditions of identifiability, based on deindividuation theory, the SIDE model and reputational theory.

**Table 1 : Research Design**

| Conditions of identifiability | No. of replications | | |
|---|---|---|---|
| | Equality | Illegitimate Inequality | Total replications per identifiability condition |
| Anonymity | k=5 | k=5 | k=10 |
| Complete Anonymity | k=5 | k=5 | k=10 |
| Identifiable to In-group only | k=5 | k=5 | k=10 |
| Identifiable to Out-group only | k=5 | k=5 | k=10 |
| Identifiable to both in- and out-group | k=5 | k=5 | k=10 |
| Identifiable to Pt. received tokens from and given tokens to | k=5 | k=5 | k=10 |

In total, sixty experimental games were conducted (ten games per identifiability condition, of which five had an equal status condition, and five had an unequal status condition) and eight participants were included in each experimental game (see Table 1).

In addition, the two experimental constants which were visible to all participants for the duration of the game were also included in the design. These were:

- token balances (delineating the number of token players accrue in each round) and
- ties between participants (which form as a result of token exchanges between them).

**Ethical considerations in sampling and data collection:**

Full ethical approval was granted by the UKZN Humanities and Social Sciences Research Ethics Committee for this study (Appendix 1). The sample did not include special or vulnerable participants. All participants were over the age of eighteen years. Participants were recruited through the use of an advert (Appendix 2), stating that we are conducting a study on virtual interaction and intergroup behaviour, as well as in person by the experimenters and research assistants.

All participants were given an information letter (Appendix 3) and were encouraged to ask questions if they experienced any misunderstanding. Additionally, participants were asked to sign an informed consent form (Appendix 4), stipulating that they understood that participation was voluntary as well as confidential, and that they were able to withdraw from the study at any point.

While participants were required to scan their fingerprint to take part in the study, this was only done in order to prevent them from participating in more than one game, and did not link their behavioural data to any personal information, such as their name or student number. Additionally, in order to log into the game, participants had to register a VIAPPL account which required their email address and name. However, this information was in no way tied to their game data. LimeSurvey data was anonymous.

Participants were given a small cash payment as an incentive and/or partial compensation for their time, expenses accrued and effort involved in taking part in the study. Incentives were used to make the games a realistic competition for resources. Each token in the game was valued at R1, enforcing the illegitimate inequality of the starting token balances. Each participant received an incentive that coincided with their final token balance, plus a bonus ZAR10.00. The average cash incentive was ZAR30.00 per participant.

The experimental study involved some low risk deception. Participants were told that they were assigned to their group based on them being over estimators or under estimators in a dot estimation task, however in reality they were randomly assigned to their groups. This low risk form of deception was warranted in this study as the research explored the effects of group membership and identifiability to in- and out-groups on individuals' behaviour using the minimal groups created in the experimental setting.

Participants were debriefed after their participation in order to minimize any potential stress or harm. Participants were debriefed by informing them that their assignment to a group was allocated randomly (see experimental procedure – Appendix 5).

The VIAPPL data from the games were stored on the main server in the Psychology Laboratory, and the demographic data were collected through LimeSurvey, with the data stored on the Psychology Laboratory's administration profile which is not accessible to any third party. The Psychology Laboratory requires an alarm code and key to gain access to the room. Furthermore, the LimeSurvey profile requires the use of a username and password in order to gain access; these are not freely available to third parties, and are only know to experimenters.

## Data analysis

Token exchanges made during each trial situated within each game were recorded by the VIAPPL software. Trial one was used to familiarise participants with how the game worked and to allow them to practice allocating tokens. The analysis used the data from trial two, which consisted of forty rounds of play.

The VIAPPL software allows for the exportation of the game data to Microsoft Excel format. These sheets were then read into the statistical program R. Due to the complex nature of the game data (participants' interactions over time, over a number of rounds and games with specific conditions) multilevel modelling was the chosen method for analysis.

### Reliability, validity and generalisability

The results from the studies conducted by Durrheim et al. (2016), indicate that the VIAPPL game environment provides a successful experimental platform in which to conduct experiments of this nature, where consistency in behaviour was observed amongst players. The VIAPPL platform allows for the evolution of behaviour as interactions take place over time, i.e. over the 40 rounds of play. For this reason, reliability in terms of repeatability in its traditional form is not expected, but one can expect consistency in behaviour between similar conditions.

The internal validity of experiments conducted using the VIAPPL platform is reasonably high, due to the studies being conducted using a controlled experimental approach. This methodology reduces the possibility of confounding factors having an effect on results. For this study, these controls included measures such as random allocation of participants to computers, and therefore groups within the game; a strictly controlled environment where participants could not talk or communicate; the use of a fingerprint scanner to prevent participants from partaking more than once; and the use of an experimental procedure and script, to ensure little to no experimenter effects could occur.

The aim of this study was not to produce generalisability in the traditional sense (i.e. to a broader population), but rather to examine basic intergroup behaviours in a virtual, minimal group environment. Because this study only included students at the University of KwaZulu-Natal, the results cannot be generalized to the broader population, but may be indicative of social norms at the local, or specific group level.

## Multilevel modelling

Multilevel modelling allows for the variability between different layers of data to be taken into account (Snijders & Bosker, 1999). It is often used to analyse clustered (grouped) or repeated measures data (Buxton, 2008). For clustered data, there are often various contextual factors that may affect a measurement, for example, when conducting analyses on school children, their results could be affected by the class, school or region they are in. Failing to take these clustered variables into account could result in unrealistic results. Similarly, in repeated measures data, each measurement is not independent of the measures that came before it, for each individual. Multilevel modelling takes this lack of independence of measures into account, by including the nested nature of data in the structure of the model (Paranjothy & Thomas, 2000). Multilevel models allow for the inclusion of both random and fixed effects, whereas regression models only allow for the inclusion of fixed effects.

The VIAPPL data structure is a nested design, and multilevel modelling was found to be an appropriate method of analysis. VIAPPL data is nested due to individual responses being nested in rounds, which were nested in games with specific conditions attached to them. Multilevel modelling also allowed for the study of how behaviours emerged over time, by allowing time to be included as a random effect.

## Behavioural analysis

Behavioural analysis of the VIAPPL data was conducted in order to determine levels of ingroup favouritism and self-giving, and how these emerged over time based on different conditions within the game. The data were analysed using various packages in R.

Three different models were used to analyse ingroup favouritism, self-giving and reciprocation respectively.

### *Modelling*

### *Ingroup favouritism*

A hierarchical linear model was used for modelling ingroup favouritism, in order to take the unexplained variation between groups and individuals, and the fact that these vary in different ways into account (Snjiders & Bosker, 1999). In order to include this variation, both random intercepts and random slopes were included in the model.

Modelling of ingroup favouritism was achieved using the lme() function in R, which fits a linear mixed effects model to the data. This function allows for nested random effects (such as the random intercepts and slopes mentioned above) to be included in the model. The function also allows the analysis to take autoregressive data into account, where past values can have an effect on current values (as in the experiments included in this work, which included repeated measures, where previous rounds affected the output values for future rounds).

The linear mixed effects model was run with the following predictors:

*Time (5) x Status (3) x Identifiability(6)*

The model was run in order to determine main effects and to test interactions. Following this, tests for autocorrelation were conducted. The model was tested for the effects of random intercepts and random slopes, which were then included in the model. In addition, and AR1 correlation structure was applied to the model due to the autoregressive nature of the data – this improved the fit of the model.

Post hoc analyses were carried out using the emmeans and multcomp packages in R, to calculate estimated marginal means for each condition, and make multiple comparisons using Tukey's D.

***Self-giving***

An examination of the distributions for the self-giving data across the design indicated that the distribution was skewed and the data were extensively zero inflated with very little to no self-giving at the start of each condition, with this behaviour increasing over time (see Appendix 16). For this reason, it was decided to fit a linear mixed-effects model to the data using the lmer() function from the LME4 package. This allows for the inclusion of random effects. In order to deal with the violation of normality due to zero-inflation, the bootstrapping method was used as it does not rely on the assumption of normality in order to make inferences. Bootstrapping refers to a technique in which data is randomly resampled with replacement in order to create a number of resampled datasets (James, Witten, Hastie, & Tibshirani, 2013). From these resampled datasets, new confidence intervals can be computed.

The dependent variable for the model was Tokens to Self. The models were run with the following predictors:

*4 (Time) x 3 (Status) x 6 (Identifiability)*

Post hoc analyses of the self-giving models were run using lsmeans() from the lmerTest package in R, using Tukey's D. This allowed for the comparison of estimated marginal means.

***Reciprocation***

Reciprocation was operationalised by creating a binary variable which counted as 1 if reciprocation occurred, and 0 if it did not. This was achieved using a lag function in R. Following this, reciprocation was modelled as a binary independent variable using a generalised linear mixed effects model in R, with a full nesting structure of participants nested in games.

**Packages used in R**

Various packages were installed and loaded into R in order to conduct the analyses. The following packages were used (The Comprehensive R Archive Network):

*ggplot2*

The statistical package ggplot2 is designed to provide the user with a means with which to create statistical graphics or plots, which can be layered, starting with raw data and building up layers of annotations and summaries (Wickham, 2009). It uses a grammar based on the Grammar of Graphics, which allows components to be composed in many different ways. This allows one to tailor graphics to be specific to your problem.

*descr*

The descr package in R is used to compute descriptive statistics for categorical variables.

*vcd*

The vcd package in R is used to visualise categorical data.

*tidyr*

tidyr is a package in R used to "tidy" data so that it is easier to work with, by ensuring that each column is a variable and each row can be treated as an observation.

*dplyr*

The dplyr package in R is used for manipulating data.

*magrittr*

The magrittr package in R is used to reduce development time of code, as well as to improve the codes readability and maintenance.

*xtable*

The xtable package in R allows the user to make tables out of R output.

*simsalapar*

The simsalapar package in R is used for running and analysing simulation studies.

*readxl*

The readxl package in R allows for the easy importation and exportation of excel files into and out of R.

*tools*

The tools package in R allows the user to manipulate R packages and their documentation

*lubridate*

The lubridate package in R allows the user to work with dates and times in R.

*stringr*

The stringr package in R allows the user to manipulate characters in strings.

*moments*

The moments package in R provides a variety of ways to calculate skewness and kurtosis.

*nlme*

The nlme package in R is used to fit linear and non-linear mixed effects models.

*lme4*

The lme4 package in R is used to fit linear and generalised linear mixed effects models.

*effects*

The effects package in R allows the user to display effects in graph and tabular format.

*car*

The car package in R is used for regression analysis.

*DHARMa*

The DHARMa package in R allows for the easy interpretation of residuals coming from general linear mixed models (Hartig, 2017a).

*emmeans*

The emmeans package in R is used to calculate estimated marginal means for various kinds of models.

*multcomp*

The multcomp package allows for simultaneous inference in parametric models.

*lsmeans*

The lsmeans package in R allows for the calculation of least-squares means, contrasts and comparisons of slopes.

# Chapter 4: Results

## Descriptive Statistics: Ingroup, outgroup and self-giving across the full experimental design

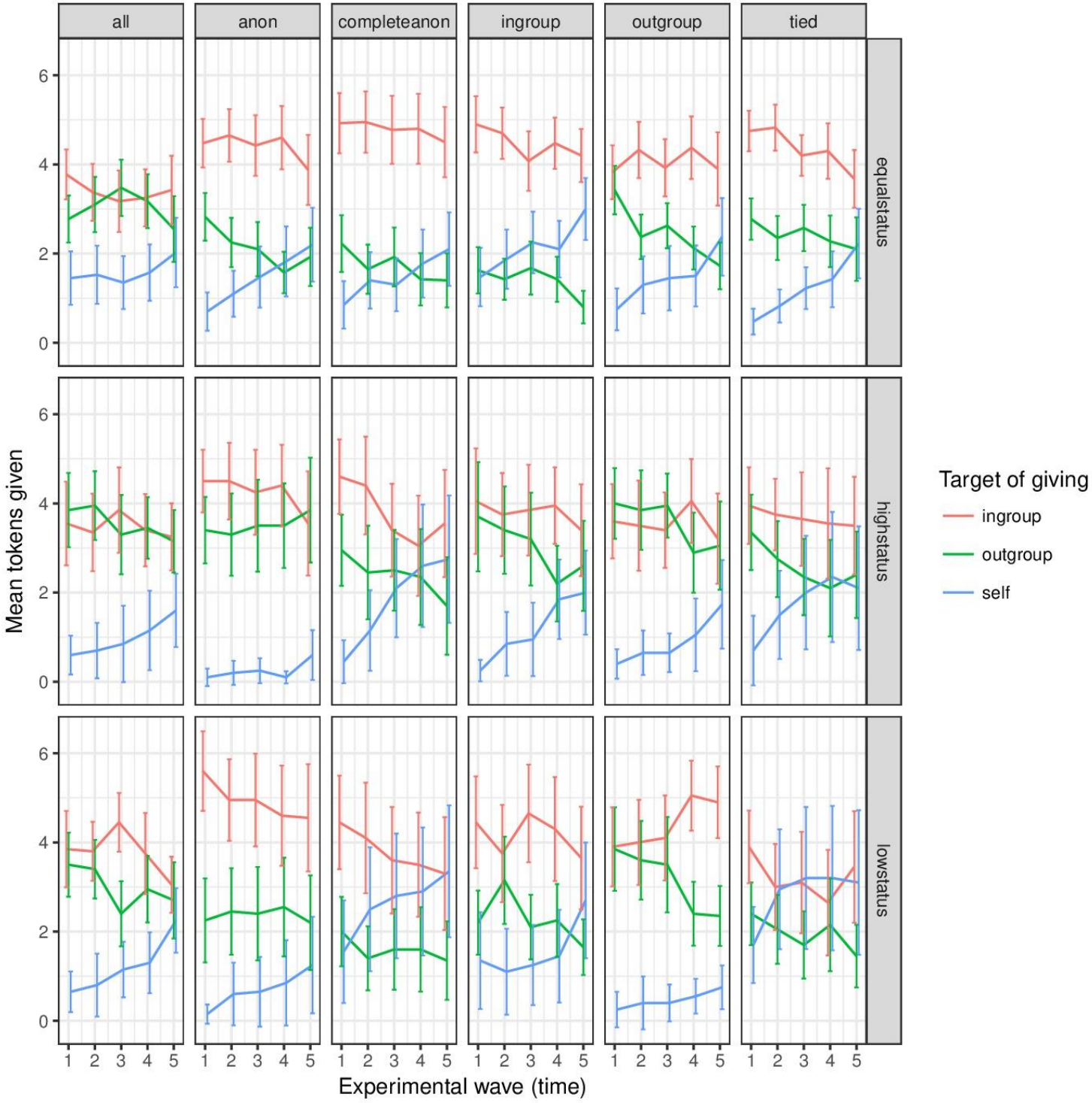
Descriptive statistics (means, standard deviations and skewness) were calculated for ingroup giving, outgroup giving, and self-giving across the full design. The means for ingroup, outgroup and self-giving refer to the average number of times tokens were allocated to the target group over the eight rounds in each experimental time wave. Following this, means were plotted graphically to illustrate the changes in ingroup, outgroup and self-giving over the five experimental waves, for each crossed condition in the full design (Figure 9).

