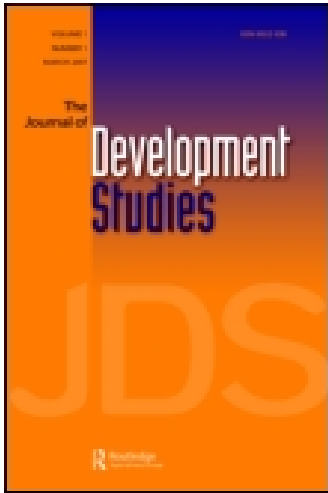


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Theft, Gift-Giving, and Reciprocity: A South African Experiment

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ABSTRACT *This paper uses a taking game to examine how South African subjects alter the amount they choose to 'steal' in response to a resource transfer from the potential victim. Any positive resource transfer significantly reduces the amount taken. 'Small' transfers reduce a victim's total losses, including the transfer and the subsequent 'theft'. Larger transfers increase a victim's total losses. This study failed to find that differences in the frame of a transfer (i.e. gift, as a bribe, or as a payment) influenced a taker's response to the transfer.*

1. Introduction

The laboratory experiment described in this paper uses a reframed dictator game to examine how players respond to resource transfers from a potential victim before they decide how much to take from that individual. The motivation for this work is a South African university administrator's successful efforts to use gift-giving (i.e. sharing agricultural output and training) to alleviate the theft of livestock and agricultural production from university research land. Although it is not a commonly discussed problem, livestock theft is a major challenge in the developing world.¹ Given the success of this intervention in reducing theft, it is useful to understand what factors were integral to its success and under what circumstances this strategy could be applied elsewhere. While the laboratory environment cannot fully capture the incentives faced by potential victims and thieves, it can provide insight into some of the motivations these actors face. It can also shed light on behavioural tools to limit theft when standard policing and enforcement mechanisms may fail. In addition to complementing other research on reciprocity and livestock theft, this paper also provides additional evidence on the role of resource transfers and reciprocity in other situations. A few examples of related situations include labour relationships (i.e. wages and effort), charitable donations, blood donations, and a variety of instances in which individuals can choose to behave pro-socially. Some of these situations can be one-shot interactions like the experiment discussed in this work. Others may be repeated interactions. This experiment provides insights into both the one-shot interactions as well as how repeated interactions may develop into reciprocal equilibria.

In this experiment, potential 'thieves' respond to several resource transfers to determine how transfer size influences taking decisions. Additionally, transfers are described as gifts, bribes, or payments to determine if framing influences decision making. Overall, transfers reduce the amount a taker chooses to appropriate from a potential victim. However, in this one-shot interaction only small

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transfers reduce a victim's total losses, which include the resource transfer and the subsequent theft. For most transfer sizes, offering resources to a potential taker leads to higher total losses for the victim. There is little evidence that variation in the size or the framing of the transfer influences a taker's response.

Theft can be considered in a dictator or taking game framework. The potential thief is the proposer, who can choose the final resource outcome by stealing when the victim is unable to prevent theft. Although victims can take precautions to protect their property, there are situations in which effective protection or policing is prohibitively expensive and/or ineffective. Theft from agricultural land is an important but often overlooked example of such a situation.

In the dictator game, proposers do not generally divide an endowment such that the receiver gets nothing. For theft, that would mean potential thieves do not steal as much as they are able. Potential thieves might be influenced by reciprocity concerns, a distaste for taking, or other behavioural considerations. For example, other work in South Africa showed that taking behaviour is altered by the racial identity of the potential victim (Pecenka & Kundhlande, 2013). Reciprocal behaviour may also play a role in mitigating theft. If the potential victim were to transfer resources (i.e. a gift or a payment) to a potential thief, this may encourage reciprocal behaviour and reduce theft. The following paragraphs highlight key areas of research relevant to this work.

Crime and deterrence have long attracted the attention of economists (e.g. Becker, 1968). Certain cases, such as livestock theft in the developing world, present different challenges because enforcement and punishment are not credible deterrents due to high detection and enforcement costs. In spite of these problems, little academic research examines this issue. Schechter (2007) is an important exception. Schechter develops a dynamic limited commitment model of theft and gift-giving and conducts field experiments with Paraguayan farmers on risk aversion and trust. Schechter finds that giving increases when trust is low and the threat of theft is high. While Schechter shows how a gift-giving equilibrium develops in response to theft, the current work uses a theft experiment to determine if 'imposing' gift-giving might reduce theft in a segmented society. The current work also focuses on the responses of potential thieves rather than the decision to offer a gift.

In addition to the limited work on theft and gift-giving, there is a more expansive literature on payments, gifts, and reciprocity. Perhaps the best known studies are related to worker responses to higher than expected wages (Fehr, Kirchsteiger, & Riedl, 1993; Gneezy & List, 2006). While Fehr, Kirchsteiger, and Riedl find quality improvements to higher than expected wages, Gneezy and List find increased worker effort in the short run dissipates and does not increase productivity in the long run. There is also related research on crowding out and framing. Crowding out theory states that when extrinsic rewards are offered for intrinsically rewarding tasks, the extrinsic motivation crowds out or replaces the reward inherent to the task. Titmuss (1970) argued that monetary compensation might discourage blood donation by undermining a sense of civic duty. An experimental test of this hypothesis later verified his prediction (Mellström & Johannesson, 2008). Similar results were found in a test of Swiss residents' willingness to accept a nuclear waste facility in their region. When payment was offered in return for acceptance of the facility, the level of acceptance fell (Frey & Oberholzer-Gee, 1997). In psychology, Deci (1971) has long made similar arguments about the impact of extrinsic motivation (economic incentives) on internal motivation. A similar work by Gneezy and Rustichini (2000) shows that the effect of payment on performance and effort is not monotonic. Gneezy and Rustichini use an IQ test and success at soliciting charitable donations to measure performance and effort. In both contexts, at low levels, payment inhibits performance and/or effort relative to a no payment control, but as payments rise they improve. There is less evidence for crowding out when payment takes the form of a gift. For example, Falk (2007) conducts a field experiment soliciting donations from residents of Zurich for street children in Dhaka. Three treatment groups are formed based on gift size: no gift, small gift, or large gift. The gifts of postcards drawn by children were meant to encourage donations for the children in Dhaka. Although differences were small, donations were lowest in the no gift condition, followed by the small gift condition, and then the large gift condition. This work provides evidence that the framing (payment or gift) influences how recipients view the transaction and thus whether crowding out occurs. A similar work by Heyman and

