Supplementary Online Material for

The Bystander Effect in an *N*-Person Dictator Game

Blinded Authors

This supplement contains the following:
.	• Oral instructions for Studies 1, 2, and 3.
.	• Derivation of Fehr and Schmidt's inequality aversion model for the *N*-person dictator game
.

* Send correspondence to *Blinded Author*

Study 1 – 1 Dictator Condition
Oral Instructions

Thank you all for participating in this research. Please don't press any keys on the computer until you are instructed. Please turn off your cell phones. I am now going to explain to you the procedures.

You are free to leave the room at any point during the session, for any reason. If you leave, you will still earn the $5 show-up fee.

When we begin, you will be broken up into groups of 2. The computer randomly assigns you to a group. You may be interacting with someone sitting right next to you, or you may be interacting with someone sitting at the far end of the room.

Each group consists of one person assigned the role of RECIPIENT and one the role of ALLOCATOR. You will be randomly assigned to one of these two roles: ALLOCATOR or RECIPIENT. You will be assigned your role when we begin. Since there are XXX people in the room, XXX of you will be RECIPIENTS and XXX of you will be ALLOCATORS.

I will now explain what will happen from the viewpoint of the ALLOCATOR and the RECIPIENT.

<u>ALLOCATORS start out with $24. RECIPIENTS start out with nothing.</u>

If you are assigned the role of ALLOCATOR, you will have an opportunity to transfer some of your $24 to the RECIPIENT.

As an ALLOCATOR, you will go home with the show-up fee, and the portion of your $24 that you did not transfer to the RECIPIENT. The other participants will **<u>not</u>** know the decision you made.

If you are assigned the role of RECIPIENT, you will be asked to predict how much money you expect to receive from the ALLOCATOR. If you guess correctly, you will be paid a $3 bonus.

As a RECIPIENT, you will go home with the show-up fee, the amount that the ALLOCATOR transfers to you, and, if applicable, the bonus payment.

The entire session is one round, each of you play your role once. Remember, you are free to leave the room at any point, for any reason. If you leave, you will still earn the $5 show up fee.

After making decisions as ALLOCATORS and RECIPIENTS, you will answer a series of questions. You will advance to the next question in this series after you and your group members have answered the current question. This means that you may have to wait a little while before the computer advances. The computer will instruct you when you are finished with the study.

Does anyone have any questions?

Before we begin, it is in everyone's interest that that everyone understands all aspects of the instructions. If you don't understand something, then others probably don't understand it, too. So, please ask any questions you may have.

Please double-click the red icon on your screen labeled "MC". Double-click only once, it may take a minute to load. When prompted, input an ID. Your ID can be your name, your email, or anything you want. You can begin when the computer loads up. If you have any questions during the session, please raise your hand. Take as long as you need.

The computer will instruct you when you are finished, at which point you are free to leave. DO NOT close any of the windows on the computer.

Study 1 – 2 Dictators Condition
Oral Instructions

Thank you all for participating in this research. Please don't press any keys on the computer until you are instructed. Please turn off your cell phones. I am now going to explain to you the procedures.

You are free to leave the room at any point during the session, for any reason. If you leave, you will still earn the $5 show-up fee.

When we begin, you will be broken up into groups of 3. The computer randomly assigns you to a group. You may be interacting with someone sitting right next to you, or you may be interacting with someone sitting at the far end of the room.

Each group of 3 will consist of one person assigned the role of **RECIPIENT** and two people assigned the role of **ALLOCATOR**. You will be randomly assigned to one of these two roles: **ALLOCATOR** or **RECIPIENT**. You will be assigned your role when we begin. Since there are XXX people in the room, XXX of you will be **RECIPIENTS** and XXX of you will be **ALLOCATORS**.

I will now explain what will happen from the viewpoint of the **ALLOCATOR** and the **RECIPIENT**.

<u>**ALLOCATORS** start out with $18. **RECIPIENTS** start out with nothing.</u>

If you are assigned the role of **ALLOCATOR**, you will have an opportunity to transfer some of your $18 to the **RECIPIENT**. The other **ALLOCATOR** will also have an opportunity to transfer some of his or her $18 to the same **RECIPIENT**. Both **ALLOCATORS** will make their decisions at the same time. So, you will not know how much the other **ALLOCATOR** transfers when you make your decision.