Across the design, mean ingroup giving in the first experimental wave is higher than both outgroup giving and self-giving. The only exceptions to this are for the high-status group when visible to all players (Ingroup giving – $M$ = 3.550, $SD$ = 2.139), and when visible to the outgroup (Ingroup giving – $M$ = 3.850, $SD$ = 1.899). In these conditions' outgroup giving begins at a higher point than ingroup giving and self-giving. The other exception is for the low-status group, when visible to the outgroup (Ingroup giving – $M$ =3.900, $SD$ = 2.024). In these conditions', outgroup giving and ingroup giving appear to begin at more or less equal levels. Self-giving begins at lower point than both ingroup and outgroup giving across all conditions in the design.

Ingroup giving decreases over time (between wave one and wave five) across all equal status and high-status group conditions. However, in the low-status group condition, when visible to the outgroup, ingroup giving increases between the first ($M$ =3.900, $SD$ = 2.024) and the fifth wave ($M$ = 4.900, $SD$ = 1.832). In all other low-status conditions, ingroup giving decreases over time. Outgroup giving decreases over time across all conditions, with the exception of the high-status group when anonymous, where it increases slightly between the first ($M$ = 3.400, $SD$ = 1.698) and the fifth wave ($M$ = 3.850, $SD$ = 2.681). Self-giving increases over time in all conditions, ending at higher level by the end of the fifth wave.

Ingroup, outgroup and self-giving across the full design were used to calculate mean ingroup favouritism and self-giving, the dependent variables used in the models. The methods used to calculate these variables were discussed in chapter 3.

**Figure 9: Descriptive plot of mean ingroup, outgroup and self-giving over five experimental time waves**




Note: Error bars represent the 95% confidence interval around the mean.

## Ingroup favouritism

The methodology for modelling was discussed in Chapter 3. Below, the steps taken during the modelling process are outlined, with results and statistics discussed accordingly. The data structure was round/time (Level 1), nested in game (Level 2), in participant (Level 3).

According to the intra-class correlation, 50% of the unexplained variance exists at the round level, 37% of the unexplained variance existed at the participant level, and 13% of the unexplained variance exists at the game level. The initial step in modelling involved determining whether random terms were needed. This meant comparing a linear model that excluded random effects with a linear model with a random factor. Including random intercepts significantly improved the fit of the initial model ($AIC_{null}$=762.616). The first step in this process involved including only games as a random factor (*AIC*=485.803; *L-Ratio*=278.814, *df*=3, p < 0.0001), and after this included both games and individuals as random factors (*AIC*=-368.847; *L-Ratio*=1135.463, df=4, p < 0.0001).

Next, the fixed effects (time, status and identifiability) were added to the model, first with random intercepts only (*AIC*=-381.909), and then with random intercepts and random slopes (*AIC*=-1080.06), which improved fit (*L-Ratio*=706.152, *df*=16, *p*<0.0001). The inclusion of random intercepts and slopes helps to take into account any variability that exists between and within different layers of data (Snjiders & Bosker, 1999). Based on the improved fit of the model, the nested effects (individuals, time and games) were included in the analysis, which meant the random effects for intercept and slope terms were estimated. Next an AR1 correlation structure was applied to the model (with the 3 fixed effects) to take autocorrelation into account and see if it would improve fit. As the data consisted of repeated measures, it was autoregressive in nature and past rounds had an effect on future rounds. The AR1 correction improved model fit (*L-Ratio* = 8.595, *df* = 17, *p* = 0.0034). The residuals were approximately normally distributed with the full nesting structure in place.

The model was first tested for interactions and then main effects. The 3-way interaction (*AIC* = 203.014, *LogLik* = -57.507) between time, status and identifiability was not significant $\chi^2(10, n = 480) = 6.045$, $p = 0.81$, however both status $\chi^2(2, n = 480) = 15.1975$, $p = 0.0005$ and identifiability $\chi^2(10, n = 480) = 26.341$, $p = 7.663e\text{-}05$ had significant main effects, with time not being significant $\chi^2(1, n = 480) = 1.478$, $p = 0.2240$. For this reason, the 3-way interaction was dropped from the analysis, and instead 2-way interactions were included.

The 2-way interaction between time and status (*AIC* = 42.445, *LogLik* = -7.223) was not significant $\chi^2(2, n = 480) = 1.010$, $p = 0.6035$, but status had a significant main effect in this model $\chi^2(2, n = 480) = 12.7$, $p = 0.0017$. Similarly, the two-way interaction between time and identifiability (*AIC* = 72.884, *LogLik* = -16.442) was not significant $\chi^2(5, n = 480) = 5.317$, $p = 0.3784$, however identifiability had a main effect on this model $\chi^2(5, n = 480) = 23.113$, $p = 0.0003$.

Next, the interaction between identifiability and status – the two significant main effects – was tested. Again, the interaction was not found to be significant $\chi^2(10, n = 480) = 8.683$, $p = 0.5624$ (*AIC* = 72.595, *LogLik* = -10.297), and both identifiability $\chi^2(5, n = 480) = 26.340$, $p = 7.665e\text{-}05$ and status $\chi^2(2, n = 480) = 15.218$, $p = 0.0005$ were found to have significant main effects.

Based on the above, the final model selected included identifiability $\chi^2(5, n = 480) = 27.475$, $p = 4.61e\text{-}05$ and status $\chi^2(2, n = 480) = 15.330$, $p = 0.0005$ as two main effects, with no interactions (*AIC* = 26.986, *LogLik* = 2.507). Restricted maximum likelihood algorithms (REML), were used to obtain estimates of AIC and Log Likelihood, however full maximum likelihood (ML) was used for model comparisons. The results for the model for ingroup favouritism can be found in Table 2.

**Table 2 : Results for Identifiability and Status as Main Effects on Ingroup Favouritism**

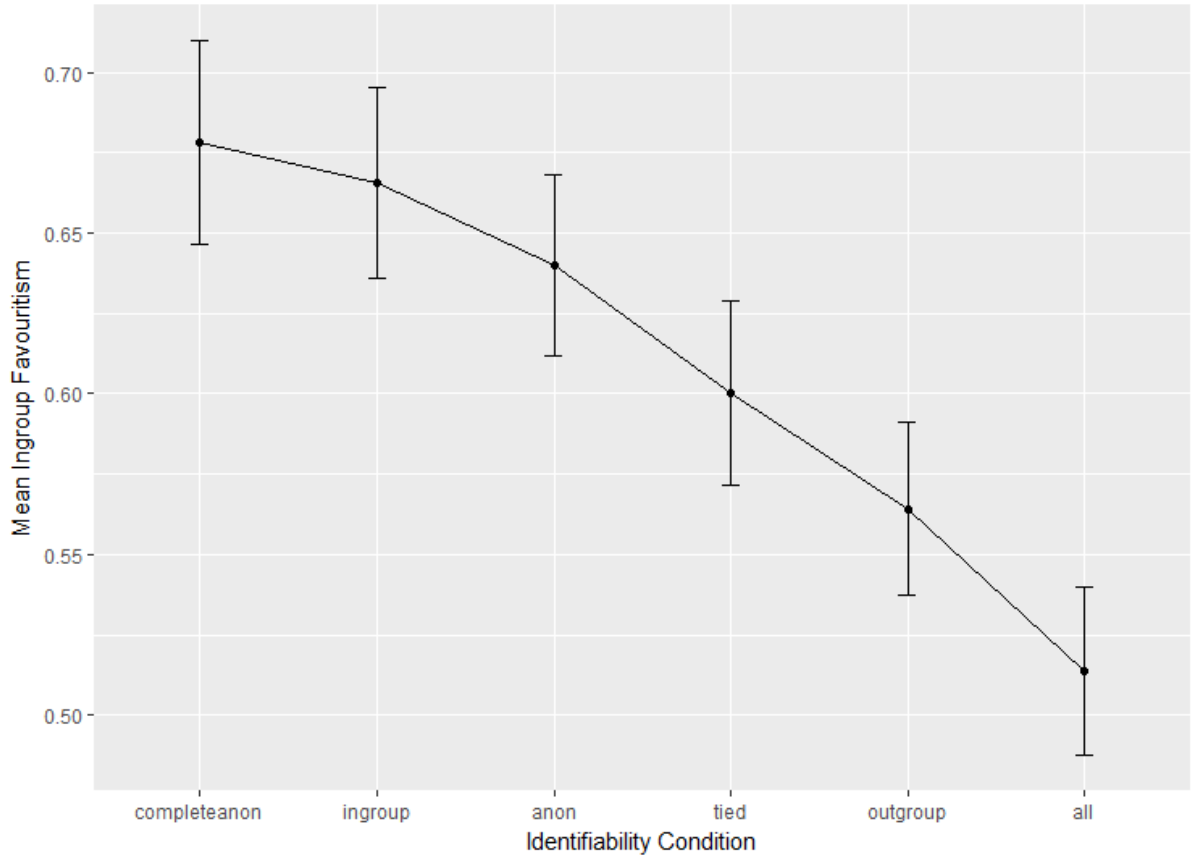
| ***Fixed Effects*** | **Model coefficients** | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Source** | $\chi^2$ | **Df** | **p <** | **Source** | **B** | **SD** | **T-value** | **P-value** |
| Identifiability | 27.475 | 5 | 0.0001 | Intercept | 0.55 | 0.03 | 18.00 | 0.0000 |
| Status | 15.330 | 2 | 0.0005 | Equality: high vs equal | -0.10 | 0.03 | -3.89 | 0.0001 |
| | | | | Equality: low vs equal | -0.04 | 0.03 | -1.68 | 0.0932 |
| ***Random Effects*** | | | | Identifiability: complete anon vs all | 0.16 | 0.04 | 3.89 | 0.0003 |
| **Source** | Int. (SD) | Slope. (SD) | R | Identifiability: anon vs all | 0.14 | 0.04 | 3.38 | 0.0013 |
| Time\|Game | 0.040 | 0.028 | -0.266 | Identifiability: Ingroup vs all | 0.12 | 0.04 | 3.06 | 0.0034 |
| Time\|Game\|Particip | 0.159 | 0.041 | -0.252 | Identifiability: Outgroup vs all | 0.01 | 0.04 | 0.22 | 0.8249 |
| Residual | 0.202 | | | Identifiability: Tied vs all | 0.09 | 0.04 | 2.32 | 0.0240 |

**Identifiability as a main effect on ingroup favouritism**

Results of the model for ingroup favouritism can be found in Table 2. The descriptive statistics for identifiability as a main effect on ingroup favouritism can be found in Appendix 7. Figure 10 depicts the differences in mean ingroup favouritism between the identifiability conditions, as well as error bars for each condition, which represent 95% confidence intervals. 95% confidence intervals for each condition of identifiability can be found in Appendix 8. The confidence intervals for each condition provide the range of values for mean ingroup favouritism which are plausible to occur in the wider population. Standardized fixed effects were calculated for the identifiability conditions using the fixef() function in R, which extracts fixed effect sizes for the model. Fixed effect sizes can be found in Appendix 9.

Visibility to all players was the reference category for comparison. Visibility to the out-group ($M$ = 0.564, $SD$ = 0.272) was the only identifiability condition that was not significantly different $B$= 0.009, $SD$= 0.040, $t$(54) = 0.222, 95% $CI$[-0.071, 0.089], $p$ = 0.8249 from the reference category. Complete anonymity ($M$ =0.678, $SD$ = 0.321) appeared to have the largest difference $B$ = 0.156, $SD$ = 0.040, $t$(54) = 3.888, 95% $CI$[0.076, 0.236], $p$ = 0.0003 when compared with the group where players were visible to all participants ($M$ = 0.514, $SD$ = 0.266). The fixed effect size for this condition was also moderately high, 0.771. Anonymity, ($M$ = 0.640, $SD$ = 0.287), $B$ = 0.136, $SD$ = 0.040, $t$(54) = 3.384, 95%$CI$[0.055, 0.216], $p$ = 0.0013; visibility to the ingroup ($M$ = 0.666, $SD$ = 0.302), $B$ = 0.123, $SD$ = 0.040, $t$(54) = 3.060, 95% $CI$[0.042, 0.203], $p$ = 0.0034; and visibility to those to whom one was tied ($M$ = 0.600, $SD$ = 0.290), $B$ = 0.093, $SD$ = 0.040, $t$(54) = 2.323, 95% $CI$[0.013, 0.173], $p$ = 0.0240 were also significantly different from the condition where players were visible to all participants. The condition in which players were anonymous also had a moderately high effect size, 0.671, as did the condition in which players were visible to the ingroup, 0.607. In the above three significantly different groups, the mean ingroup favouritism was higher than that of the comparison category.