Ariely (2004) shows that crowding out may be a greater concern in markets where money changes hands than markets where the payment is not monetised. The next section of this paper describes how the experiment was designed and implemented. The third section outlines non-parametric and econometric results. The fourth section concludes.

2. Experiment Design

Previous academic work and the anecdotal evidence mentioned above show that gift-giving can be an effective strategy to mitigate theft. The purpose of this experiment is to determine how gift-giving, or resource transfers more generally, from potential victims to takers influences decisions in a laboratory theft game. The experiment took place on two campuses of the University of the Free State in South Africa. The Bloemfontein campus of the University of the Free State is a racially diverse environment. In contrast, the Qwaqwa campus is located in a former 'homeland' area of South Africa, and its student body is composed almost entirely of black students.² In total, 362 students participated in the experiment. In exchange for participation, each student received a ZAR20 payment and the opportunity to earn additional money. At the time of the experiment, ZAR7.3 was equivalent to USD1. Half of the participants were recruited from the Bloemfontein campus to play the role of receivers. Approximately half of these Bloemfontein student participants were white and half were black. An equal number of participants were recruited from the Qwaqwa campus to play the role of takers. Reflecting campus demographics, these students all identified themselves as black.

This experiment is part of a larger study on theft. An additional objective of the larger study is to understand how racial identity and inequality influence theft decisions. Although this is not the topic of this paper, this experiment was conducted in conjunction with work on identity and inequality. The implication for this experiment is a design that formed treatment groups by the level of inequality between players and the race of the receiving player. As mentioned above, approximately half of the Bloemfontein participants identify themselves as black and the others identify themselves as white. Levels of inequality were created by allowing Bloemfontein participants to earn an additional payment by completing a word scramble task. By completing this task, individuals earned an additional ZAR30 or 50. Although this additional payment was randomly determined, neither the Bloemfontein participants nor their partners had this knowledge. The payment was described as earnings to solidify the Bloemfontein player's ownership of this additional payment. Variation in these two factors created four groups that differed based on the race of the receiver (i.e. victim) and the level of inequality between players. These groups are summarised in Table 1.

Participant pairings were made between campuses, and so the individuals in each pair never met. Rather, Bloemfontein participants were recruited via email and participated online. After completing the word scramble task, Bloemfontein participants learned that they were paired with another player. They also learned how much real money they had been allotted to begin the study as well as the smaller amount their unknown partner had been allotted. Bloemfontein participants were then asked to make one decision. This decision was similar to a dictator game decision. Bloemfontein participants

Table 1. Treatment groups

Group (# of pairs)	Bloemfontein participant			Qwaqwa participant		
	Race	Participation payment (ZAR)	Additional payment (ZAR)	Race	Participation payment (ZAR)	Additional payment (ZAR)
WRHI ^a (43)	White	20	50	Black	20	0
WRLI (49)	White	20	30	Black	20	0
BRHI (41)	Black	20	50	Black	20	0
BRLI (48)	Black	20	30	Black	20	0

Notes: ^aWRHI refers to the white receiver, high inequality treatment. The other groups are similarly identified.

were allowed to transfer up to ZAR15 from their additional payment to the other player.³ The decisions made by Bloemfontein participants are not the focus of our interest and are not discussed further. These decisions are mentioned because this ‘transfer information’ was presented to Qwaqwa participants to provide the opportunity for a reciprocal response. After making this decision, Bloemfontein players then provided their surname and other demographic data. Surnames were then used to convey racial identity to partners in Qwaqwa.⁴

In contrast to the online participation by Bloemfontein students, Qwaqwa students were recruited via student-to-student recruiting, classroom announcements, and signs posted on campus. These students participated in the study during one of 10 classroom/laboratory experimental sessions. First students in Qwaqwa learned that they were participating in games with real monetary payoffs, that they were already paired with a student from another university campus, and that at least one of their decisions would have implications for both their payoffs and those of the players with whom they were paired. Qwaqwa players then began the decision-making portion of the study.

The decision-making portion of the study consists of several related decisions. First, all Qwaqwa participants decide how much to take in the baseline condition, followed by several similar decisions in the transfer condition. In the baseline condition, Qwaqwa participants are reminded of their own participation payment and learn the surname and payment earned by the Bloemfontein player with whom they are paired. Without any additional information, Qwaqwa players then decide how much money they would like to take from the other player. The exact text presented to Qwaqwa players in the low inequality baseline treatment is in Table 2. The text for the high inequality baseline treatment is identical except for the larger additional payment paid to student A.

After answering the question in Table 2, Qwaqwa players then proceed to additional decisions. These additional decisions are largely the same, with three notable exceptions. One important change is that Qwaqwa players are newly paired with a different individual from within the same treatment group outlined in Table 1. This ensures that the characteristics (i.e. receiver race and level of inequality) between the two players are constant.⁵ Because new pairings have been made, the first round decision should not influence the response to a new player in the subsequent conditions. A second important change is that Qwaqwa participants now learn that the current Bloemfontein participant previously had the opportunity to transfer resources to them. As mentioned above, the

Table 2. Baseline question, low inequality treatment

Your participation payment is ZAR20. The student A with whom you are paired will receive a participation payment of ZAR20. In addition, student A has earned an additional payment of ZAR30 for completing a task. This information is summarised in the table below.