As an **ALLOCATOR**, you will go home with the show-up fee, and the portion of your $18 that you did not transfer to the **RECIPIENT**. The other participants will <u>**not**</u> know the decision you made.

If you are assigned the role of **RECIPIENT**, you will be asked to predict how much money, in total, you expect to receive from both **ALLOCATORS**. If you guess correctly, you will be paid a $3 bonus.

As a **RECIPIENT**, you will go home with the show-up fee, the sum that the **ALLOCATORS** transfer to you, and, if applicable, the bonus payment.

The entire session is one round, each of you play your role once. Remember, you are free to leave the room at any point, for any reason. If you leave, you will still earn the $5 show up fee.

After making decisions as **ALLOCATORS** and **RECIPIENTS**, you will answer a series of questions. You will advance to the next question in this series after you and your group members have answered the current question. This means that you may have to wait a little while before the computer advances. The computer will instruct you when you are finished with the study.

Does anyone have any questions?

Before we begin, it is in everyone's interest that that everyone understands all aspects of the instructions. If you don't understand something, then others probably don't understand it, too. So, please ask any questions you may have.

Please double-click the red icon on your screen labeled "MC". Double-click only once, it may take a minute to load. When prompted, input an ID. Your ID can be your name, your email, or anything you want. You can begin when the computer loads up. If you have any questions during the session, please raise your hand. Take as long as you need.

The computer will instruct you when you are finished, at which point you are free to leave. DO NOT close any of the windows on the computer.

Study 1 – 3 Dictators Condition
Oral Instructions

Thank you all for participating in this research. Please don't press any keys on the computer until you are instructed. Please turn off your cell phones. I am now going to explain to you the procedures.

You are free to leave the room at any point during the session, for any reason. If you leave, you will still earn the $5 show-up fee.

When we begin, you will be broken up into groups of 4. The computer randomly assigns you to a group. You may be interacting with someone sitting right next to you, or you may be interacting with someone sitting at the far end of the room.

Each group of 4 will consist of one person assigned the role of RECIPIENT and three people assigned the role of ALLOCATOR. You will be randomly assigned to one of these two roles: ALLOCATOR or RECIPIENT. You will be assigned your role when we begin. Since there are XXX people in the room, XXX of you will be RECIPIENTS and XXX of you will be ALLOCATORS.

I will now explain what will happen from the viewpoint of the ALLOCATOR and the RECIPIENT.

ALLOCATORS start out with $16. RECIPIENTS start out with nothing.

If you are assigned the role of ALLOCATOR, you will have an opportunity to transfer some of your $16 to the RECIPIENT. The other two ALLOCATORS will also have an opportunity to transfer some of their $16 to the same RECIPIENT. All three ALLOCATORS will make their decisions at the same time. So, you will not know how much the other two ALLOCATORS transfer when you make your decision.

As an ALLOCATOR, you will go home with the show-up fee, and the portion of your $16 that you did not transfer to the RECIPIENT. The other participants will **not** know the decision you made.

If you are assigned the role of RECIPIENT, you will be asked to predict how much money, in total, you expect to receive from the three ALLOCATORS. If you guess correctly, you will be paid a $3 bonus.

As a RECIPIENT, you will go home with the show-up fee, the sum that the ALLOCATORS transfer to you, and, if applicable, the bonus payment.

The entire session is one round, each of you play your role once. Remember, you are free to leave the room at any point, for any reason. If you leave, you will still earn the $5 show up fee.

After making decisions as ALLOCATORS and RECIPIENTS, you will answer a series of questions. You will advance to the next question in this series after you and your group members have answered the current question. This means that you may have to wait a little while before the computer advances. The computer will instruct you when you are finished with the study.

Does anyone have any questions?

Before we begin, it is in everyone's interest that that everyone understands all aspects of the instructions. If you don't understand something, then others probably don't understand it, too. So, please ask any questions you may have.

Please double-click the red icon on your screen labeled "MC". Double-click only once, it may take a minute to load. When prompted, input an ID. Your ID can be your name, your email, or anything you want. You can begin when the computer loads up. If you have any questions during the session, please raise your hand. Take as long as you need.