**Figure 10: Identifiability as a main effect on Ingroup Favouritism**




Note: Error bars represent the 95% confidence interval (CI) around the mean. The plot is constructed with independent CIs (i.e. for the means), which do not and cannot take clustering or repeated measures in a multilevel model into account. Although this plot does not show overlap, this does not necessarily indicate significance (as there are many exceptions to this general rule that "no overlap indicates significance"). Generally, plots do not show the corrected confidence intervals for the differences between means, but rather show the individual means plus the CI (Cousineau, 2017). The CIs for the significance test are what should be relied upon to determine the difference between means.

### Post hoc tests for identifiability as a main effect on ingroup favouritism

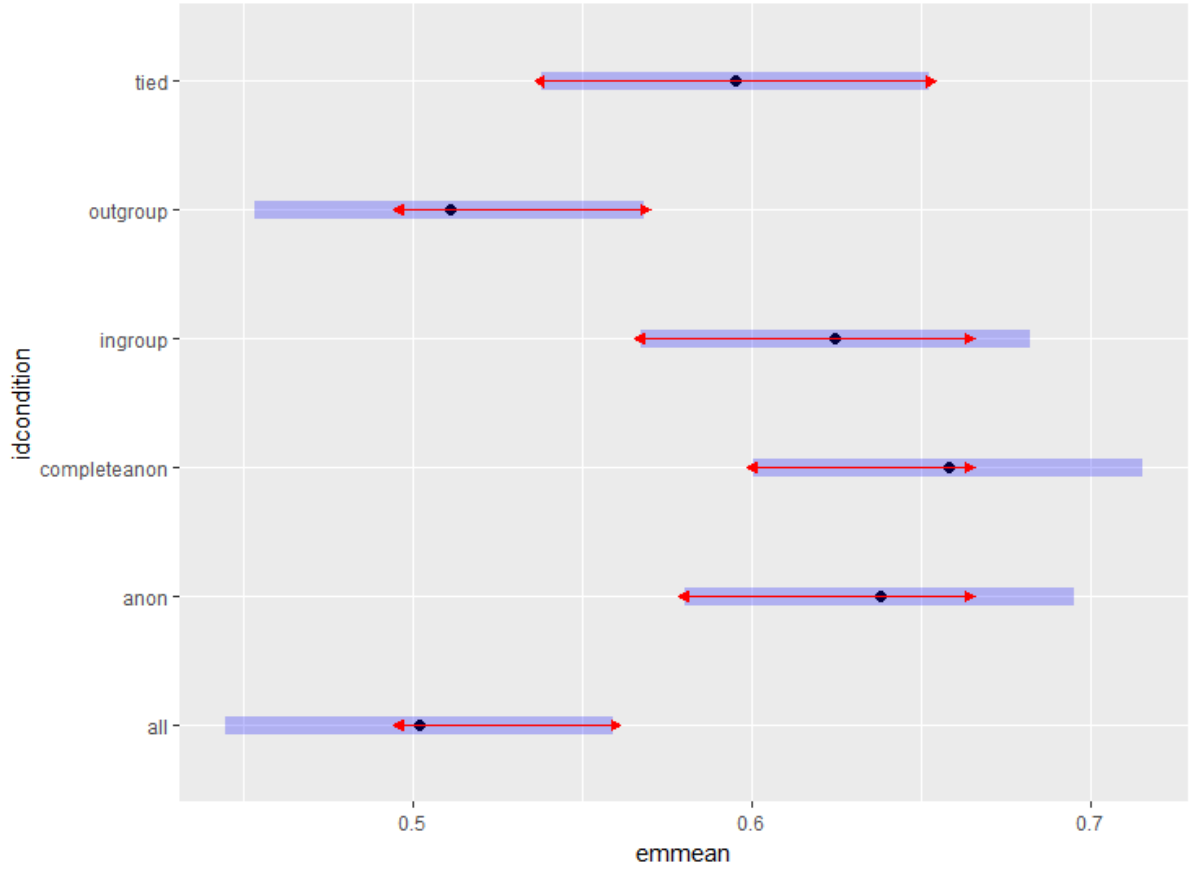
Although there was no significant interaction, tests of simple main effects were carried out in order to further explore the differences that existed between different conditions of identifiability. These were averaged over the levels of status.

Estimated marginal means (Appendix 10) and pairwise comparisons (Appendix 11) indicated that players in the complete anonymity condition ($M$ = 0.66, $SE$ = 0.03) were significantly more likely to display ingroup favouritism than those in the condition where players were all visible to each other ($M$ = 0.50, $SE$ = 0.03), $B$ = 0.14, $SE$ = 0.040, $t(54)$ = 3.384, $p$ =0.0036. Players in the anonymity condition ($M$ = 0.64, $SE$ = 0.03), $B$ = 0.156, SE = 0.040, $t(54)$ = 3.888, $p$ = 0.0160, as well as players who were visible to only their ingroup ($M$ = 0.62, $SE$ = 0.03), $B$ =

0.122, *SE* = 0.04, *t*(54) = 3.060, *p* = 0.0383) were also significantly more likely to display ingroup favouritism than those in the condition where players were all visible to one another (*M* = 0.50, *SE* = 0.03). Those in the complete anonymity condition (*M* =0.66, *SE* = 0.03), *B* = 0.147, *SE* = 0.04, *t*(54) = 3.665, *p* = 0.0071, as well as those in the anonymity condition (*M* =0.64, *SE* = 0.03), *B* = 0.127, *SE* = 0.040, *t*(54) = 3.161, *p* = 0.0294, were significantly more likely to display ingroup favouritism than those in the outgroup (*M* = 0.51, *SE* = 0.03).

The emmeans() package in R includes a plot function which allows the user to plot the estimates and 95% confidence intervals in separate panels for each condition. The plot for post hoc results of identifiability as a main effect on ingroup favouritism can be found in Figure 11.

**Figure 11: Plot of post hoc results for identifiability as a main effect on ingroup favouritism**



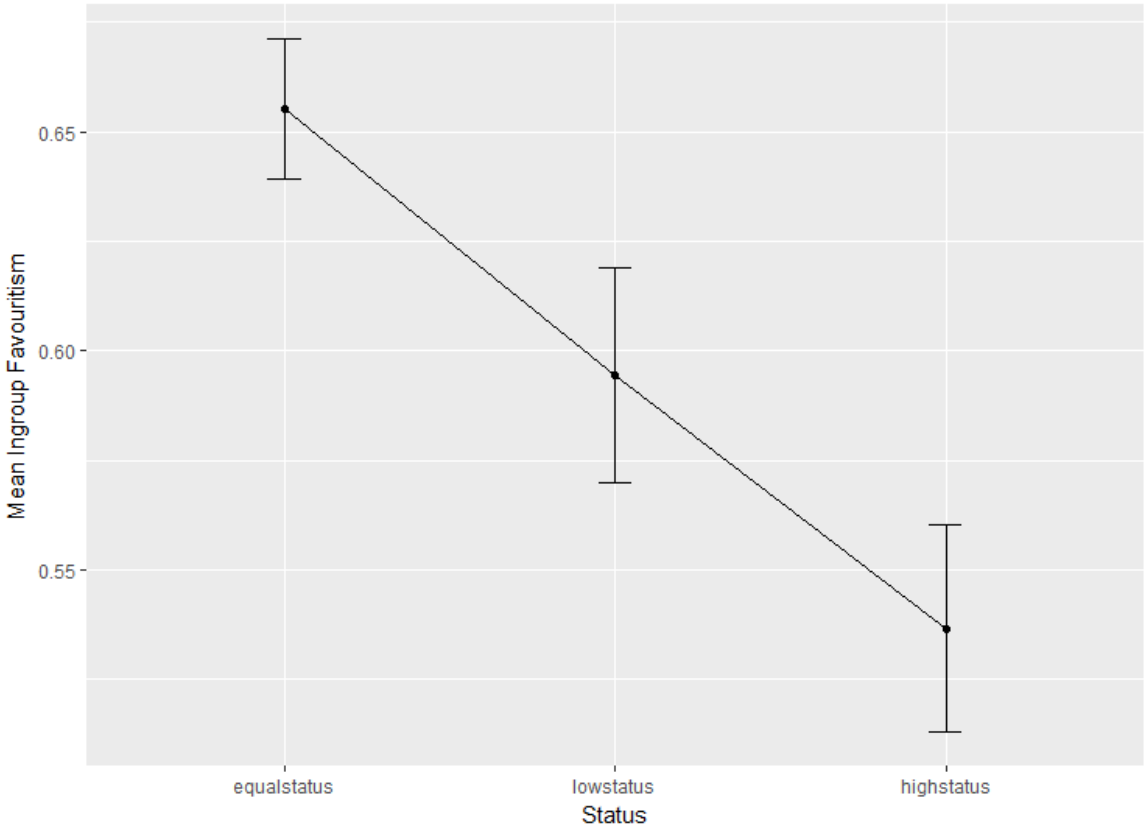

Note: The estimated marginal mean is represented by the dot, and the confidence interval for the mean is represented by the blue bar. The red arrow represents the comparison among the means, and if the red arrows overlap, it indicates that there is no significant difference between means.

**Status as a main effect on ingroup favouritism**

Results of the model for ingroup favouritism can be found in Table 5. The descriptive statistics for status as a main effect on ingroup favouritism can be found in Appendix 12. Figure 12 depicts the differences in mean ingroup favouritism between the status conditions, as well as error bars for each condition. Confidence intervals for status can be found in Appendix 13.

The equal status group ($M$ = 0.655, $SD$ = 0.283) was the reference category for comparison. The high-status group ($M$ = 0.537, $SD$ = 0.294) in the inequality condition was significantly different from the comparison category $B$ = -0.103, $SD$ = 0.026, $t$(418) = -3.887, 95% $CI$[-0.155, -0.051], $p$ = 0.0001, and had a moderate effect size, -0.508. The low-status group ($M$ = 0.594, $SD$ = 0.306) was not found to be significantly different $B$ = -0.044, $SD$ = 0.026, $t$(418) = -1.682, 95% $CI$ [-0.096, 0.007], $p$ = 0.0932, from the comparison category.

**Figure 12: Status as a main effect on ingroup favouritism**

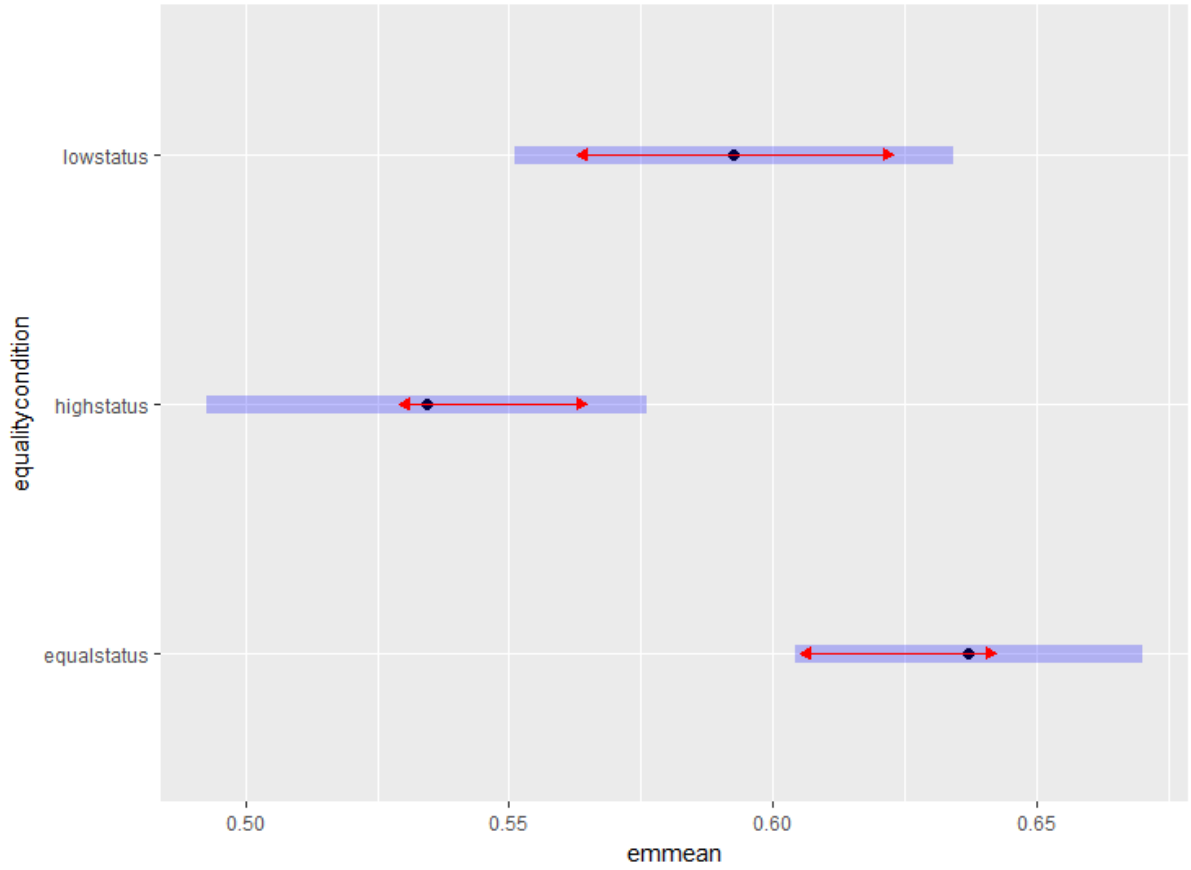



Note: Error bars represent the 95% confidence interval (CI) around the mean. The plot is constructed with independent CIs (i.e. for the means), which do not and cannot take clustering or repeated measures in a multilevel model into account. Although this plot does not show overlap, this does not necessarily indicate significance (as there are many exceptions to this general rule that "no overlap indicates significance"). Generally, plots do not show the corrected confidence intervals for the differences between means, but rather show the individual means plus the CI (Cousineau, 2017). The CIs for the significance test are what should be relied upon to determine the difference between means.