	You	Student A
Participation payment (ZAR)	20	20
Additional payment (ZAR)	0	30
Total (ZAR)	20	50

Student A's last name is _____.

It is possible for you to take money from the **additional payment** student A earned for completing a task.

How many Rand do you want to take from the money student A earned?

(Circle your answer below)

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15^a

Notes: ^aBecause participants were promised at least ZAR20 for their time, takers were only allowed to take up to ZAR15 from the victim. This ensures that victims in the low inequality treatment (as shown here) receive the promised ZAR20 even if the taker appropriates all ZAR15 in a separate (double penalty) condition.

Bloemfontein players were given the opportunity to offer a transfer (either a gift, bribe, or payment) to the Qwaqwa player. To be clear, the Bloemfontein players had the opportunity to offer a transfer and chose its size; they did not have the opportunity to choose which transfer type they would offer (gift, bribe, or payment). The gift frame states that the Bloemfontein player was able to offer a gift and this person had no knowledge that the Qwaqwa player would later be able to take resources from them. The bribe frame differs only slightly. In the bribe frame, the Bloemfontein player knew the Qwaqwa player would be able to take resources after learning the size of the voluntary resource transfer. Because the Bloemfontein player knew the Qwaqwa participant would later be able to take resources, any transfer in this frame could be perceived as a bribe. A final payment frame was identical to the gift frame, except language related to 'give' or 'gift' was replaced by 'pay' or 'payment'. The purpose of this variation in framing was to determine if the perceived motivation of a resource transfer influenced the potential thief. A third important difference between the transfer condition and the baseline condition is the opportunity to respond to multiple transfer sizes within the transfer condition. The purpose for this difference is two-fold. On one hand, asking potential takers to respond to transfers of multiple sizes through the strategy method allowed the collection of additional data points. Equally important was the desire to include the actual transfers offered by the Bloemfontein players. Before implementation, there was concern that there would be little variation in the actual transfers offered. To ensure responses to a wide range of transfer sizes, potential transfers were categorised into three intervals. A small transfer included those on the [0, 3] interval. A medium transfer included those on the [4, 7] interval, while a large transfer was on [8, 15].⁶ As mentioned above, Bloemfontein participants were given the opportunity to offer any transfer size between zero and 15. Then, two additional transfers were generated from the uniform distribution over the two transfer intervals that were not selected by the Bloemfontein participant. This allowed each taker to respond to three different transfer sizes presented in random order. Although only one of these transfers was actually offered and might impact final payments, the Qwaqwa participant was not aware of which transfer was 'real'. Although the design of the experiment is relatively complex from the reader's perspective, the information presented to participants is straightforward. An example of the low inequality gift frame is presented in [Table 3](#). The (low inequality) bribe and payment frames are presented in Online Appendix [Tables 1](#) and [2](#).

After responding to these questions, Qwaqwa participants completed a demographic questionnaire. In accordance with the experiment instructions, one treatment was then randomly selected to impact participant earnings. Earnings were calculated and payments were made beginning the following week.

3. Results

This section begins with a brief summary of the results from the baseline treatment. The baseline treatment is then compared to the transfer condition to shed light on the principal question of interest in this work: do transfers from potential theft victims to takers mitigate theft? To build on the results from the baseline treatment, responses to transfers are also examined with reference to the race of the potential victim. The analysis then shifts to focus on the size of the transfers, how size influences a taker's response, and how this response ultimately impacts the potential victim. Finally, there is a brief discussion of how framing influences taking decisions. In general, results are presented visually, and non-parametric statistical tests are used to examine differences between groups and/or treatment conditions. Later, econometric methods are used to control for additional variables of interest.

In the baseline treatment, takers had the opportunity to appropriate resources from another player. In this treatment, the mean amount taken from the victim was ZAR10.4, or 69 per cent of the vulnerable endowment.⁷ The baseline treatment serves as a comparison to determine how individuals adjust their taking in response to transfers from a potential victim. Recall that the taker was presented with three potential transfers of different sizes on the [0, 15] interval, only one of which was actually offered by

Table 3. Gift question, low inequality treatment

You are now paired with a different student A. Again, consider the following table.

	You	Student A
Participation payment (ZAR)	20	20
Additional payment (ZAR)	0	30
Total (ZAR)	20	50

Student A's last name is _____.

Student A was given the opportunity to give you up to ZAR15 from their **additional payment**. Student A offered this gift **without** knowing that you can take from them.

One of the cases below is student A's real gift to you. Only the real gift can impact final earnings. You do not know which of these gifts was actually offered so you should answer each part of this question as if that gift was student A's real gift to you.

- (a) Suppose student A gave you ZAR_____ from their **additional payment**.

You will receive this gift from student A. In addition to the gift from student A, it is possible for you to take money from the **additional payment** student A earned for completing a task. How many Rand do you want to take from the money student A earned?

(Circle your answer below)

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

- (b) Suppose student A gave you ZAR_____ from their **additional payment**.

You will receive this gift from student A. In addition to the gift from student A, it is possible for you to take money from the **additional payment** student A earned for completing a task. How many Rand do you want to take from the money student A earned?

(Circle your answer below)

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

- (c) Suppose student A gave you ZAR_____ from their **additional payment**.

You will receive this gift from student A. In addition to the gift from student A, it is possible for you to take money from the **additional payment** student A earned for completing a task. How many Rand do you want to take from the money student A earned?