The computer will instruct you when you are finished, at which point you are free to leave. DO NOT close any of the windows on the computer.

Study 2 — Strategy Method
Oral Instructions

Thank you all for participating in this research. Please don't press any keys on the computer until you are instructed. Please turn off your cell phones. I am now going to explain to you the procedures.

You are free to leave the room at any point during the session, for any reason. If you leave, you will still earn the $5 show-up fee.

When we begin, you will be broken up into groups of 3. The computer randomly assigns you to a group. You may be interacting with someone sitting right next to you, or you may be interacting with someone sitting at the far end of the room.

Each group of 3 will consist of one person assigned the role of **RECIPIENT** and two people assigned the role of **ALLOCATOR**. You will be randomly assigned to one of these two roles: **ALLOCATOR** or **RECIPIENT**. You will be assigned your role when we begin. Since there are XXX people in the room, XXX of you will be **RECIPIENTS** and XXX of you will be **ALLOCATORS**.

I will now explain what will happen from the viewpoint of the **ALLOCATOR** and the **RECIPIENT**.

ALLOCATORS start out with $18. **RECIPIENTS** start out with nothing.

If you are assigned the role of **ALLOCATOR**, you will be playing for two rounds. In one round, you will be a **PROPOSER**; and in the other round, you will be a **RESPONDER**.

As a **PROPOSER**, you will have have an opportunity to transfer some of your $18 to the **RECIPIENT**.

As a **RESPONDER** you will indicate how much of your $18 you would transfer to the **RECIPIENT**, for each transfer amount the other **ALLOCATOR** in your group, acting as the **PROPOSER**, can make, ranging from $0 to $18.

When indicating your choices as a **RESPONDER**, press enter after each choice, making sure that the box turns blue. You can edit your choices as many times as you'd like. Before pressing the submit button, make sure that all the boxes are filled in, and each box has a number that is between $0 and $18.

Remember, in each group, there are two **ALLOCATORS** and two rounds. Each **ALLOCATOR** in the group will play both as a **PROPOSER** and a **RESPONDER**. If you are an **ALLOCATOR,** the computer randomly determines whether the first or the second round counts. That is, the computer determines whether your decision as a **PROPOSER** counts or whether your decision as a **RESPONDER** counts.

The decisions you make are binding. You will not know how much the other **ALLOCATOR** transfers when you make your decision.

As an **ALLOCATOR,** you will go home with the show-up fee, and the portion of your $18 that you did not transfer to the **RECIPIENT**. The other participants will **not** know the decision you made.

If you are assigned the role of **RECIPIENT**, you will be asked to predict how much money, in total, you expect to receive from both **ALLOCATORS**. If you guess correctly, you will be paid a $3 bonus.

As a **RECIPIENT**, you will go home with the show-up fee, the sum that the **ALLOCATORS** transfer to you, and, if applicable, the bonus payment.

If you are an **ALLOCATOR**, you will only be an **ALLOCATOR**; if you are a **RECIPIENT**, you will only be a **RECIPIENT**. Remember, you are free to leave the room at any point, for any reason. If you leave, you will still earn the $5 show up fee.

After making decisions as **ALLOCATORS** and **RECIPIENTS**, you will answer a series of questions. You will advance to the next question in this series after you and your group members have answered the current question. This means that you may have to wait a little while before the computer advances. The computer will instruct you when you are finished with the study.

Does anyone have any questions?

Before we begin, it is in everyone's interest that that everyone understands all aspects of the instructions. If you don't understand something, then others probably don't understand it, too. So, please ask any questions you may have.

Please double-click the "CASSEL" icon on the lower-left of your screen. Double-click only once, it may take a minute to load. When prompted, press "RUN" and then input an ID. Your ID can be your name, your email, or anything you want. You can begin when the computer loads up. If you have any questions during the session, please raise your hand. Take as long as you need.

The computer will instruct you when you are finished, at which point you are free to leave. DO NOT close any of the windows on the computer.

Study 3 — Communication
Oral Instructions

Thank you all for participating in this research. Please don't press any keys on the computer until you are instructed. Please turn off your cell phones. I am now going to explain to you the procedures.