**Post hoc tests for status as a main effect on ingroup favouritism**

Tests for simple main effects for status were carried out to further investigate the differences between groups in the status conditions. Estimated marginal means (Appendix 14) and pairwise comparisons (Appendix 15) indicated that players in the equal status condition ($M$ = 0.637, $SE$ = 0.016) were significantly more likely to display ingroup favouritism than those in the high-status condition ($M$ = 0.534, $SE$ = 0.020), $B$ = 0.102, $SE$ = 0.026, $t(418)$ = 3.887, $p$ = 0.0003. The plot for post hoc results of status as a main effect on ingroup favouritism can be found in Figure 13.

**Figure 13: Post hoc results for status as a main effect on ingroup favouritism**



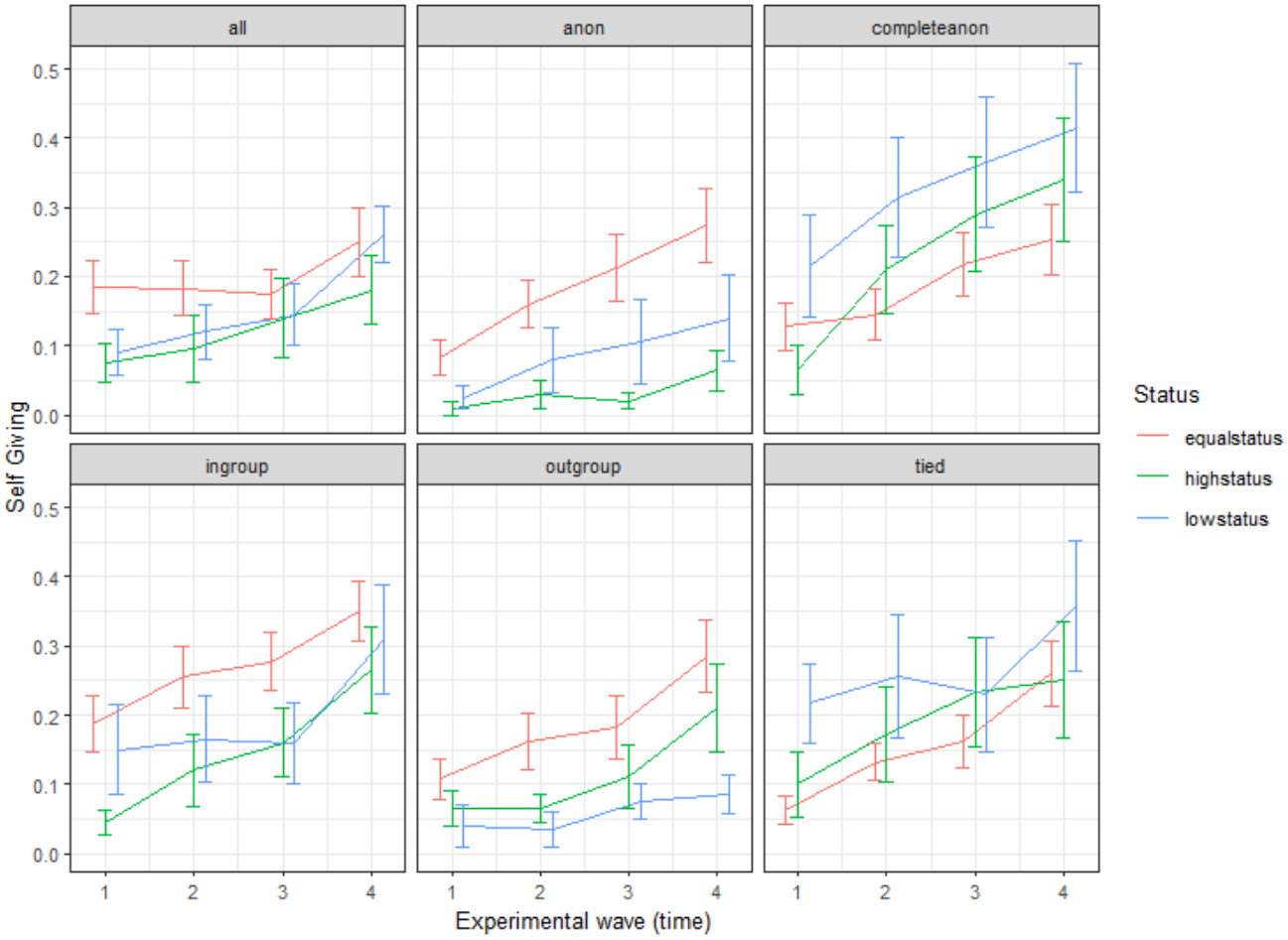

Note: The estimated marginal mean is represented by the dot, and the confidence interval for the mean is represented by the blue bar. The red arrow represents the comparison among the means, and if the red arrows overlap, it indicates that there is no significant difference between means.

## Self-giving

### Descriptive statistics for self -giving over time across the full design

Self-giving across all conditions showed an increase over time. The group that showed the highest self-giving in the first wave ($M$ = 0.217, $SD$ = 0.246), was the low-status group in the condition in which players were visible to those with whom they were tied. Closely following this, the low-status group in the complete anonymity condition had the second highest initial level of self-giving ($M$ = 0.215, $SD$ = 0.328). The conditions in which participants were visible to those whom they were tied with, and that in which they were completely anonymous showed the largest increases in self-giving. In these conditions, both high and low-status groups showed higher levels of self-giving than the equal status group, and these levels increased substantially more than in the equal status group. The group that showed the lowest level of self-giving was the high-status group in the condition in which players were anonymous ($M$ = 0.01, $SD$ =0.044). While this group showed an increase in self-giving over time, the increase was minor. Descriptive statistics for self-giving can be seen in Figure 14.

**Figure 14: Descriptive plot of self-giving across identifiability and status conditions**




Note: Error bars represent the 95% confidence interval around the mean.

**Modelling Self Giving**

The data structure was round/time (Level 1), nested in game (Level 2), in participant (Level 3). According to the intraclass correlation, 43% of the unexplained variance was nested in participant, 24% was nested in game, 6% was nested in time, and 27% was nested in round. The model for self-giving included random intercepts and random slopes, and was first tested for interactions and then main effects. The three-way interaction (*AIC* = -1092.6, *LogLik* = 589.29) between time, status and identifiability was not significant, however both time $F(1, 48.026) = 47.0893$, $p = 1.193e\text{-}08$ and status $F(2, 84.766) = 3.7619$, $p = 0.02721$were significant main effects, with identifiability not being significant $F(5, 48.105) = 0.4837$, $p = 0.78672$. For this reason, the three-way interaction was dropped from the analysis, and the two-way interactions were tested.

The two-way interaction between time and identifiability (*AIC* = -1221.181, *LogLik* = 629.5903) was not significant $F(5, 53.98) = 0.4248$, $p = 0.8294$ but time was a significant main effect in this model $F(1, 53.981) = 55.0724$, $p = 8.551e\text{-}10$. Similarly, the two-way interaction between status and identifiability (*AIC* = -1178.684, *LogLik* = 614.3422) was not significant $F(10, 84.857) = 1.0261$, $p = 0.42882$, however status was a main effect for this model $F(2, 84.860) = 3.3923$, $p = 0.0383$.

Next, the interaction between time and status – the two significant main effects – was tested. Again, the interaction (*AIC* = -1261.294, *LogLik* = 643.647) was not found to be significant $F(2, 100.674) = 0.4825$, and both time $F(1, 58.018) = 50.8158$, $p = 1.78e\text{-}09$ and status $F(2, 100.848) = 3.7214$, $p = 0.0276$ were found to be significant main effects.

Based on the above, the final model selected included time $F(1, 58.965) = 57.9147$, $p = 2.51e\text{-}10$ and status $F(2, 100.852) = 3.3749$, $p = 0.0381$ as two main effects, with no interactions (*AIC*= -1278.702, *LogLik* = 650.3512). Restricted maximum likelihood algorithms (REML), were used to obtain estimates of AIC and Log Likelihood, however full maximum likelihood (ML) was used for model comparisons. The results for the model for self-giving can be found in Table 3.

**Table 3: Results for Status and Time as Main Effects on Self-giving**

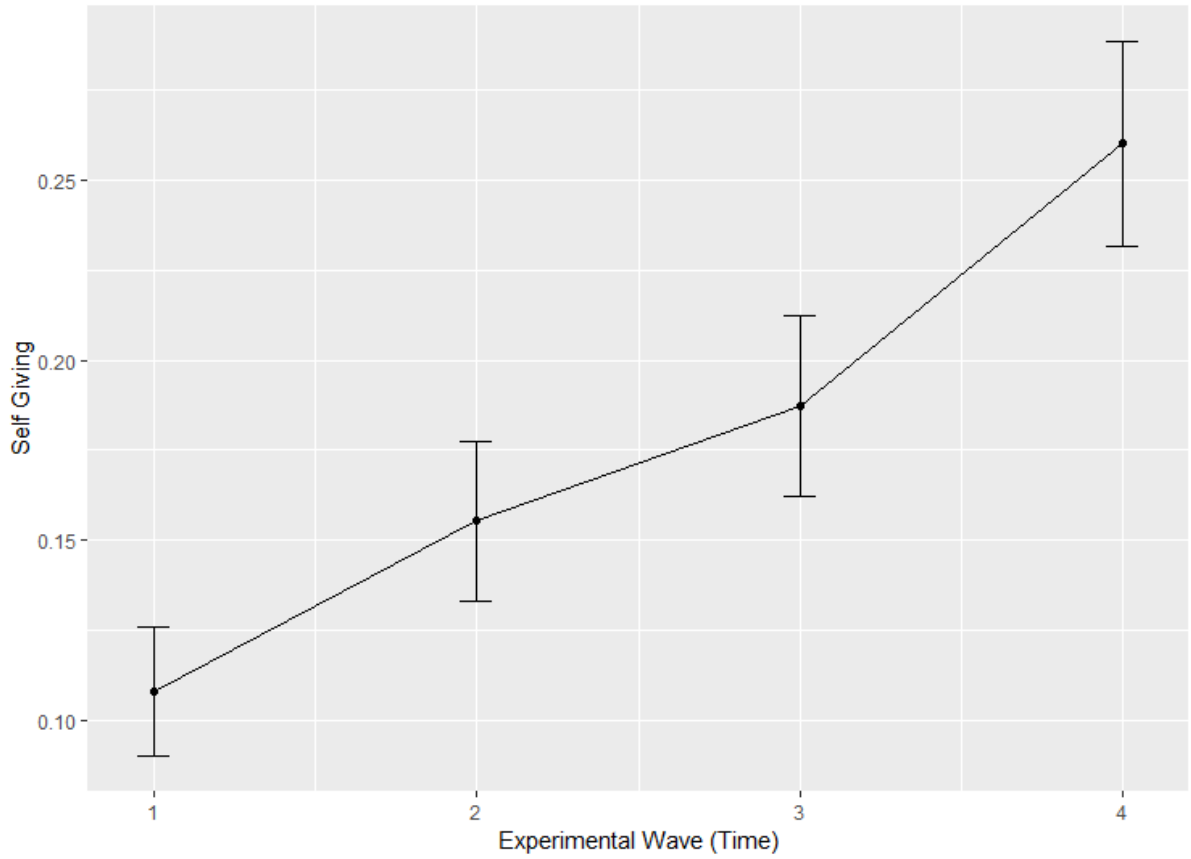
| ***Fixed Effects*** | **Model coefficients** | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Source** | F | **Df** | **p** | **Source** | **B** | **SE** | **T-value** | **P-value** |
| Time | 57.915 | 1 | 2.51e-10 | Intercept | 0.07 | 0.02 | 3.046 | 0.0034 |
| Status | 3.375 | 2 | 0.0381 | Equality: high vs equal | -0.06 | 0.03 | -1.732 | 0.0876 |
| | | | | Equality: low vs equal | 0.01 | 0.03 | - 0.218 | 0.8284 |
| ***Random Effects*** | | | | Time | 0.05 | 0.01 | 7.16 | 2.51e-10 |
| **Source** | Int. (SD) | Slope. (SD) | R | | | | | |
| Time\|Game | 0.116 | 0.0421 | -0.26 | | | | | |
| Time\|Game\|Particip | 0.136 | 0.052 | -0.05 | | | | | |
| Residual | 0.013 | | | | | | | |

**Time as a main effect on self-giving**

Figure 15 depicts the differences in mean self-giving between the experimental time waves, with error bars for each wave.

Time was found to be a significant main effect for self-giving, $B$ = 0.05, $SE$ = 0.01, $t(59)$ = 7.16, 95% $CI$[0.036, 0.061], $p$ = 2.51e-10. The main effect for time can be found in Figure 15. This indicates that there is a tendency for self-giving to increase over time, which was also evident in Figure 14.