(Circle your answer below)

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

the victim. The two additional transfers were randomly generated for the purpose of gathering additional responses to varied transfer sizes. Although the taker did not know which transfer the victim had actually offered, the taker did know that one of the three transfers was real and would be honoured if this treatment was selected for payment. One question of interest in this work is how takers respond to transfers in general, and whether responses vary based on the transfer size. [Figure 1](#) provides answers to both questions.

The first column of [Figure 1](#) represents the mean amount (ZAR10.4) taken from victims in the baseline condition. The next column represents takers' responses to small transfers of ZAR0–3. In

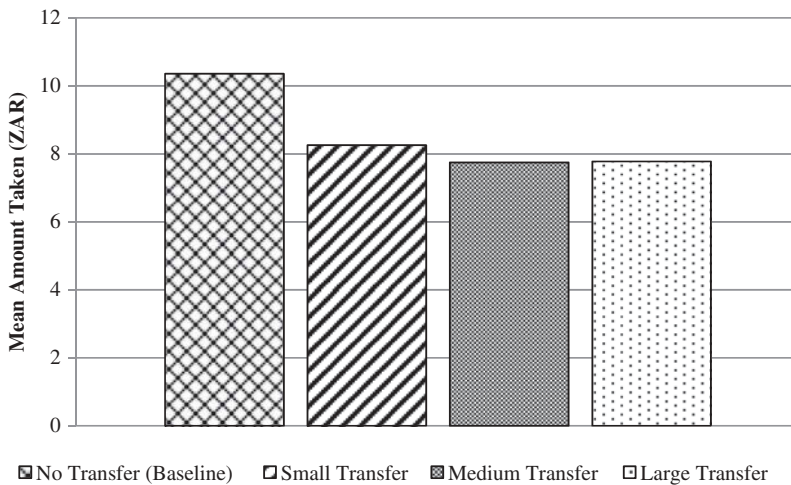


Figure 1. Mean amount taken by transfer size.

response to a small transfer, takers reduced the mean amount they took to ZAR8.3. A medium transfer of ZAR4–7 was slightly more effective in reducing taking. The mean amount taken in response to a medium transfer is ZAR7.8. The mean response to a large transfer of ZAR8–15 is also ZAR7.8. The responses to each transfer size are each significantly different from to the baseline condition at the $p < 0.01$ level, using the Wilcoxon signed-rank test. However, the differences in responses to the three questions are indistinguishable from one another by the Friedman test ($p = 0.50$). Likewise, the Wilcoxon signed-rank test is unable to detect a significant difference in responses to any two transfer sizes.

In the baseline condition, black victims lost 15 per cent more than white victims.⁸ It is thus useful to ask whether takers' response transfers are also influenced by the race of the receiver. Online Appendix Figures 1 and 2 display responses to transfers from white and black receivers, respectively. Although the level of taking in the baseline condition is greater when takers are paired with black receivers, a resource transfer of any size influences takers to appropriate less when paired with either race. Those paired with white receivers reduce the amount they take in response to a resource transfer by approximately ZAR2. Those paired with black receivers follow a similar but visually more pronounced pattern, reducing the average amount appropriated by nearly ZAR3. A more illustrative way to view differences in the reduction in taking by receiver race due to transfers is presented in Figure 2.

Figure 2 shows that reductions in taking are more pronounced for those paired with black receivers at each transfer size. The differential impact by race ranges from less than ZAR0.5 in the small transfer case to nearly ZAR2 in the medium transfer case. Only in the medium transfer case does the difference in responses by receiver race approach statistical significance (Mann-Whitney U test, p -value = 0.09). Corresponding p -values for the small and large transfers are 0.87 and 0.51, respectively.

Figures 1 and 2 and Online Appendix Figures 1 and 2 demonstrate how individuals respond to resource transfers from potential theft victims. In each case, the mean response is to reduce taking after a resource transfer. Although the differences by race are not generally statistically significant, it appears that takers paired with black receivers are more influenced by resource transfers than those paired with white receivers. Even though transfers reduce taking, the viability of this strategy depends on whether potential victims can enhance their own payoffs by transferring resources to potential thieves. Figure 3 and the following discussion suggest that small resource transfers can be an effective theft deterrent for the potential victim. However, larger transfers lead to greater overall losses for the victim.

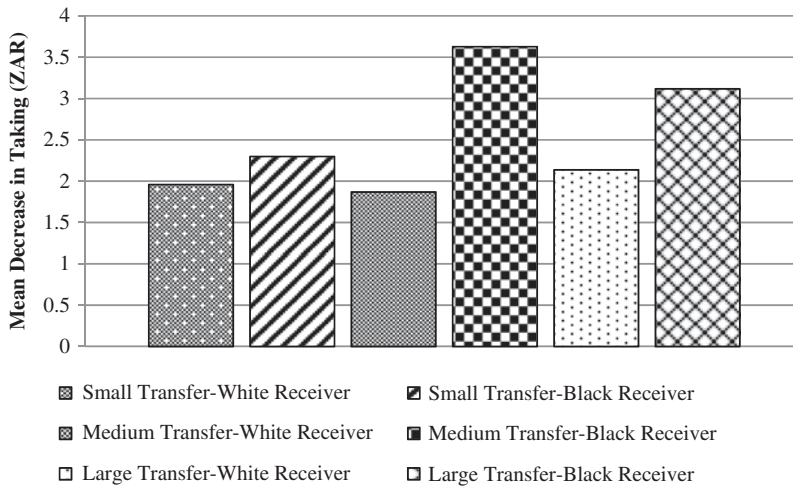


Figure 2. Mean decrease in taking by transfer size and receiver race.