You are free to leave the room at any point during the session, for any reason. If you leave, you will still earn the $5 show-up fee.

When we begin, you will be broken up into groups of 3. The computer randomly assigns you to a group. You may be interacting with someone sitting right next to you, or you may be interacting with someone sitting at the far end of the room.

Each group of 3 will consist of one person assigned the role of **RECIPIENT** and two people assigned the role of **ALLOCATOR**. You will be randomly assigned to one of these two roles: **ALLOCATOR** or **RECIPIENT**. You will be assigned your role when we begin. Since there are XXX people in the room, XXX of you will be **RECIPIENTS** and XXX of you will be **ALLOCATORS**.

I will now explain what will happen from the viewpoint of the **ALLOCATOR** and the **RECIPIENT**.

ALLOCATORS start out with $18. **RECIPIENTS** start out with nothing.

If you are assigned the role of **ALLOCATOR**, you will have an opportunity to transfer some of your $18 to the **RECIPIENT**. The other **ALLOCATOR** will also have an opportunity to transfer some of his or her $18 to the same **RECIPIENT**.

Both **ALLOCATORS** will make an initial transfer decision. Next, each **ALLOCATOR** will see the set of transfer decisions. This set contains the transfer decision he or she made AND the transfer decision made by the other **ALLOCATOR**. Each **ALLOCATOR** then decides whether to accept or reject this set of transfers.

- If both **ALLOCATORS** accept the set of transfers, then the transfer phase ends.
- If either **ALLOCATOR** rejects the set of transfers (or both reject), then the **ALLOCATORS** move on to another round of transfers, in which each **ALLOCATOR** gets to make a new transfer decision. This transfer decision can be the same as in the previous round or different from the previous round.

The transfer phase continues until both **ALLOCATORS** accept the set of transfer decisions in the same round. If the **ALLOCATORS** can't agree on a set of transfers after 30 minutes, I'll call time and the **ALLOCATORS** will have to conclude the transfer phase.

During the transfer phase, the **ALLOCATORS** have the ability to send text messages to one another. **RECIPIENTS** will not see the messages sent between the **ALLOCATORS**. **ALLOCATORS** can use the messaging to communicate whatever they would like to the other **ALLOCATOR**.

As an **ALLOCATOR,** you will go home with the show-up fee, and the portion of your $18 that you did not transfer to the **RECIPIENT**. The other participants outside of your group will **not** know the decision you made.

If you are assigned the role of **RECIPIENT**, you will be asked to predict how much money, in total, you expect to receive from both **ALLOCATORS**. If you guess correctly, you will be paid a $3 bonus.

As a **RECIPIENT**, you will go home with the show-up fee, the sum that the **ALLOCATORS** transfer to you, and, if applicable, the bonus payment.

The entire session is one round, each of you play your role once. Remember, you are free to leave the room at any point, for any reason. If you leave, you will still earn the $5 show up fee.

After making decisions as **ALLOCATORS** and **RECIPIENTS**, you will answer a series of questions. You will advance to the next question in this series after you and your group members have answered the current question. This means that you may have to wait a little while before the computer advances. The computer will instruct you when you are finished with the study.

Does anyone have any questions?

Before we begin, it is in everyone's interest that that everyone understands all aspects of the instructions. If you don't understand something, then others probably don't understand it, too. So, please ask any questions you may have.

Please double-click the green icon on your screen labeled "DN". Double-click only once, it may take a minute to load. When prompted, input an ID. Your ID can be your name, your email, or anything you want. You can begin when the computer loads up. If you have any questions during the session, please raise your hand. Take as long as you need.

The computer will instruct you when you are finished, at which point you are free to leave. DO NOT close any of the windows on the computer.

Inequality aversion and the N-person dictator game

In this appendix, we use Fehr and Schmidt's (1999, p. 822) model of inequality aversion to study the N-person dictator game. We will show that inequality aversion predicts a bystander effect.