**Figure 15: Mean self-giving for each experimental time wave**



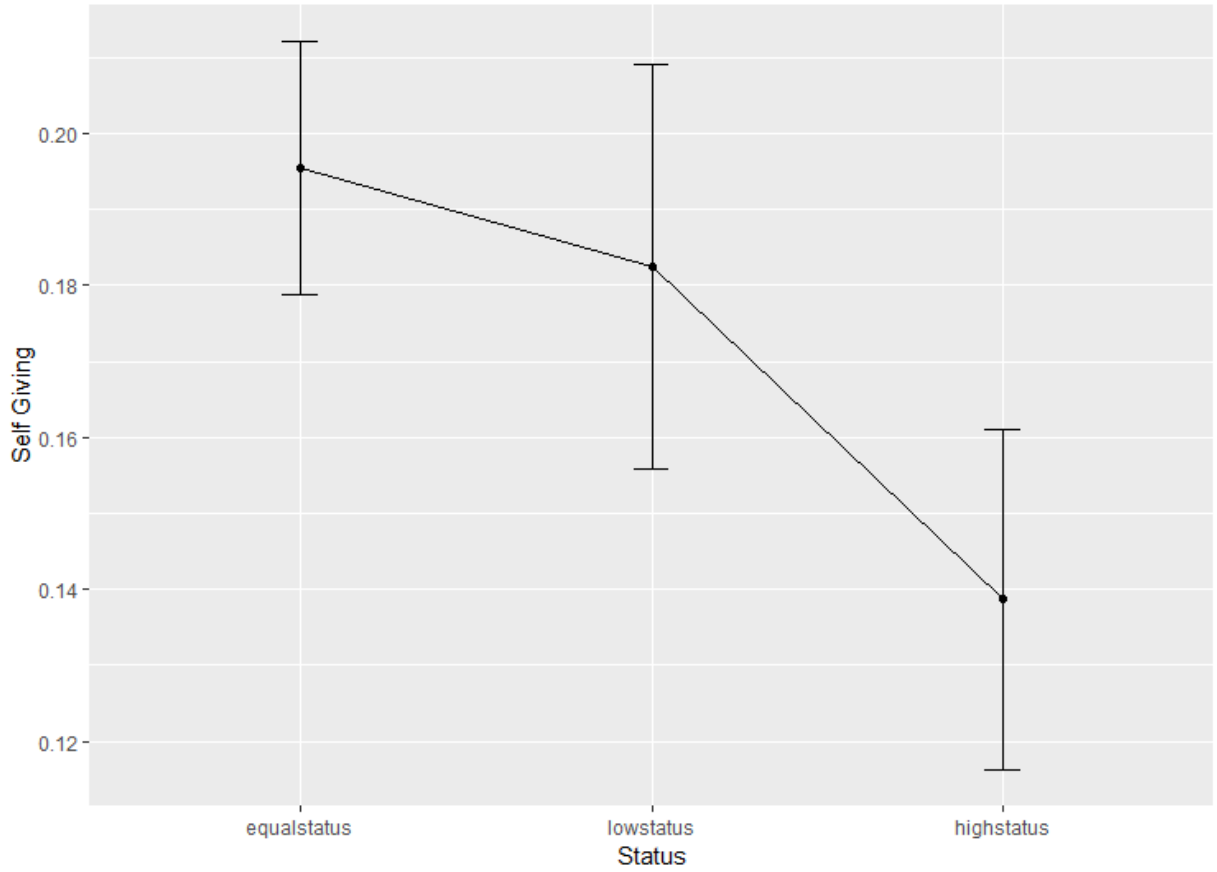

Note: Error bars represent the 95% confidence interval (CI) around the mean.

**Status as a main effect on self-giving**

The descriptive statistics for status as a main effect on self-giving can be found in Appendix 17. Figure 16 depicts the differences in mean self-giving between the status conditions, as well as error bars for each condition.

The equal status condition ($M$ = 0.195, $SD$ = 0.264) was the reference category for comparison. The high-status group ($M$ = 0.139, $SD$ = 0.250) in the inequality condition was not found to be significantly different from the equal status group, $B$ = -0.060, $SE$ = 0.035, $t$(71.65) = -1.732, 95% $CI$[-0.128, 0.007], $p$ = 0.007. The low-status group ($M$ = 0.182, $SD$ = 0.298) was also not found to be significantly different, $B$ = -0.008, $SE$ = 0.035, $t$(71.73) = -0.218, 95% $CI$ [-0.075, 0.060], $p$ = 0.850) from the equal status group. Profile confidence intervals can be found in Appendix 18, and bootstrapped confidence intervals can be found in Appendix 19.

**Figure 16: Status as a main effect on self-giving**

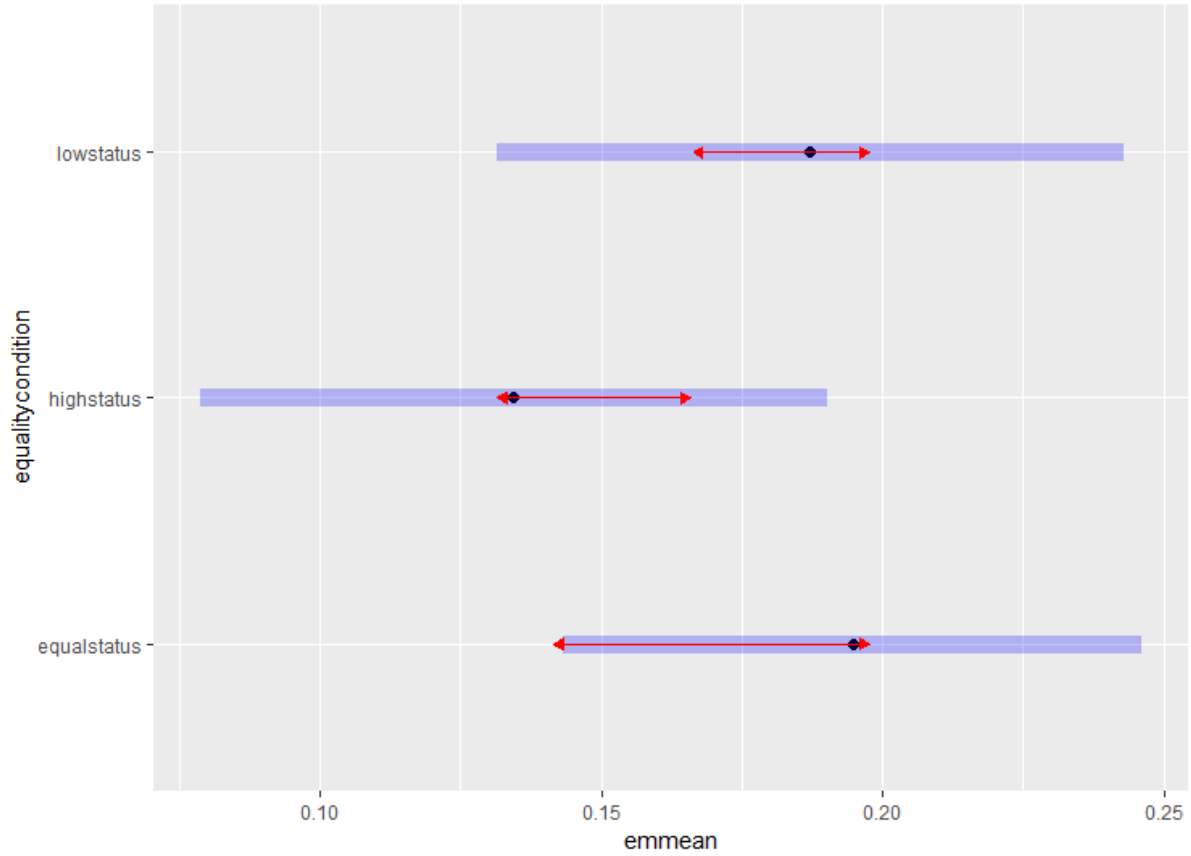



Note: Error bars represent the 95% confidence interval (CI) around the mean. This plot is constructed with independent CIs (i.e. CIs for the means), which do not and cannot take clustering or repeated measures in a multilevel model into account. Although this plot shows no overlap between the high and equal status groups, this does not necessarily indicate significance (as there are many exceptions to this general rule that "no overlap indicates significance"). Generally, plots do not show the corrected confidence intervals for the differences between means, but rather show the individual means plus CI (Cousineau, 2017). The CIs for the significance test are what should be relied upon to determine the difference between means.

### Post hoc tests for status as a main effect for self-giving

Tests for simple main effects for status were then carried out to further investigate the differences between the unequal status groups. Least squares means (Appendix 20) and pairwise comparisons (Appendix 21) indicated that players in the low-status condition ($M$ = 0.187, $SE$ = 0.028) were significantly more likely to display self-giving than those in the high-status condition ($M$ = 0.134, $SE$ = 0.028), $B$ = -0.053, $SE$ = 0.022, $t$(420.33) = -2.38, $p$ =0.047. A plot for the post hoc results can be found in Figure 17.

**Figure 17: Post hoc results for status as a main effect on self-giving**




Note: The estimated marginal mean is represented by the dot, and the confidence interval for the mean is represented by the blue bar. The red arrow represents the comparison among the estimated marginal means, and if the red arrows overlap, it indicates that there is no significant difference between means.

## Reciprocation

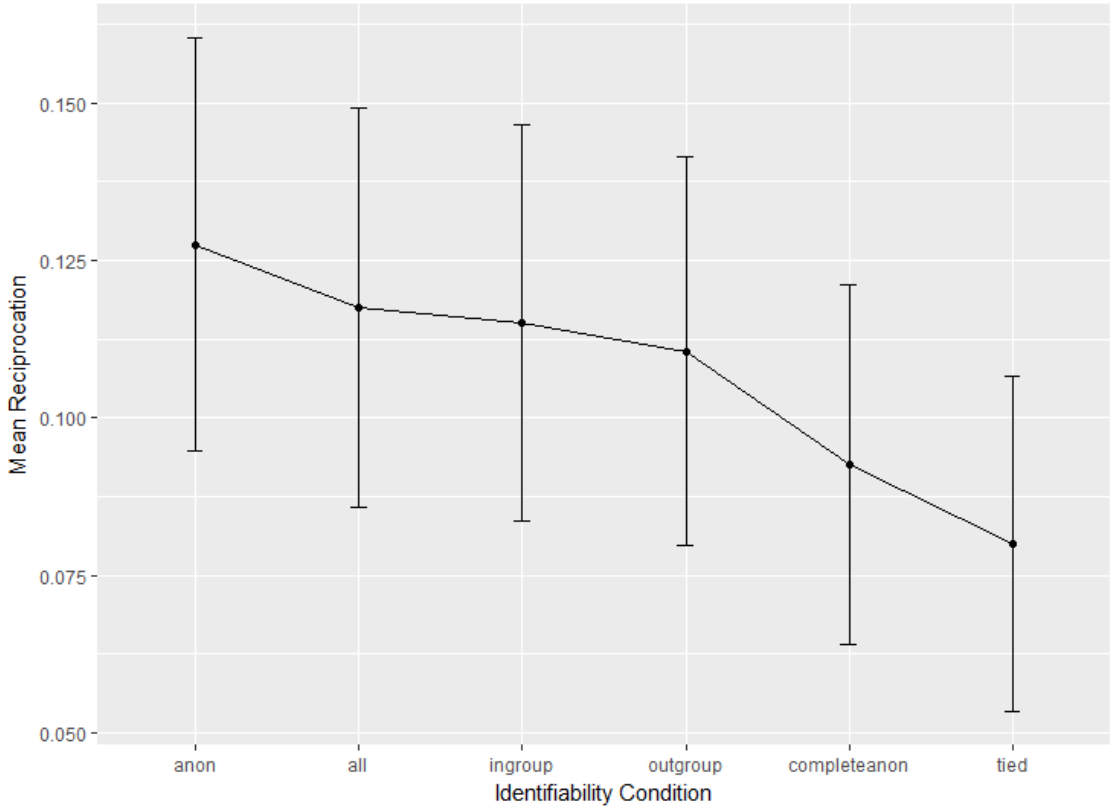
### Descriptive statistics for identifiability as a main effect on reciprocation

In contrast to expectations, the tied condition had the lowest mean reciprocation ($M$ = 0.08, $SD$ = 0.27). Visibility to outgroup also showed low mean levels of reciprocation. The means for each condition are depicted in figure 18. The means for each condition can be found in Appendix 21.

### Modelling reciprocation using a generalized linear mixed-effects model

It was hypothesized that in the condition in which individuals were tied to one another, reciprocation would increase. Additionally, if reputational theory were supported, reciprocation would increase when visible to the outgroup. For this reason, the model included only identifiability as a main effect (*AIC* = 1641.2, *LogLik* = -812.6), however it was not found to be significant.

**Figure 18: Means for reciprocation across identifiability conditions**




Note: Error bars represent the 95% confidence interval around the mean.