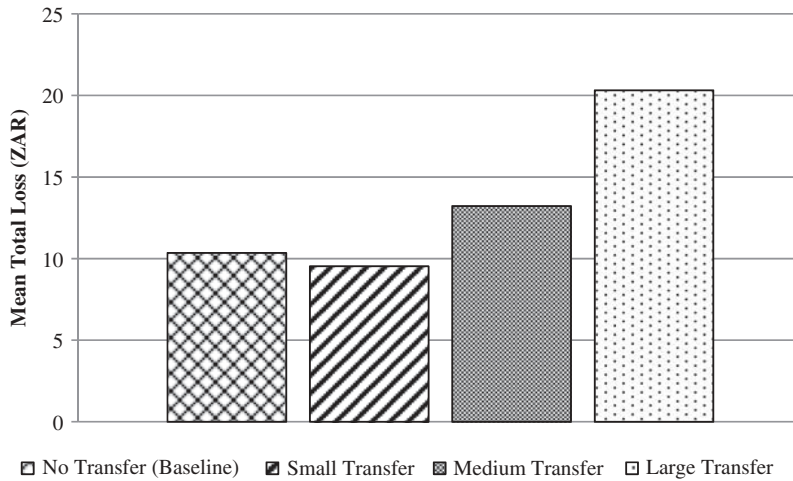


Figure 3. Mean total loss by transfer size.

The mean loss in the baseline condition is ZAR10.4. The mean total loss in the small transfer condition, including the transfer offered and the ensuing appropriation, falls to ZAR9.5. On average, a small [0, 3] Rand transfer to a potential thief reduces overall losses by nearly ZAR1. Interestingly, offering just a ZAR1 transfer yields the greatest benefit by reducing overall losses to ZAR7.5 on average, a 28 per cent decrease from the baseline condition. Transfers up to ZAR3 do provide benefits relative the baseline scenario. On average any transfer in excess of ZAR3 results in greater losses for the potential theft victim. The difference between the baseline condition and the small transfer condition is significant at the $p = 0.04$ level by the Wilcoxon signed-rank test. The more pronounced differences between the baseline and the medium transfer condition, as well as the baseline and large transfer condition, each yield p -values of less than 0.01.

As discussed above, transfers from the potential victim to the taker do influence taking decisions. The general result is that offering a transfer reduces the amount that individuals choose to take, although it does not necessarily reduce a victim's total losses. Whether a transfer is offered influences decision making, but there is no significant difference in taking behaviour based on the three size

Table 4. Mean taking response by transfer frame and size

		Transfer size			Friedman p-value
		Small	Medium	Large	
Transfer frame	Gift	8.57	7.20	8.13	0.22
	Bribe	8.20	7.69	7.58	0.62
	Payment	7.98	8.39	7.64	0.68
	Kruskal-Wallis p-value	0.73	0.24	0.72	

categories selected in the design stage of the experiment. This finding is true whether individuals are paired with white receivers or black receivers. There is no significant evidence for a crowding out effect when monetary transfers are used to discourage taking. Offering a small transfer does not encourage more taking relative to the baseline condition by crowding out and an individual's intrinsic motivation to refrain from taking.

This experiment was also designed to test for differences in responses to transfers framed as gifts, bribes, or payments. Disaggregating the data along these frames yields similar results for each transfer size. Although there is some variation in the responses to gifts, bribes, or payments within a given transfer size, the differences between these framings are not statistically significant. Likewise, within a gift, bribe, or payment frame the Friedman test was unable to detect a difference between responses to a small, medium, or large transfer. The mean taking data in response to a given transfer frame and size as well as the associated p-values are presented in [Table 4](#).

In summary, the results of the non-parametric analysis show that transfers from potential victims to takers reduce taking. Whether a transfer has been made influences taking decisions, but the size of such transfers does not appear to play a large role. Additionally, takers paired with black receivers appear more responsive to transfers, although these differences are not significant at conventional levels. Examining total losses, including any transfer from the potential victim to the taker and the subsequent appropriation, shows that only small transfers are successful in reducing a potential victim's losses due to theft. There is no significant evidence that the transfer frame or the size of the transfer influence taking decisions. In the following section, econometric methods are used to examine the same questions while controlling for additional variables of interest.

Econometric Results

A number of models are compared to ensure the robustness of the results. Ordinary least squares (OLS) is first compared to random effects (RE) and fixed effects (FE) specifications to account for the panel nature of the data set. After examining these three model types, the most appropriate is used for a more thorough analysis using a tobit specification. Recall that the dependent variable of interest, the amount the taker appropriates, is limited to the $[0, 15]$ interval. Tobit models are used to account for censoring in the data.

Previous experimental work in South Africa related to dictator type games provides guidance on appropriate controls (Burns, 2004). In addition, the baseline treatment considered victim race and the level of inequality between players. Variables are included to account for these treatment conditions. Additional variables quantify the effect of: perceived opportunities for one's racial group; highest level of education of one's parents; the race of one's closest friends; perceived relative income; devoutness to one's religion; and whether one has been a victim of theft. Standard experimental economic controls such as sex, age, and the number of economics courses taken by the decision maker are also included, as are a series of dummy variables indicating the ethnic identity of the potential victim. An additional dummy variable is included to indicate whether a particular decision was made in the baseline condition. More importantly, two variables were added to capture the influence of transfers from potential victims to takers. A dummy variable denoting

whether a positive transfer was offered and an additional variable denoting transfer size in excess of the smallest positive transfer (ZAR1) were added to the model. Together, these two variables capture the impact of any transfer as well as transfers of increasing size. The results of the base models are presented in Table 5.