Fehr and Schmidt's inequality aversion model

In Fehr and Schmidt's (1999) model, individuals derive utility from their own payoff and disutility from the differences between their own payoff and the payoffs of others. A player's utility function is given by:

$$U_i(x) = x_i - \alpha_i \frac{1}{n-1} \sum_{i \neq j}^{n-1} \max\{x_j - x_i, 0\} - \beta_i \frac{1}{n-1} \sum_{i \neq j}^{n-1} \max\{x_i - x_j, 0\} \quad (1)$$

U_i refers to the utility of the focal individual i. x_i refers to the monetary payoff for the focal individual. If we are modeling the decision of a dictator, x_i represents the amount that the dictator keeps for herself. And, x_j represents the monetary payoff of one of the other players, which might be the amount that another dictator keeps for himself, or the sum of contributions that a recipient receives.

In this model, there are two social preferences, α and β, which represent disutility from having less than others and disutility from having more than others. α can be thought of as envy and β as guilt. By assumption, $\beta_i \leq \alpha_i$ and $0 \leq \beta_i < 1$. The first assumption means that a dictator feels more disutility from having less than someone else than disutility from having more. Put another way, envy is stronger than guilt. The second assumption has two parts to it. First, we assume that a dictator does not derive additional utility from having more than others (i.e., $\beta_i \geq 0$).[1] Second, assuming that $\beta_i < 1$ implies that people will not

[1]Note: This assumption may not hold for everyone. For example, within a social value orientation framework (MacCrimmon and Messick, 1976; McClintock, 1972; Messick and McClintock, 1968; Van Lange, 1999), 'competitive' types seem to prefer maximizing the difference between their payoffs and the payoffs of others, which is consistent with $\beta_i < 0$. In a dictator game context, however, individuals with these competitive preferences (i.e., $\beta_i < 0$) behave no differently than individuals with no concern for how their payoff compares to other (i.e., $\beta_i = 0$); both types will

destroy wealth in order to achieve equality.[2]

n refers to the number of players in the dictator game, including the focal dictator, the other dictators, and the recipients (in our experiments, there was only one recipient). When there are more than two players ($n > 2$), a dictator compares her payoff to each of the other players. In this case, the disutility from comparison with each other player has been normalized by dividing the second and third term in Equation (1) by $n - 1$.

When the focal dictator compares herself to a particular player, she can either have a higher payoff, a lower payoff, or the same payoff. When the focal dictator's payoff is higher than the other player's payoff, the focal dictator may feel guilt but not envy (if $\beta_i > 0$), and the second term in Equation (1) drops out. When the focal player's payoff is lower than the other player's payoff, the focal dictator may feel envy (if $\alpha_i > 0$), but not guilt, meaning the third term drops out. Finally, when the focal dictator has the same payoff as the other player, she feels neither guilt nor envy, and both the second and third terms drop out.

keep all of the endowment. So, this assumption has no consequence.

[2]Note: We have imposed no upper bound on α. That is α_i can be greater than one. Fehr and Schmidt (1999, p. 824) discuss this assumption, explaining why there is no justification to place an upper bound on envy in this model.

Inequality aversion and the *N*-person dictator game

In the utility function presented in Equation (1), a dictator equally weights her comparisons to other dictators and to recipients. This need not be the case. For example, some may focus on how they compare to other dictators. Others may only compare themselves to recipients. To allow for these possibilities, we add different weights for comparisons to dictators and comparisons to recipients, where w_i^d is the weight that dictator i gives to her comparison with each other dictator, and w_i^r is the weight given to the comparison with each recipient. The weights across all comparisons must sum to one. If we let r refer to the number of recipients and d to the number of other dictators (i.e., not including the focal dictator), then $rw_i^r + dw_i^d = 1$. Each of the weights has a range of possible values. For comparisons to recipients, $0 \leq w_i^r \leq \frac{1}{r}$. Because the sum of these weights must be one, $w_i^d = \frac{1}{d}(1 - rw_i^r)$. With these different weightings, we can re-write Equation (1) as:

$$
\begin{aligned}
U_i(x) \;=\; & x_i - \alpha_i w_i^d \sum_{i \neq j}^{d} \max\{x_j - x_i, 0\} - \alpha_i w_i^r \sum_{i \neq k}^{r} \max\{x_k - x_i, 0\} \\
& - \beta_i w_i^d \sum_{i \neq j}^{d} \max\{x_i - x_j, 0\} - \beta_i w_i^r \sum_{i \neq k}^{r} \max\{x_i - x_k, 0\} \qquad (2)
\end{aligned}
$$

In Equation (2), other dictators are indexed by j and recipients by k. The utility of the focal dictator is equal to the amount she keeps for herself (the first term) minus envy toward other dictators (the second term), minus envy toward recipients (the third term), minus guilt for other dictators (the fourth term), and minus guilt for recipients (the fifth term).