# Chapter 5: Discussion

Behaviour in the intergroup context has been extensively studied in social psychology, with a number of competing theories as to the underlying causes for behaviours such as ingroup favouritism, selfishness and reciprocation. Deindividuation theory suggests that when individuals are submerged in a group and are anonymous, there is a loss of inhibition of behaviour, causing them to behave in ways that would usually be deemed socially inappropriate. Social identity theorists have suggested that this theory of disinhibited behaviour does not provide a sufficient explanation for many of the behaviours observed when individuals are anonymous, and have contested deindividuation theory by providing an alternative explanation which is arguably more robust. The SIDE model suggests that ingroup identification and the salience of social identity affect individual group members behaviours in interaction, and that the more salient an individual's social identity, the more likely they are to behave according to group norms. Additionally, the theory suggests that conditions of anonymity can either accentuate or attenuate normative behaviour, depending on identity salience. When anonymous, and personal identity is salient, individuals are more likely to behave according to personal standards – however, when group identity is salient, individuals will partake in group normative behaviours. Therefore, when submerged in a group, rather than behaviour simply becoming disinhibited it becomes driven by the salient social identity in question and will be based on group norms. The SIDE model has been argued to be strategic in the sense that ingroup members choose to behave in specific ways in order to advance their own group within the social context. In contrast to the SIDE model, reputational theory suggests that behaviour is instead governed by an inherent, unconscious group heuristic which is based on economic rather than social concerns – therefore behaviour is ultimately driven by economic self-interest. According to this line of thought, individuals use a mental shortcut in order to avoid exclusion from social groups in which resources are exchanged. This is not based on social identity or identity salience, but rather on a default assumption that ecologically rational behaviours like cooperation and reciprocity will ensure inclusion in the exchange system.

In different conditions of identifiability, we would expect different behavioural outcomes depending on whether deindividuation theory, the SIDE model or reputational theory were supported. Under conditions of anonymity, where individuals are not visible to others,

deindividuation theory predicts that behaviour will become disinhibited and individuals will be more likely to behave in ways which are socially inappropriate; for example in this study, individuals within the anonymous experimental condition will be more likely to behave selfishly. The SIDE model predicts that when social identity becomes more salient, the individual will behave in a group normative way, for example by giving to the ingroup; whereas if personal identity is more salient, the individual would behave according to personal standards, and behaviour would depend on what those personal standards are – however group normative behaviours such as ingroup favouritism would be less likely. Reputational theory predicts that when the risk of being excluded from an exchange system is high, an individual will avoid behaviours such as selfishness, to avoid exclusion. However, when anonymous, there is no longer a risk of being held accountable for behaviour and it could be expected that individuals would be more likely to behave selfishly. This condition would provide a strong way to test the contrasting theories, especially with regard to the SIDE model and reputational theory, as the expected outcomes for each theory differ significantly.

When visible to the ingroup, both the SIDE model and reputational theory predict that ingroup normative behaviours would occur, however the theories differ in their reasoning regarding why this is the case. The SIDE model suggests that visibility to the ingroup strengthens the salience of social identity, increasing group normative behaviours like ingroup favouritism. Reputational theory, however, suggests that individuals behave according to the group heuristic, in order to gain access to the system of generalized exchange, and in this view, behaviour is based on self-interest rather than salient social identity. As the expected outcome is the same for both the SIDE model and reputational theory, this condition does not provide as strong a test for contrasting the theories.

Similarly, visibility to the outgroup would also result in the same expected behaviour for both the SIDE model and reputational theory. In this condition, group normative behaviours would be expected to decrease. The SIDE model suggests that individuals who are visible to the outgroup may attempt to downplay their group membership in order to prevent competition from the outgroup. Alternatively, the individual's social identity may become less salient, with personal identity salience becoming more prominent. In both cases, group normative behaviours like ingroup favouritism would be less likely. Reputational theory suggests that because one is not visible to the ingroup, there is no risk of detection or exclusion when they do not behave altruistically toward their in-group. Additionally, direct exchange may occur in this condition – when one is visible to those who one receives from, it is more likely that the

individual will reciprocate in order to maintain their reputation. In this condition, it is expected that ingroup favouritism would decrease. We would also expect direct exchange to take place, if reputational theory is supported. With regard to ingroup favouritism, this condition doesn't provide a very robust test for the SIDE model and reputational theory, as the predicted behaviour is the same for both. However, if reciprocation is observed, it would provide support for reputational theory.

In the condition where participants are visible to all other players, the behaviours predicted by each theory differ. Deindividuation theory suggests that when individuals are visible to others, they will be more likely to inhibit their behaviour and only behave in ways which are socially appropriate. In this condition, we could expect players will directly reciprocate with those whom they receive tokens from. Behaviour according to the SIDE model would depend on whether social or personal identity is more salient for the individual. When social identity is highly salient, group normative behaviour like ingroup favouritism could be expected; contrastingly, when personal identity is highly salient, behaviour will occur according to personal preferences. Reputational theory suggests that in a situation where individuals can be held accountable for their behaviour in the group context, they will behave according to the group heuristic and cooperate with all others in the exchange system. Therefore, indirect exchange would be expected. Although the expected behaviours for each theory differ in this condition, it does not provide a very good test for the contrasting theories as the SIDE model predicts two very different behaviours which are dependent on identity salience, and indirect reciprocation is difficult to observe.

In conditions where individuals are visible to those with whom they interact, reputational theory suggests that direct reciprocation would increase. This condition does not provide a strong test for the contrasting theories, as the SIDE model and deindividuation would not expect specific behaviours in such a condition.

Status should also be considered when understanding behaviour. It can be expected that illegitimately low status group members will be more likely to display ingroup promoting behaviour, in an attempt to shift the power differential and improve their group's standing within the social hierarchy. It can therefore be expected that the low status players in this study would show higher ingroup favouritism than their high-status counterparts. The status condition therefore provides a good test for theories on status and group favouring behaviour.

The present study therefore sought to examine the effects of identifiability and status on ingroup favouritism and self-giving over time. Additionally, identifiability was examined as an effect on reciprocation between individuals in interaction. Following this, support for the SIDE model and reputational theory was assessed.

## Ingroup Favouritism

Although there were no statistically significant interactions, both identifiability and status were found have significant main effects on ingroup favouritism. Due to the fact that time was not found to be a significant variable affecting ingroup favouritism in this study, as a main effect or in interaction with other variables, it wasn't possible to make extrapolations about ingroup favouritism increasing or decreasing over time.

### Different conditions of identifiability result in varied levels of ingroup favouritism

A number of previous studies have examined anonymous behaviour and its effects on individuals in interaction with one another, however, to date there have been none which have examined varying conditions of identifiability within a specific social context and made comparisons between them. The present study was unique in that it allowed for the examination of a number of conditions of identifiability, using a specific, experimental interactional context.

The results of this study indicate that complete anonymity did in fact result in higher levels of ingroup favouritism and normative group behaviour than all other conditions of identifiability, supporting $H_1$'s expectations regarding the SIDE model. Tajfel et al.'s (1971) minimal group studies took place under completely anonymous conditions, and the results of their work indicated that ingroup favouritism was normative in such a context. Tajfel et al. (1971) therefore suggested that even when group membership was based on the most minimal conditions, group normative behaviour was still likely to occur. Additionally, although Tajfel et al.'s (1971) study only allowed participants to award points to either ingroup or outgroup members without them personally receiving allocations from either, ingroup favouring behaviour was still preferred. The SIDE model suggests that when group identity is highly salient, and individuals are immersed in the group, they are much more likely to act in group normative ways. The groups in the VIAPPL games for this study were minimal to an extent, such that participants were allocated to groups in which they shared a "group colour" with the other members of their group. Although this is the case, in both of the anonymity conditions participants avatars contained their own webcam photograph, which only they could see. Arguably, this could have heightened the salience of personal identity, however, results indicated that participants still behaved according to the group norm of giving to the ingroup,

which suggests that group identity may have been more salient for them even though there was potential for heightened personal identity. These results clearly indicate that when anonymous, group normative behaviour is strengthened, supporting the SIDE model. This effect persists even when players are not individually accountable for their actions (i.e. when they were shuffled to a new position after every round), and where reputational concerns could not have played a role. This suggests that there must be reasons other than individual accountability for the ingroup favouritism which was observed.

Both the SIDE model and reputational theory suggest that when visible to the ingroup, individuals are likely to cooperate with other ingroup members, therefore ingroup favouritism is likely to occur. The results indicated that this was the case, and $H_2$ was supported. According to Noel et al. (1995), individuals who are visible to other ingroup members are likely to display behaviours that serve to solidify their position and acceptance within their group, and a behavioural norm such as ingroup favouritism serves such a purpose. Reicher et al. (1998) have suggested that visibility to other ingroup members often results in group normative behaviour occurring, as the salience of group identity is heightened. This condition not only provided participants with visibility to their ingroup, but also anonymity to the outgroup. This exclusivity of visibility could have amplified group normative behaviours, because participants would not be able to find commonalities between themselves and outgroup members as easily. Yamagishi and Mifune (2008) similarly suggest that the group heuristic allows individuals to gain access to group resources through their cooperation with other group members. However, they suggest that ingroup altruism is driven more by self-interest than social identity – the individual is motivated to cooperate in order to avoid exclusion. When they do not cooperate, they run the risk of being perceived by other group members as "selfish" or uncooperative, and in turn, may be excluded from the generalized system of exchange, losing access to group resources – in the case of a VIAPPL game, others would choose not to allocate tokens to them. In the condition where participants were visible to other ingroup members, ingroup favouritism was high – which was predicted by both the SIDE model and reputational theory.

Visibility to only outgroup members was expected to result in lower levels of ingroup favouritism, for both the SIDE model and reputational theory ($H_3$). This expectation was supported by the results, with the condition of being visible to only outgroup members having low levels of ingroup favouritism when compared to the anonymity conditions and being visible to the ingroup only. The SIDE model suggests that being visible to outgroup members may result in individuals down-playing their group identity in order to avoid competitive

behaviours on the part of the outgroup (Klein et al., 2007). Being visible to the outgroup could also reduce the salience of social identity (Reicher et al., 1995) and increase the salience of personal identity. This in turn would result in individuals not necessarily behaving according to ingroup norms, but rather making allocations based on personal standards. When the salience of personal identity is high, an individual may identify with individual outgroup members based on perceived commonalities, rather than with their own ingroup. This could result in lower ingroup favouritism and allocations being made based on personal preference rather than ingroup norms. Additionally, Yamagishi and Mifune (2008) suggest that when one is not visible and accountable to the ingroup, the group heuristic is less likely to be followed as there is no risk of being "found out" for behaving in a way that is not ingroup altruistic.

What is particularly interesting about the results of identifiability as a main effect is that complete anonymity showed the highest levels of ingroup favouritism out of all the conditions of identifiability. While the SIDE model indicates that anonymity can either accentuate or attenuate group normative behaviour, based on the literature, visibility to the ingroup is generally expected to produce high levels of ingroup normative behaviour. From this, the expectation was the visibility to the ingroup would produce the highest level of ingroup favouritism, with complete anonymity being less predictable – as ingroup identification was expected to vary more between players in this condition, and the salience of social identity was therefore expected to be less clear cut. In fact, in this study, visibility to the ingroup actually appeared to dilute the salience of social identity when compared with anonymity, in contrast to expectations made by the SIDE model. Additionally, it is interesting to note the difference between the complete anonymity condition and the anonymity condition, where the only difference in the manipulation was the shuffling of participants after every round in the complete anonymity condition. Although there was no statistically significant difference between these conditions, it is interesting that such a minor manipulation of the condition could produce fairly different levels of ingroup favouritism. This suggests that complete anonymity and anonymity are quite different – due to the fact that the anonymous players still remained in one position throughout the game, their behaviours would still be attributable to them (i.e. the player in a specific position) throughout the game, rendering them not quite anonymous, but also not personally identifiable. Contrastingly, the complete anonymity condition, where players shuffled throughout the game, rendered players to be anonymous as well as individually unaccountable, as players had no way of knowing who had moved where in each round.

Although the results for identifiability as a main effect provide some support for both the SIDE model and reputational theory, it seems as though the SIDE model provides a more solid explanation for the high levels of ingroup favouritism in the complete anonymity condition.

**Status effects on ingroup favouritism**

As status is such an inherent part of social life, it has been widely studied in social psychology, and in various other disciplines. The present study manipulated status in order to examine the differences between equal, high and low-status groups. As the VIAPPL environment provides a platform for participants to interact with one another, and for the social situation to evolve over time, there is potential for the status quo in any game to be changed over time through participant behaviour. This allows for an unstable status environment where participants are able to work towards changing their groups relative position in the game by making strategic allocations.

$H_4$ was not supported, as there was no interaction between identifiability and status on ingroup favouritism. However, status was found to have a main effect on ingroup favouritism. Although there was no statistically significant difference between the low and high-status groups, the confidence intervals only just overlap (see Figure 13; Appendix 14), with the low-status group showing higher mean ingroup favouritism than the high-status group. Ellemers et al. (1993) have suggested that when group status is viewed as illegitimate, individuals from low-status groups will be more likely to show solidarity with their ingroup in an effort to change the status quo. Due to the fact that there was no legitimate reason given to participants for the inequality at the start of the game, low-status group members may have experienced an increase in willingness to display "compensatory (or ingroup) favouritism", as a means of trying to achieve some level of fairness. This strategy for social competition would bolster the low-status groups ability to create a situation in which they have equal status to, or even surpass the initially high-status group.

The high-status group showed the lowest levels of ingroup favouritism. Although unequal status was created on an illegitimate basis in these experiments, the differences between the high and low-status groups' token balances were fairly substantial (with high-status group members each having 30 tokens, and low-status group members having only 10). Previous studies using the VIAPPL software have indicated a norm for high-status groups to partake in compensatory outgroup giving, and low-status groups to partake in compensatory ingroup favouritism, in order to shift the status differential between groups to a more equal level

(Durrheim et al., 2016). In these studies, low-status groups tend to show high levels of ingroup favouritism, and high-status groups show lower levels. Hays and Blader (2017) have produced similar results and in their study suggested that due to the illegitimacy of the inequality, the high-status group may undertake compensatory outgroup giving in an attempt to create fairness in the social context.

A similar result was observed by a study by Harvey and Bourhis (2013, Study 2), where those who were placed in a high-status group based on chance showed more outgroup favouritism than those who were placed in a high-status group based on merit. This supports the idea that illegitimate high-status individuals are less likely to partake in ingroup favouritism.