Overall, the OLS and RE models are similar. The FE model is also similar with respect to the effects of transfers. Coefficients and significance levels in the FE specification differ with respect to the

Table 5. Econometric results, OLS, random effects, and fixed effects

Dependent variable: amount taken	β	p-value	β	p-value	β	p-value
	<i>SE</i>		<i>SE</i>		<i>SE</i>	
	OLS (1)		RE (2)		FE (3)	
Constant	15.39 2.16	0.00	15.28 2.65	0.00	9.83 0.74	0.00
Receiver is white	-1.95 0.71	0.01	-1.87 0.80	0.02	-	-
High inequality	0.50 0.37	0.18	0.49 0.46	0.29	-	-
Own racial group has fewer opportunities ^a	-0.57 0.22	0.01	-0.57 0.28	0.04	-	-
Parent education ^b	-0.02 0.12	0.88	-0.01 0.15	0.93	-	-
Close friends with person of another race	0.74 0.40	0.06	0.75 0.49	0.13	-	-
Perceived economic situation ^c	0.44 0.33	0.19	0.46 0.41	0.27	-	-
Religion is less important	-0.42 0.24	0.08	-0.42 0.29	0.15	-	-
Theft victim	-0.91 0.38	0.02	-0.90 0.47	0.06	-	-
Male	-0.00 0.39	0.99	-0.02 0.48	0.96	-	-
Age	-0.18 0.08	0.04	-0.18 0.10	0.08	-	-
Number of economics courses	0.29 0.16	0.08	0.29 0.20	0.15	-	-
Receiver is Afrikaner	0.97 0.65	0.14	0.96 0.70	0.17	0.95 0.94	0.31
Receiver is Zulu	0.08 0.89	0.93	0.19 0.94	0.84	0.47 1.20	0.70
Receiver is Xhosa	-0.22 0.72	0.76	-0.29 0.77	0.71	-0.35 1.04	0.73
Receiver is Sotho	-1.00 0.57	0.08	-0.73 0.63	0.24	0.26 0.95	0.78
Baseline condition	0.13 0.70	0.85	0.17 0.66	0.80	0.21 0.68	0.75
Any positive transfer	-3.17 0.71	0.00	-3.14 0.68	0.00	-3.13 0.72	0.00
Additional transfer (for transfers >1)	0.09 0.05	0.06	0.09 0.05	0.05	0.09 0.05	0.07
N	637		637		637	

Notes: ^aRespondents chose from *Strongly Agree* (1), *Agree* (2), *Don't Know* (3), *Disagree* (4), and *Strongly Disagree* (5). ^bNine respondents did not know the highest level of education achieved by their parents. These respondents were assigned the modal response of *Some general education but did not complete grade 9*. ^cRespondents were asked to choose between *Better off* (1), *About the same* (2), *Worse off* (3), or *Don't Know*. *Don't Know* responses were coded as *About the same*.

ethnicity dummy variables included in the regressions. As most of the explanatory variables are invariant over the panel, most of the FE coefficients are not comparable to the other specifications. The three variables of greatest interest relate to the transfer condition and whether a transfer is offered. The baseline coefficient is small and insignificant, suggesting that individuals are not influenced by the condition itself. Rather, takers are influenced by the actions of the potential victim in this condition. Any positive transfer discourages taking and is highly significant. Interestingly, the size of the transfer plays little role with larger transfers slightly increasing the amount a taker chooses to appropriate. As in other work related to theft in South Africa, white receivers are significantly less vulnerable to taking (Pecenka & Kundhlande, 2013). Perceiving fewer opportunities for one's racial group is also associated with less taking. Interestingly, the results above differ from the study by Pecenka and Kundhlande (2013) in several ways. Parental education does not have a significant influence on taking, and having been a victim of theft reduces taking. Curiously, rating religion as being less important in one's life is also associated with less taking. Marginally significant predictors associated with more taking include having a close friend of a different race, being younger, and having taken more economics classes.

Although each of the three models presented in Table 5 yields similar results with respect to the treatment variables, specification tests favour the RE specification. Using a Bruesh-Pagan test to detect the presence of random effects (RE) yields a p-value of less than 0.01. This highly significant result indicates that RE is preferred over OLS. Conversely, the Hausman test yields a p-value of 0.49, providing little evidence in favour of FE over RE. In order to estimate the coefficients associated with invariant predictors, and to account for the censored dependent variable, the remainder of the analysis will employ RE tobit models. Table 6 includes the RE model previously presented (RE 2) as well as three additional RE tobit specifications.

The results of the RE tobit (1) largely parallel those of the RE model presented in Table 5. Some coefficients differ due to the censored nature of the data. In the RE tobit, the impact of the baseline condition is again small and insignificant, while offering any positive transfer amount is associated with nearly a ZAR5 reduction in taking. Offering transfers exceeding ZAR1 is again associated with a slight increase in the amount taken. As discussed in Pecenka and Kundhlande (2013), white receivers in the experiment are less vulnerable to theft. In the RE tobit (1) specification, the difference is nearly ZAR2.5. Again, takers who perceive fewer opportunities for their own racial group appropriate less. Takers who have been victims of theft, are older, or rate religion as being less important in their lives take less, although these effects are only marginally significant. A number of variables included in the RE tobit (1) and the linear RE model are not significant predictors of taking. To simplify results, insignificant predictors were omitted. The resulting model is RE tobit (2). This model retains the variables with significant coefficients described above and otherwise changes little. A likelihood ratio test was conducted to determine if the smaller specification reduces the fit of the model.⁹ A p-value of 0.64 provides little evidence that the larger model is preferred.

RE tobit (3) is also included in Table 6. The purpose of this model is to understand whether takers respond differently to transfers from black or white victims. This model differs from RE tobit (2) in that a dummy variable has been added to indicate that a taker is paired with a black victim and has been offered a positive transfer. The additional dummy variable in RE tobit (3) is not significant at standard thresholds ($p = 0.13$). It does suggest, however, that although individuals take less from white victims, they reduce taking from black victims to a greater extent in response to positive transfers. Albeit puzzling, this result also corroborates the findings of Pecenka and Kundhlande (2011): although takers take less from white victims, they respond more strongly to increased costs of theft paid by the victim when the victim is black. The econometric analysis conducted thus far corroborates the principal non-parametric findings that transfers are effective in reducing taking, although the size of the transfer is of little importance. The paragraphs below extend this analysis by examining how the framing of a transfer might influence taking decisions. One additional model, RE tobit (4), is presented in Online Appendix Table 3.