To simplify the analysis, we constrain the dictators' choice set. A dictator has two options. She can choose either to transfer nothing or to transfer the *equal share*, which we define as the amount of money all dictators need to transfer so that all players go home with the same amount of money.[3] The equal share is computed as follows. If e is the endowment each dictator has, then $e(d+1)$ is the total wealth in the group. If we divide the total wealth by the number of players in the group, n, we get the average wealth in the group, which is given by $\frac{1}{n}[e(d+1)]$. This represents an even split. Subtracting the even split from a dictator's endowment, we get the equal share transfer, which is given by $\frac{1}{n}[e(n-d-1)]$ which, since $r = n-d-1$, can be re-written as $\frac{er}{n}$.

In a simultaneous *N*-person dictator game, a dictator with social preferences (i.e., $\alpha > 0$ and $\beta > 0$) makes her choice based on how much she believes other dictators will transfer. In a sequential or strategy method game, this dictator makes her choice based on the knowledge of how many other the dictator(s)

[3] The model would more accurately describe the dictator game if we allowed dictators to transfer any amount of their endowment. The analysis, however, becomes more complicated. The key insights are gleaned from this simpler model.

transferred. To cover both cases, we introduce the variable t, which denotes the focal dictator's belief or knowledge about how many other dictators will transfer the equal share.

Computing the utility-maximizing choice

To determine whether a dictator will transfer, we compare the utility from transferring with the utility from keeping all of the endowment. To determine the utilities associated with each choice, we input the dictator's decision (i.e., to transfer or not) and beliefs about how many other dictators will transfer (i.e., t) into the Equation (2), which results in:

$$\begin{aligned} U_i(\text{transfer}) &= \left(e - \frac{er}{n}\right) - \alpha_i w_i^d (d-t)\frac{er}{n} - \beta_i w_i^r (d-t)\frac{er}{n} \\ U_i(\text{keep}) &= e - \beta_i w_i^d t\frac{er}{n} - \beta_i w_i^r (n-t)\frac{er}{n} \end{aligned} \tag{3}$$

If a dictator transfers, she will have less than the original endowment, and so she might feel envious toward any dictators she believes will not transfer. She may also feel guilt when comparing herself to a recipient if she believes some of the other dictators will not transfer. If a dictator does not transfer, she will have all of her endowment, and she may feel guilty when comparing herself to other dictators she believes will transfer, and she might also feel guilty when comparing herself to a recipient.

A dictator will transfer to a recipient when the utility from transferring exceeds the utility from keeping all of the endowment. Solving for $U_i(\text{transfer}) = U_i(\text{keep})$, results in:

$$\beta_i^* = \frac{1 + \alpha_i w_i^d (d - t)}{w_i^d t + w_i^r (n - d)} \tag{4}$$

When the strength of guilt a dictator feels (β_i) exceeds the threshold (β_i^*) in Equation (4), a dictator will transfer.

The bystander effect in an *N*-person dictator game

Next, following Fehr and Schmidt (1999), let's assume that a dictator weights her comparison to other dictators equally to her comparison to recipients (i.e., $w_i^r = w_i^d = \frac{1}{n-1}$). And, since we only had one recipient in our experiments, we set $n = d + 2$. Equation (4) simplifies to:

$$\beta_i^* = \frac{(d+1) + \alpha_i(d-t)}{t+2} \tag{5}$$

To get a sense of what Equation (5) means, let's looks at two extreme situations. First, if we assume that a dictator believes all of the other dictators will transfer (i.e., $t = d$), then she will transfer if her level of guilt (β_i) exceeds the threshold given by:

