

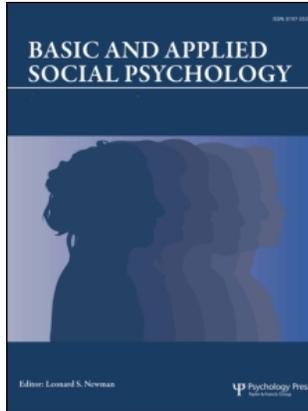
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Focalism and the Failure to Foresee Unintended Consequences

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Focalism and the Failure to Foresee Unintended Consequences

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From drug policy to environmental initiatives, well-intentioned actions have often led to dramatic unintended consequences. The present research demonstrates that individuals focus on what is intended in a way that leads them to not sufficiently consider important unintended consequences. Participants fail to sufficiently weight the unintended consequences of attempts to satisfy preferences in a computer simulation (Study 1). Focus on intended consequences, and the resulting error in prediction, is reduced when the inter-relatedness of variables within a system is highlighted (Studies 2 and 3). This research can inform means of improving predictions within complex systems.

History is replete with examples of well-intentioned policies producing dramatic unintended consequences. National Prohibition was undertaken in 1920 with the best of intentions. However, people turned to medicinal alcohol that was legal but also more potent. In the end, deaths by alcohol poisoning increased by 300% during Prohibition (Thornton, 1998). Similarly, proponents of the Civil Rights Act of 1991 sought to minimize discrimination in the workplace by increasing the rights of plaintiffs. Instead, fear of legal action made employers more likely to lay off and less likely to hire minority applicants (Oyer & Schaefer, 2003).

A common theme in film and literature, both high-brow (e.g., *Romeo and Juliet*) and less so (e.g., all three *Back to the Future* films), is that seemingly insignificant acts can set off a complicated string of unintended consequences. Despite a common understanding that unintended consequences can arise from seemingly benign actions, their occurrence is often not anticipated. The goal of the present research is to better understand why it is so difficult to foresee unintended consequences and, in so doing, to inform ways to foresee unwanted consequences in the future.

WHY ARE UNINTENDED CONSEQUENCES OFTEN UNANTICIPATED?

The phrases “unintended consequences” and “unanticipated consequences” are often treated as though they are logical equivalents. However, anticipated consequences are not always intended. Manufacturers sometimes anticipate, but do not intend, injuries related to the use of their products. Similarly, consequences can be intended but not anticipated. Last-ditch efforts are executed with strong intentions to bring about a perhaps unlikely consequence. People often use unintended and unanticipated consequences nearly interchangeably, however, because it is exactly those consequences that are unintended that are often also unanticipated.

An early analysis by Merton (1936) provides a useful frame for summarizing past research on why people fail to foresee unintended consequences. First, Merton argued, the failure to anticipate unintended consequences sometimes arises from ignorance. Unintended consequences frequently appear in systems that are extremely complex and for which not all variables are known. Merton argued that the failure to anticipate can also arise from error in our understanding of the relevant systems. Predictions and judgments can be heavily

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biased by inaccurate causal theories (e.g., Nisbett & Wilson, 1977; Ross, 1989). Misunderstanding the causal relationships in a system can make it difficult to foresee unintended consequences of one's actions and choices.

Most of the literature on unanticipated consequences is devoted to descriptions of specific cases of unintended consequences that were not foreseen because understanding of the relevant systems was either incomplete or erroneous. Stretching across disciplinary lines, this literature includes analyses of unintended consequences in political science (e.g., Holden, 1987; Jervis, 1997; Thornton, 1998), organizations (e.g., Kaminski, 2001; McBriarty, 1988; McKinley & Scherer, 2000), medicine and public health (e.g., Corn, 2000; Fisher & Welch, 1999), engineering (e.g., Reason, 1987; Tenner, 1996), ecology (Simberloff & Stiling, 1996), and social systems (Kipnis, 1993; Meddin, 1986; for reviews, see Perrow, 1999; Tenner, 1997).

Thus, one means of identifying potential unintended consequences is to ensure that one's understanding of the relevant systems is complete and accurate (or, at minimum, that one's level of confidence and risk considerations matches one's level of understanding of those systems). We argue that, in addition, there are psychological features of the way that predictions are made that can make it difficult to foresee unintended consequences. In particular, we argue that there are two ways in which focus on the intended consequence can blind people to alternative consequences. First, failures to foresee unintended consequences can stem from an overly passionate focus on the intended consequence. Merton argued that people might become so consumed by desire for a preferred consequence that they are unable to think beyond that consequence. This article explores a second way in which focus can be blinding. We argue that failures to foresee unintended consequences can also stem from a *dispassionate* focus on the intended consequence. We draw from past research suggesting that people's attention is often focused quite narrowly (e.g., Schkade & Kahneman, 1998). This dispassionate narrowing of attention, known as focalism, leads to judgments that are overly influenced by the current object of attention and that place insufficient weight on other relevant variables.