RE tobit (4) and its results are similar to RE tobit (2) except for the addition of six dummy variables. These dummy variables are meant to determine how the framing of a transfer influences taking. Two

Table 6. Econometric results, random effects tobit

	β	p-value	β	p-value	β	p-value	B	p-value
	<i>SE</i>		<i>SE</i>		<i>SE</i>		<i>SE</i>	
	RE (2)		RE Tobit (1)		RE Tobit (2)		RE Tobit (3)	
Dependent variable: amount taken								
Constant	15.28 <i>2.65</i>	0.00	19.67 <i>3.58</i>	0.00	19.81 <i>3.11</i>	0.00	20.24 <i>3.13</i>	0.00
Receiver is white	-1.87 <i>0.80</i>	0.02	-2.39 <i>1.10</i>	0.03	-1.13 <i>0.64</i>	0.08	-2.16 <i>0.94</i>	0.02
High inequality	0.49 <i>0.46</i>	0.29	0.44 <i>0.62</i>	0.48	- <i>-</i>	- <i>-</i>	- <i>-</i>	- <i>-</i>
Own racial group has fewer opportunities	-0.57 <i>0.28</i>	0.04	-0.82 <i>0.37</i>	0.03	-0.71 <i>0.37</i>	0.06	-0.70 <i>0.37</i>	0.06
Parent education	-0.01 <i>0.15</i>	0.93	-0.08 <i>0.20</i>	0.70	- <i>-</i>	- <i>-</i>	- <i>-</i>	- <i>-</i>
Close friends with person of another race	0.75 <i>0.49</i>	0.13	0.93 <i>0.66</i>	0.16	- <i>-</i>	- <i>-</i>	- <i>-</i>	- <i>-</i>
Perceived economic situation	0.46 <i>0.41</i>	0.27	0.58 <i>0.56</i>	0.30	- <i>-</i>	- <i>-</i>	- <i>-</i>	- <i>-</i>
Religion is less important	-0.42 <i>0.29</i>	0.15	-0.65 <i>0.40</i>	0.10	-0.63 <i>0.41</i>	0.12	-0.63 <i>0.41</i>	0.12
Theft victim	-0.90 <i>0.47</i>	0.06	-1.13 <i>0.64</i>	0.08	-1.02 <i>0.64</i>	0.11	-1.02 <i>0.64</i>	0.11
Male	-0.02 <i>0.48</i>	0.96	-0.08 <i>0.65</i>	0.90	- <i>-</i>	- <i>-</i>	- <i>-</i>	- <i>-</i>
Age	-0.18 <i>0.10</i>	0.08	-0.26 <i>0.14</i>	0.06	-0.21 <i>0.13</i>	0.13	-0.20 <i>0.14</i>	0.13
Number of economics courses	0.29 <i>0.20</i>	0.15	0.37 <i>0.27</i>	0.17	- <i>-</i>	- <i>-</i>	- <i>-</i>	- <i>-</i>
Receiver is Afrikaner	0.96 <i>0.70</i>	0.17	1.16 <i>0.96</i>	0.23	- <i>-</i>	- <i>-</i>	- <i>-</i>	- <i>-</i>
Receiver is Zulu	0.19 <i>0.94</i>	0.84	0.33 <i>1.31</i>	0.80	- <i>-</i>	- <i>-</i>	- <i>-</i>	- <i>-</i>
Receiver is Xhosa	-0.29 <i>0.77</i>	0.71	-0.10 <i>1.08</i>	0.92	- <i>-</i>	- <i>-</i>	- <i>-</i>	- <i>-</i>
Receiver is Sotho	-0.73 <i>0.63</i>	0.24	-0.99 <i>0.87</i>	0.26	- <i>-</i>	- <i>-</i>	- <i>-</i>	- <i>-</i>
Baseline condition	0.17 <i>0.66</i>	0.80	0.04 <i>0.95</i>	0.97	- <i>-</i>	- <i>-</i>	- <i>-</i>	- <i>-</i>
Any positive transfer	-3.14 <i>0.68</i>	0.00	-4.73 <i>0.97</i>	0.00	-4.87 <i>0.65</i>	0.00	-4.11 <i>0.81</i>	0.00
Additional transfer (for transfers >1)	0.09 <i>0.05</i>	0.05	0.12 <i>0.06</i>	0.06	0.11 <i>0.06</i>	0.08	0.11 <i>0.06</i>	0.08
Any positive transfer when paired with black receiver	- <i>-</i>	- <i>-</i>	- <i>-</i>	- <i>-</i>	- <i>-</i>	- <i>-</i>	-1.52 <i>1.00</i>	0.13
N	637		637		637		637	

of these dummy variables denote whether a taker was in the bribe or payment frame instead of the gift frame. Two additional variables are formed by interacting the transfer frame dummy variables just described with the dummy variable indicating that a positive transfer was offered. The final two dummies are formed by interacting the transfer frame dummies with the additional transfer variable that measures of the influence of transfers as they increase in size.

These six dummy variables, although at most marginally significant, provide new and intriguing information. First, the bribe and payment frame dummies indicate that exposure to the bribe or payment frame is associated with taking approximately two fewer Rand relative to the gift frame.