$$\beta_i^* = \frac{d+1}{d+2} \tag{6}$$

When there are no other dictators (i.e., $d = 0$), Equation (6) reduces to $\beta_i^* = \frac{1}{2}$. When there is one other dictator, the threshold guilt level is $\beta_i^* = \frac{2}{3}$. As the number of dictators grows larger, β_i^* approaches one. This means that, for situations with many dictators, only the most guilt-prone individuals will transfer. This is what leads to the bystander effect with inequality aversion. For a given number of dictators, some fraction of dictators will have a guilt parameter value larger than the requisite guilt threshold (β_i^*), and so transfer to the recipient; other dictators will have a guilt parameter value less than the threshold, and so will not transfer. As the number of dictators increases, fewer and fewer will have a guilt parameter value larger than the threshold, and so more and more will switch from transferring the equal share to keeping all of their endowment.

We can also consider Equation (5) when a dictator believes that all of the other dictators will keep all of their endowment (i.e., $t = 0$). In this case, she will transfer if her guilt level (β_i) exceeds the threshold given by:

$$\beta_i^* = \frac{1 + d(1 + \alpha_i)}{2} \tag{7}$$

In this case, a dictator will not transfer to the recipient if there are any other dictators. To see this, assume that the focal dictator feels no envy (i.e., $\alpha_i = 0$) and that there is just one other dictator (i.e., $d = 1$). In this case, the focal dictator will not transfer unless $\beta_i > 1$. As we discussed previously, a β value larger than one implies that someone is prepared to destroy wealth in order to achieve equality.

In summary, even if dictators believe that other dictators will transfer, the Fehr and Schmidt's (1999) inequality aversion model predicts a bystander effect (i.e., as the number of dictators increases, fewer will transfer the equal share). If dictators believe that other dictators will not transfer, the bystander effect becomes stronger.

Differentially weighting dictator and recipient comparisons

Finally, we can also consider what happens when a dictator differentially weights her comparison to the recipient and the other dictators. We'll re-consider Equation (4) with two extremes. First, we consider a focal dictator who only compares herself to the recipient, ignoring how her payoff compares to other dictators (i.e., $w_i^d = 0$ and $w_i^r = \frac{1}{r}$). Such a dictator will transfer when her guilt level (β_i) exceeds the threshold given by:

$$\beta_i^* = \frac{1}{2} \tag{8}$$

When a dictator only compares herself to the recipient, there is no bystander effect. A dictator will transfer to the recipient if her guilt level is above some threshold, regardless the number of other dictators.

Next, we consider a focal dictator who only compares herself to the other dictators, ignoring how her payoff compares to the recipient (i.e., $w_i^d = \frac{1}{d}$ and $w_i^r = 0$). Such a dictator will transfer when her guilt level (β_i) exceeds the threshold given by:

$$\beta_i^* = \frac{d + \alpha_i(d - t)}{t} \qquad (9)$$

Even if a dictator believes that all of the other dictators will transfer (i.e., $t = d$), a dictator who only compares herself to other dictators will transfer only if $\beta_i > 1$, which, as we discussed, is unlikely. If this dictator believes some or all of the other dictators will not transfer, the threshold guilt value in Equation (9) grows larger.

References

Fehr, E. and Schmidt, K. M. (1999). A theory of fairness, competition, and cooperation. *The Quarterly Journal of Economics*, 114(3):817–868.

Jenni, K. E. and Loewenstein, G. (1997). Explaining the ”identifiable victim effect”. *Journal of Risk and Uncertainty*, 14:235–257.

MacCrimmon, K. R. and Messick, D. M. (1976). A framework for social motives. *Behavioral Science*, 21:86–100.

McClintock, C. G. (1972). Social motivation - a set of propositions. *Behavioral Science*, 17:438–454.

Messick, D. M. and McClintock, C. G. (1968). Motivational bases of choice in experimental games. *Journal of Experimental Social Psychology*, 4:1–25.

Small, D. A. and Loewenstein, G. (2003). Helping a victim or helping the victim: Altruism and identifiability. *The Journal of Risk and Uncertainty*, 26(1):5–16.

Van Lange, P. A. (1999). The pusuit of joint outcomes and equality in outcomes: An integrative model of social value orientation. *Journal of Personality and Social Psychology*, 77(2):337–349.