In the present study, results indicated that participants in the equal status groups showed the highest mean level of ingroup favouritism. This is in contrast with results from prior studies using the VIAPPL platform (Durrheim et al., 2016). It is possible that in this study, social competition resulted in increased ingroup favouritism in the equal status condition. Due to the fact that groups began on equal footing, social competition could be a strategy used by individuals to try and create positive distinctiveness for their own group (Badea & Jetten, 2014). While most would argue that this only applies to groups of unequal status, it is possible that in a game-like situation where "realistic" competition is likely to be present because resources (or incentives) such as money or goods are at stake (Diehl, 1990), this could also apply to equal groups. In the present study, participants were aware that they would receive an incentive based on how well they did in the game, which may have increased competitive behaviour within the equal status groups.

### Self-giving

In reality, individuals within groups have many more behaviours available to them than simply behaving altruistically or antagonistically toward their own or another group. A distinct part of human behaviour involves selfishness. Selfish behaviour is very often seen as taboo, because it represents the concern of one's own welfare ahead of that of others (Le Morvan, 2009). Yamagishi and Mifune (2008) suggest that the avoidance of selfish behaviours is important for success in interactional systems, especially when these systems involve resources that can be shared. For this reason, self-giving was included in the behavioural repertoire for this experiment. Although the behaviour was available to participants, they were not informed during the instructions that it was possible and deduced that it was possible on their own, through the use of trial and error.

Results for the present study indicated that time had a main effect on self-giving, with self-giving increasing over time. This was consistent with previous studies conducted using the VIAPPL platform (Durrheim et al., 2016). This suggests that as a game progresses, a norm of self-giving emerges for all players.

In social interaction, Yamagishi and Mifune (2008) suggest that even if there is a small risk of detection, players would rather strategically avoid behaving selfishly, because if they are detected as behaving in a taboo manner they could lose access to generalized systems of exchange. It was hypothesized in $H_1$ that when players were anonymous, they would be more likely to behave selfishly due to a decreased risk of their reputation being tarnished, as they could not be held accountable for their behaviour due to no one knowing who (or where) they were. This hypothesis was not supported however, as identifiability was not found to be a main effect for self-giving. The results therefore do not support reputational theory as far as anonymity is concerned.

Status was found to have a main effect on self-giving. No initial hypotheses were made regarding status and self-giving. Results indicated that players in the low-status group were significantly more likely to display self-giving than those in the high-status group. This is interesting as it suggests that "having less" may result in players being more concerned about their own welfare than those in high-status groups. When one looks at the results for status as a main effect for ingroup favouritism, although the low status group showed higher ingroup favouritism than the high status group, they did not show higher levels than the equal status group. Previous studies using the VIAPPL platform (Durrheim et al., 2016) have indicated that low status groups usually show higher levels of ingroup favouritism than both equal and high status groups. It can be suggested that in this study, the low status group members compensated for their status position through self-giving instead of through ingroup favouritism, resulting in the high levels of self-giving and slightly lower than expected levels of ingroup favouritism (when compared to the equal status group) for the low status group. Similarly, it is possible that those in the high-status group showed lower levels of self-giving due to their compensatory outgroup favouring behaviour – they chose to rather give to the outgroup, and so were less likely to give to themselves.

## Reciprocation

Yamagishi and Kiyonari (2000) suggest that individuals will behave according to a group heuristic and will partake in direct reciprocation in a social situation where they can be held

directly accountable for their behaviours, and where there is the possibility of sequential allocations. Identifiability was, however, not found to have a main effect on reciprocation.

In $H_4$, it was hypothesised that the condition where players were all visible to one another would have high levels of reciprocation. The raw means indicate that this condition had the second highest level of reciprocation. Similarly. the raw means indicated that the condition in which participants were visible to their ties had the lowest levels of reciprocation across all identifiability conditions. This was in contrast with expectations in $H_5$. It was initially expected that participants would reciprocate in this condition due to expectations of direct exchange (Yamagishi & Kiyonari, 2000), however this was not the case. However, one cannot make extrapolations based on this, due to the effect of identifiability not being statistically significant.

# Conclusion

The aim of this thesis was to examine how identifiability affects behaviour, in order to understand whether behaviour occurs as a result of the salience of social identity and the audiences to whom one is identifiable; or conversely, due to individuals behaving according to a group heuristic which works to maintain their good reputation within the social context in order to prevent them from being excluded from group exchange systems and resources. The results of the experimental games were examined in order to better understand which theories were empirically supported.

The anonymity condition provided the strongest way to test the contrasting theories, as the behaviours predicted by each theory under conditions of anonymity were very different. The results of this study appear to better support the SIDE model's explanation for the effects of complete anonymity on behaviour. Most notably, it was expected that players who were visible to their ingroup members would produce the highest levels of ingroup favouritism across all of the conditions. Interestingly, the results indicated that this was not the case, as complete anonymity was the highest scoring condition when it came to ingroup favouritism. This suggests that complete anonymity may result in behaviour that is more group normative than previously expected. The SIDE model predicts that anonymity can increase the salience of social identity and group normative behaviour – and the results of this study clearly support this prediction.

Reputational theory, in contrast, expects ingroup favouritism to be strengthened in conditions where players are individually identifiable (i.e. where there are stronger reputational concerns). Reputational theory would also suggest that conditions of anonymity should increase self-interested behaviour such as self-giving due to the lack of accountability for the individual who displays the behaviour; and, in contrast, when one is visible or directly accountable for their behaviour, there should be very little self-giving. The results of the self-giving analysis did not support these expectations and so do not appear to provide much support for the reputational perspective.

The results for reciprocation also failed to provide any support for reputational theories, as identifiability was not found to have any effect on reciprocation. It was expected that in conditions where participants visible to those who they had interacted with, that they would be more likely to reciprocate due to the fact that they would be accountable to their donors –

however this was not found to be the case. Direct reciprocation was not affected by conditions of identifiability, and so, once again, reputational theory was not supported in this work.

From this it becomes clear that identity salience, and not individual accountability, provides a better explanation for the behaviours which were observed. It can be suggested, then, that anonymity promotes group normative behaviour more than being visible to an audience does, because it increases the salience of social identity. If we apply the SIDE model to the Marikana Massacre which occurred on 16 August 2012, it becomes clear that the visibility of the police officers to the external audience may have actually resulted in behaviour that actually undermined group norms like "protecting and serving" or "keeping the peace", instead causing the officers to behave in an anti-normative, violent way. Visibility to the external audience, in this case, may have made the officers personal identities more salient, and the threat of the striking mine workers to their personal safety may have become more of a concern than upholding group norms, causing them to react by opening fire.

In summary, the results of this study provide support for the SIDE model, especially regarding anonymity. The anonymity conditions provided a strong comparison of the two theories, as the predicted behaviours were vastly different – and only the SIDE model was supported. Interestingly, none of the hypotheses which were made explicitly about reputational theory were supported. This may suggest that the SIDE model provides a better overall explanation for behaviours such as ingroup favouritism and selfishness in the group context.

## Limitations

There were several limitations to this study which should be considered when reading the findings.

The first limitation of this study is that the VIAPPL platform is designed to allow participants to interact in very minimal contexts, and only allows for a limited range of behaviours to be undertaken. Therefore, the findings are not generalisable to real world contexts where there is a greater degree of complexity.

Secondly, we did not include extensive manipulation checks for our experimental manipulations. For this reason, we cannot be sure that participants understood the manipulations and played the games with this in mind. Future research should include manipulation checks.

Thirdly, this study utilized participants from a specific niche of the population – university students – as a convenience sample. As students are generally individuals within a specific age range, and from a fairly distinct social category, their behaviours may not be representative of the broader population. It is possible that the behaviours noted in this study could be unrepresentative of all social groups, and that results could differ if a different, random sample were used rather than a convenience sample.

Thirdly, this study attempted to understand how behaviours were affected by a wide range of conditions of identifiability. This resulted in complex analyses with very large numbers of fixed effects, which made it difficult to ensure that the models converged (especially with regard to self-giving). If a future study were to be conducted, it would be recommended that the complexity of the study be reduced in order to ensure that statistical analysis could provide clearer, more interpretable and relevant results. Narrowing the focus of the study and ensuring that objectives and expectation are clear would help to provide more robust results and a clear discussion. It would be interesting to conduct a repeat study in which complete anonymity, anonymity and visibility to the ingroup were compared with regard to ingroup favouritism and self-giving, in order to determine whether the results could be replicated.

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# Appendices

## Appendix 1: Letter of ethical approval


19 February 2016

**Miss Kirsty Manola Klipp 215078004**
**School of Applied Human Sciences**
**Pietermaritzburg Campus**

**Dear Miss Klipp**

**Protocol reference number: HSS/0143/016M**
**Project Title: An experimental study of intergroup behaviour in a minimal group setting: Examining the effects of identifiability on behaviour in an intergroup situation**

**Full Approval – Expedited Application**

In response to your application received 10 February 2016, the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and the protocol has been granted **FULL APPROVAL.**

**Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment /modification prior to its implementation. In case you have further queries, please quote the above reference number.**

**PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.**

**The ethical clearance certificate is only valid for a period of 3 years from the date of issue. Thereafter Recertification must be applied for on an annual basis.**

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

.....
**Dr Shenuka Singh (Chair)**
**Humanities & Social Scinces Research Ethics Committee**

**/pm**

Cc Supervisor: Professor Kevin Durrheim
Cc Academic Leader Research: Professor D Wassenaar
Cc School Administrator: Ms Nondumiso Khanyile

**Humanities & Social Sciences Research Ethics Committee**
**Dr Shenuka Singh (Chair)**
**Westville Campus, Govan Mbeki Building**
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## Appendix 2: Sample of advert used for recruitment of participants

# PsycLab Study

UNIVERSITY OF KWAZULU-NATAL

### Attention all Students

Would you like to take part in a Psychology experiment on Intergroup Behaviour? All you need to do is play a game and answer some questions!

If you would like to participate in the study please come to The PsycLab (Psychology building – you will see signs) around 15 minutes before the times below – in order to conduct an experiment we need to have 8 people willing to participate, so please feel free to bring some friends. Each experiment takes approximately 1 hour, depending on how fast the game goes.

**PLEASE NOTE THAT THERE IS A R30.00 CASH INCENTIVE FOR PARTICIPATION (AVERAGE – THIS CAN BE MORE/LESS DEPENDING ON THE MANIPULATION).**

| DATE | TIME |
|---|---|
| Thursday, 29 September 2016 | 9:00<br>10:15<br>11:30<br>12:45 |
| Friday, 30 September 2016 | 10:15<br>11:30<br>12:45 |
| Monday, 3 October 2016 | 13:00<br>14:15<br>15:30 |
| Tuesday, 4 October 2016 | 9:00<br>10:15<br>11:30<br>12:45 |
| Thursday, 6 October 2016 | 9:00<br>10:15<br>11:30<br>12:45 |

## Appendix 3: Information letter

**VIAPPL - 2016**

Dear Participant,

This is a research project on intergroup behaviour. It has been approved by the UKZN Human Social Science Research Ethics Committee and the protocol reference number is HSS/0143/016M.

**Brief outline of the study**: This research study aims to explore behaviour in a social setting. The study is electronically based game, played by 8 players, by giving and receiving of tokens.

**What you will be required to do**: The study will take place in the Psyc Lab. You will be required to play a game, answer some questions on questionnaires and participate in a short group interview afterwards. This will take about 45 minutes to an hour of your time.

**Voluntary participation**: Your participation is voluntary and you are not being forced to take part in this study. The choice of whether or not to participate is yours alone, and there will be no consequences if you choose to not take part. You may withdraw from the research at any time by telling me that you do not want to continue. There will be no penalties for doing so.

**Anonymity**: Although we will ask you to register as a research participant, your responses will not be linked with your name or any other information by which you can be identified. Furthermore, will we ask you to take a webcam photo at the start of the game depending on the manipulation; these photos are in no way linked to your responses and will not be used for any purpose other than game manipulation. In other words, you will remain entirely anonymous and your participation will remain confidential. There are no limits to confidentiality.

**Research incentive**: Participants will be given an average of R30 cash after completing the study; however this will vary depending on the manipulation (i.e. you may get more/less than R30).

**Who to contact if you have been harmed or have any concerns**: Although this research involves very little risk, if you have any questions or complaints about aspects of the research or feel that you have been harmed in any way by participating in this study, please contact:

- Human Social Science Research Ethics Committee:
  Ms. PhumeXimba (ximbap@ukzn.ac.za/ 031 260 3587)
- Project Leaders: School of Applied Human Sciences, University of KwaZulu-Natal:
  Professor Kevin Durrheim (Durrheim@ukzn.ac.za)

  Ms. Kirsty Klipp (kirst.klipp@gmail.com)

## Appendix 4: Consent form

***Consent form***

I hereby agree to participate in research on social interaction. I am aware of what is required of me, and I understand that:

- I am participating freely and without coercion.
- This is a research project whose purpose is not necessarily to benefit me personally.
- I will remain anonymous and my participation in the study will remain confidential.
- I have a right to withdraw from the study at any time, without penalty.
- I agree to the results of my participation being used for research and teaching purposes and for presentation in reports and at conferences. My name will not appear in any of these documents.
- I agree to my photo being taken via webcam for game manipulation purposes.
- I agree/disagree to the discussion at the end of the game being recorded for research purposes.

Signature of participant:_____ Date:_____

## Appendix 5: Experimental procedure

Procedure

8 participants were let into the lab, and fingerprints were scanned in order to keep a record of who had participated and to prevent individuals from participating more than once. Participants were asked to draw a number from a bag (1 – 8) and were asked to sit at the computer corresponding to the number they had drawn. Once all participants were seated, the experimenter asked them to switch off their mobile phones, and read out the information sheet to them, and after this requested them to sign and date the consent forms. Consent forms were collected, and participants were requested to stay silent throughout the procedure and not look around the room.