This is somewhat surprising, as one might expect the gift frame to be viewed more favourably. Given this finding, the coefficients on the interactions of the payment frame and the bribe frame with the positive transfer variable are puzzling. If the payment and bribe frames encourage less taking relative to the gift frame when no transfer is offered, one might expect a positive transfer in one of these frames to also reduce taking relative to the gift frame. The result is the opposite. When receivers are offered a positive transfer in the bribe or payment frame, they respond by taking nearly ZAR2 more relative to a positive transfer in the gift frame. To reiterate this point, being treated in the bribe or payment frame results in taking approximately two fewer Rand relative to the gift frame when no transfer is offered. Once a positive transfer is offered, individuals in all frames take less. However, when a positive transfer is offered, individuals take approximately ZAR2 more in the bribe and payment frames than in the gift frame. The final two dummy variables measure the effect of increasing transfer size in the bribe and payment frame relative to the gift frame. These variables are both small and insignificant.

Taken together, the results of the non-parametric and econometric analyses demonstrate that offering a transfer to a taker does reduce theft. Increasing the size of the transfer has little effect on the amount appropriated. Although the framing results are intriguing, there is no significant evidence that the framing of a transfer (as a gift, bribe, or a payment) altered taking behaviour relative to any other frame.

4. Conclusion

This paper discusses the results of an economic experiment conducted in a laboratory setting at the University of the Free State in South Africa. The purpose of this study is to determine how ‘thieves’ respond to resource transfers from potential victims in a taking game. In this one-shot interaction, we seek to determine whether resource transfers can be an effective deterrent to theft, and whether the size or framing of the transfer influences a potential thief’s decision making.

The results of this experiment demonstrate that transfers from a potential theft victim to a potential thief can be an effective method to mitigate taking. Although whether a transfer is offered influences taking behaviour, the size of the transfer itself has almost no impact on the amount a taker chooses to appropriate. Interestingly, taking slightly increases along with transfer size. Based on the results of this study, there is no evidence that small transfers crowd out one’s intrinsic motivation to refrain from taking. An additional objective of this study was to determine whether framing a transfer either as a gift, bribe, or payment influences a taker’s response relative to any other frame. There is no significant evidence that framing influenced decision making in this study. This result is somewhat surprising, as one might expect the intention of the transfer to influence behaviour. Rather than indicating that intentions do not matter, this result might reflect a lack of salience and participants’ difficulty in recognising the intention based on the verbiage used. More research would be needed to confirm this hypothesis.

Overall, there is evidence that resource transfers can be effective theft deterrents, with the greatest benefit coming from small transfers. It is worth noting that this experiment captures only part of the context of the livestock theft anecdote mentioned in the Introduction. This experiment was designed to capture the influence of a resource transfer in a one-shot interaction, but it also provides some insights into repeated interactions. In the field, a resource transfer is likely to be accompanied by repeated interactions that could help build a trusting relationship. In the absence of repeated interactions, this study captures how these relationships may begin to form rather than how they mature. With respect to transfer sizes and crowding out, it is possible that the permitted transfer sizes were not distinct enough to allow the influences of intrinsic and extrinsic motivation to be displayed. More importantly, the differences between the gift, bribe, and payment treatments may not have been explicit enough to generate a statistically significant response. Finally, we note that the within subject design used in this experiment can potentially produce demand effects because the subjects were presented with a baseline experiment followed by a transfer treatment. This might have made the treatment salient to participants. However, because our results corroborate Schechter (2007), we do not believe this appreciably affects our results. Likewise, Erat and Gneezy (2012)

conduct experiments on the moral cost of unethical behaviour using both between and within subject designs and find broadly similar results. While this does not disprove the potential for demand effects, it suggests our results are not driven by the design of the experiment. To conclude, future research could offer a different population the opportunity to play a similar game with opportunities for repeated play to determine how the transfer relationship develops and stabilises both in the case of livestock theft and other situations with similar incentive structures.

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Notes

1. In the 2007/2008 fiscal year, livestock theft in South Africa included 60,000 cattle, 80,000 sheep, and 35,000 goats, valued at ZAR358 million, or approximately USD48 million in stolen property (Brand, 2010).
2. A homeland refers to lands allocated to black ethnic groups during the apartheid era.
3. The word 'transfer' is used to describe varied phrasing in the actual study. Approximately 67 per cent of the Bloemfontein participants were presented with the opportunity to 'give' up to ZAR15 to the other player. Half of this first group of Bloemfontein participants also learned that their partner would be able to take an additional ZAR15 from their endowment after receiving the gift. The remaining 33 per cent of the Bloemfontein participants were presented with the opportunity to 'pay' the other player up to ZAR15. In the 'pay' treatment, Bloemfontein participants were also aware that the other player would be able to take an additional ZAR15 after receiving the payment. The purpose of this variation is to determine if framing the transfer either as a gift, bribe, or payment influences the behaviour of either the 'giver' or the 'taker'.
4. See the Online Appendix for a list of black- and white-sounding surnames from Van Der Merwe and Burns (2008).
5. Some players may be able to infer a player's ethnicity from a surname. As the experiment design did not specifically control the ethnic makeup of dyads, this is a potential source of variation between the two treatments.
6. In accordance with concerns at the design stage, over 40 per cent of Bloemfontein participants offered the maximum transfer of ZAR15. The average transfer was ZAR9.6 with 20, 10, and 70 per cent of the actual transfers classified as small, medium, and large, respectively. Though this is an unusually generous allocation for a dictator game, the behaviour of the Bloemfontein participants is not the subject of this paper and not discussed further.
7. See Pecenka and Kundhlande (2013) for detail on how the results of the baseline treatment were influenced by receiver race and inequality between participants.
8. Mann-Whitney p-value = 0.09.
9. A number of individuals did not indicate the number of economics courses they had taken or the race of their closest friends. These 32 individuals were excluded from the likelihood ratio test. This exclusion permitted the likelihood ratio test to be completed with a sample common to both specifications. Omitting these individuals did not appreciably change regression results.

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