Participants were then requested to register an account on the VIAPPL software, and after logging in with their credentials, entered in a code which would allow them to start the game. After logging in, the participants were instructed to take a webcam photo of themselves.

The participants were then presented with a dot estimation task, designed to enhance in-group identification. They were told that they had been allocated to groups based on their estimate. After completion of this task, the participants were presented with a questionnaire asking for demographic information.

After the completion of the questionnaire, the participants were presented with the first trial of the game, consisting of two rounds of play. The experimenter instructed the participants on how the game worked over these two rounds of play. At the end of the trial, the participants were presented with a psychometric questionnaire.

After completion of the questionnaire, the participants were presented with the second trial of the game, consisting of 40 rounds, and were instructed to play the game, without waiting for instructions in between from the experimenter. After the 40 rounds were completed, they were presented with a post-game psychometric questionnaire (repeated measure of the first, with some additional questions).

Upon completion of the questionnaire, the experimenter recorded each participant's final token balance. The experimenter informed the participants that they had not actually been allocated to their group by the dot estimation, but that it had been random allocation. The participants were each paid their final token balance and an additional R10.00, signed a register of payment and were allowed to leave.

## Appendix 6: List of Tables and figures

**Page**

**Appendix 7: Descriptive statistics for identifiability as a main effect on ingroup favouritism**

| Condition | Mean | Standard Deviation | Skewness | N |
|---|---|---|---|---|
| Visible to All | 0.514 | 0.266 | -0.083 | 400 |
| Complete Anonymity | 0.678 | 0.321 | -0.700 | 400 |
| Anonymity | 0.640 | 0.287 | -0.353 | 400 |
| Visible to Ingroup | 0.666 | 0.302 | -0.591 | 400 |
| Visible to Outgroup | 0.564 | 0.272 | -0.105 | 400 |
| Visible to Ties | 0.600 | 0.290 | -0.412 | 398 |

**Appendix 8: Confidence intervals (95%) for Identifiability**

| Source | Lower | Upper |
|---|---|---|
| Intercept | 0.491 | 0.611 |
| Complete Anonymity | 0.075 | 0.236 |
| Anonymity | 0.055 | 0.216 |
| Visible to Ingroup | 0.042 | 0.201 |
| Visible to Outgroup | -0.071 | 0.089 |
| Visible to Ties | 0.013 | 0.173 |

**Appendix 9: Standardized fixed effect sizes for identifiability and status as main effects on Ingroup Favouritism**

| Source | Standardized Fixed Effect Size |
|---|---|
| Intercept | 2.73 |
| Complete Anonymity | 0.77 |
| Anonymity | 0.67 |
| Visible to Ingroup | 0.61 |
| Visible to Outgroup | 0.04 |
| Visible to Ties | 0.46 |
| High-status | -0.51 |

**Appendix 10: Estimated marginal means for identifiability conditions**

| Identifiability Condition | Estimated marginal mean | Standard Error | Degrees of freedom | Lower CL | Upper CL |
|---|---|---|---|---|---|
| Visible to All | 0.502 | 0.029 | 59 | 0.424 | 0.580 |
| Anonymity | 0.638 | 0.029 | 54 | 0.560 | 0.716 |
| Complete Anonymity | 0.658 | 0.029 | 54 | 0.580 | 0.736 |
| Visible to Ingroup | 0.625 | 0.029 | 54 | 0.547 | 0.703 |
| Visible to Outgroup | 0.511 | 0.029 | 54 | 0.433 | 0.589 |
| Visible to Ties | 0.595 | 0.029 | 54 | 0.517 | 0.673 |

**Appendix 11: Results for pairwise comparisons of Identifiability as a main effect for Ingroup Favouritism**

| Identifiability condition | B | Standard Error | z-value | p-value |
|---|---|---|---|---|
| Anonymity vs. Visible to All | 0.14 | 0.04 | 3.38 | 0.01 |
| Complete Anonymity vs Visible to All | 0.16 | 0.04 | 3.89 | 0.001 |
| Visible to Ingroup vs Visible to All | 0.12 | 0.04 | 3.06 | 0.03 |
| Visible to Outgroup vs Visible to All | 0.01 | 0.04 | 0.22 | 1.00 |
| Visible to Ties vs Visible to All | 0.09 | 0.04 | 2.32 | 0.18 |
| Complete Anonymity vs Anonymity | 0.02 | 0.04 | 0.50 | 1.00 |
| Visible to Ingroup vs Anonymity | -0.01 | 0.04 | -0.32 | 1.00 |
| Visible to Outgroup vs Anonymity | -0.13 | 0.04 | -3.16 | 0.02 |
| Visible to Ties vs Anonymity | -0.04 | 0.04 | -1.06 | 0.90 |
| Visible to Ingroup vs Complete Anonymity | -0.03 | 0.04 | -0.83 | 1.00 |
| Visible to Outgroup vs Complete Anonymity | -0.15 | 0.04 | -3.67 | 0.003 |
| Visible to Ties vs Complete Anonymity | -0.06 | 0.04 | -1.57 | 0.62 |
| Visible to Outgroup vs Visible to Ingroup | -0.11 | 0.04 | -2.84 | 0.05 |
| Visible to Ties vs Visible to Ingroup | -0.03 | 0.04 | -0.74 | 0.98 |
| Visible to Ties vs Visible to Outgroup | 0.08 | 0.04 | 2.10 | 0.29 |

**Appendix 12: Descriptive statistics for status as a main effect on ingroup favouritism**

| Condition | Mean | Standard Deviation | Skewness | N |
|---|---|---|---|---|
| Equal Status | 0.655 | 0.283 | -0.481 | 1200 |
| High-status | 0.537 | 0.294 | -0.017 | 598 |
| Low-status | 0.594 | 0.306 | -0.348 | 600 |

**Appendix 13: Confidence Intervals (95%) for Status:**

| Source | Lower | Upper |
|---|---|---|
| Intercept | 0.49 | 0.61 |
| High-status | -0.16 | -0.05 |
| Low-status | -0.10 | 0.01 |

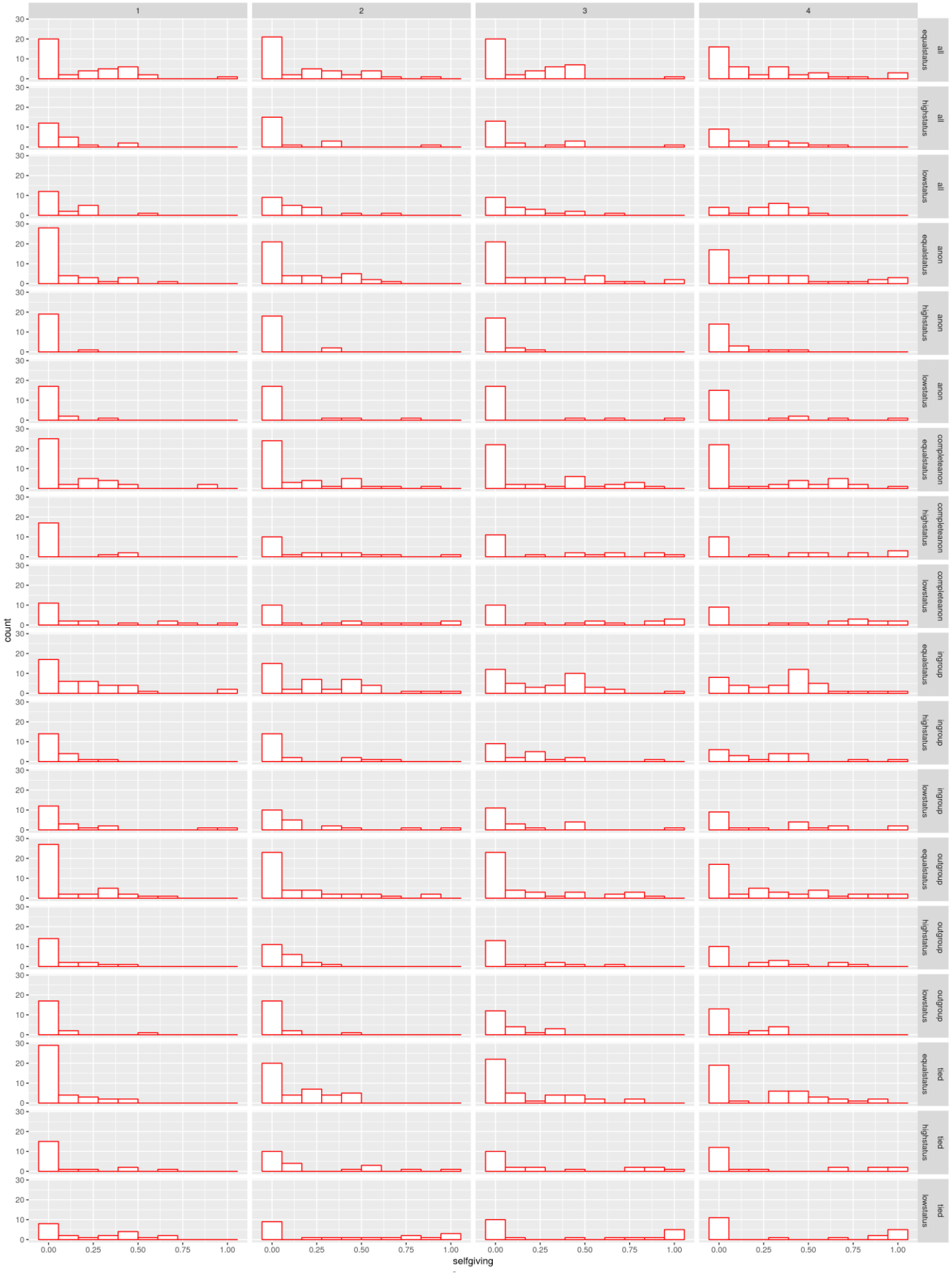
**Appendix 14: Estimated Marginal Means for Status as a main effect on Ingroup Favouritism**

| Status | Estimated marginal mean | Standard error | Degrees of Freedom | Lower CL | Upper CL |
|---|---|---|---|---|---|
| Equal Status | 0.637 | 0.016 | 54 | 0.604 | 0.670 |
| High-status | 0.534 | 0.020 | 54 | 0.493 | 0.576 |
| Low-status | 0.593 | 0.020 | 54 | 0.551 | 0.634 |

**Appendix 15: Results for pairwise comparisons of Status as a main effect for Ingroup Favouritism**

| Status | B | Standard Error | z-value | p-value |
|---|---|---|---|---|
| High-status vs Equal Status | -0.10264 | 0.02641 | -3.887 | <0.001 |
| Low-status vs Equal Status | -0.04443 | 0.02641 | -1.682 | 0.2118 |
| Low-status vs High-status | 0.05821 | 0.02546 | 2.287 | 0.0576 |

## Appendix 16: Figure showing distribution of self-giving across conditions.



**Appendix 17: Descriptive statistics for Status as a main effect on self-giving**

| Status | Mean | Standard Deviation | Skew | N | Standard Error |
|---|---|---|---|---|---|
| Low-status | 0.182 | 0.298 | 1.51 | 480 | 0.0136 |
| High-status | 0.139 | 0.250 | 2.02 | 478 | 0.0114 |
| Equal Status | 0.195 | 0.264 | 1.65 | 960 | 0.00853 |

**Appendix 18: Confidence Intervals for self-giving**

| Source | Lower | Upper |
|---|---|---|
| Intercept | 0.026 | 0.120 |
| Time | 0.036 | 0.061 |
| High-status | -0.128 | 0.007 |
| Low-status | -0.076 | 0.060 |

**Appendix 19: Bootstrapped Confidence Intervals for self-giving**

| Source | Lower | Upper |
|---|---|---|
| Intercept | 0.026 | 0.114 |
| Time | 0.037 | 0.062 |
| High-status | -0.124 | 0.006 |
| Low-status | -0.074 | 0.060 |

**Appendix 20: Least squares means for status as a main effect on self-giving**

| Status | Least squares mean | Standard error | Degrees of freedom | Lower CL | Upper CL |
|---|---|---|---|---|---|
| Equal Status | 0.195 | 0.026 | 67.34 | 0.132 | 0.258 |
| High-status | 0.134 | 0.028 | 94.33 | 0.066 | 0.203 |
| Low-status | 0.187 | 0.028 | 94.43 | 0.119 | 0.255 |

**Appendix 21: Pairwise comparisons for status as a main effect for self-giving**

| Status condition | B | Standard Error | Degrees of Freedom | T-ratio | P value |
|---|---|---|---|---|---|
| Equal Status vs High-status | 0.0603 | 0.0354 | 71.55 | 1.705 | 0.2103 |
| Equal Status vs Low-status | -0.0076 | 0.0354 | 71.63 | 0.214 | 0.9750 |
| High-status vs Low-status | -0.0527 | 0.0221 | 420.33 | -2.380 | 0.00466 |

**Appendix 22: Means for reciprocation across identifiability conditions**

| Identifiability condition | Mean | Standard Deviation | Skewness | N |
|---|---|---|---|---|
| Visible to All | 0.12 | 0.32 | 2.38 | 400 |
| Anonymity | 0.13 | 0.33 | 2.23 | 400 |
| Complete Anonymity | 0.09 | 0.29 | 2.81 | 400 |
| Visible to Ingroup | 0.12 | 0.32 | 2.41 | 400 |
| Visible to Outgroup | 0.11 | 0.32 | 2.48 | 398 |
| Visible to Ties | 0.08 | 0.27 | 3.10 | 400 |