To understand how dispassionate focus can bias judgment, imagine that you are asked to choose between two vacation spots about which you have several pieces of information. All of Spot A's qualities are average (e.g., average weather, medium quality hotel, average beaches, average nightlife). In contrast, Spot B is characterized by extremes (e.g., fantastic weather, terrible beaches, fabulous hotels, almost no nightlife). If you are like most participants faced with this choice (Shafir, 1993), you might find yourself focusing on the extreme good qualities of Spot B and prefer that vacation over

one at Spot A. This seems a reasonable choice until it is compared to choices made by participants asked to imagine that they already hold reservations to both vacation spots and must choose which vacation to *reject*. When choosing which vacation spot to reject, participants focused on the extreme *negative* qualities of Spot B and chose to reject that vacation rather than Spot A. In both cases, participants considered the same information but the particular choice they were making (which to choose vs. which to reject) led them to focus narrowly on a subset of the relevant information. As a result, the two groups made inconsistent decisions.

This illustrates just one example from a large body of research in social and cognitive psychology suggesting that focalism, or a tendency to focus narrowly on one or a few variables, can lead to neglect of important information and, consequently, inaccurate judgment (e.g., Buehler & McFarland, 2001; Koehler, 1991; Klar & Giladi, 1999; Kruger & Burrus, 2004; Windschitl, Kruger, & Simms, 2003). Further, manipulations that subtly change attentional focus can have dramatic effects on accuracy in judgment (e.g., Shafir, 1993; Storms, 1973; Tversky, 1977).

Applying this research to the problem of unintended consequences, we argue that focalism with respect to the intended consequence can result in a neglect of important information regarding alternative, unintended consequences—including information that is knowable and plainly relevant to predictions. Although psychological explanations have received little attention in the literature on unintended consequences, there is some evidence that those who mention considering possible indirect consequences of their actions in a simulation game are more successful in those games (Dörner, 1980, 1996). Although Dörner did not ask participants to make predictions in these studies, one possible reason that those who consider the possibility of indirect consequences perform better is because they are making more accurate predictions about outcomes in the game.

A second example can help to illustrate this point. People tend to mistakenly predict that people residing in California are happier than are those who reside in the Midwest (Schkade & Kahneman, 1998). This prediction makes sense when focusing on a comparison between the sun and beaches of California and the snow and cornfields of the Midwest. A focus on weather, however, leads people to give too little weight to the many other variables that might influence a person's level of happiness (e.g., social support, dispositional happiness). Imagine a person who decides to move from Iowa to California in order to enjoy a happier life. Her focus upon the sun and beaches of California might lead her to not give sufficient weight to potential unintended consequences stemming from her move (e.g., a loss of closeness with friends and family in Iowa). As a result,

her prediction that moving to California will lead to increased happiness might be completely inaccurate.

THE PRESENT RESEARCH

The present set of studies provides empirical demonstrations of how a focus on the intended consequence leads to a failure to anticipate unintended consequences across three quite different settings. In Study 1, participants predicted future states of a simulation model in which a focus on movements that might satisfy agents' preferences can make it difficult to recognize potential unintended consequences of those movements. Studies 2 and 3 explore how manipulations of focus on the intended consequence affect the likelihood of foreseeing potential unintended consequences. In Study 2, participants made predictions about the consequences of potential laws either in a no manipulation control condition or after completing a "defocusing" manipulation meant to encourage them to consider the larger system of variables. Study 3 utilized a different means of "defocusing" participants before asking them to make predictions about the consequences of a change to college admissions criteria. We expected that the defocusing manipulation in Studies 2 and 3 would produce less biased, more accurate predictions.

STUDY 1

Policymakers often act with the intention of increasing the satisfaction of their constituents. However, policy changes that increase the satisfaction of some constituents can sometimes decrease the satisfaction of others. If policymakers focus narrowly on the effects of their policies on those whom they intend to benefit and ignore potential negative effects on others, they may overestimate the net satisfaction that will be produced by their actions.

In Study 1 we designed a modified version of a Schelling (1971, 1972) model to test whether the tendency to narrowly focus on the preferences of the intended beneficiaries of a change leads people to overlook unintended consequences for others within that system and thus overestimate the net satisfaction produced by the change. A Schelling model consists of a simple grid, much like a checkerboard, in which two types of agents are distributed randomly. Each agent is endowed with a preference for proximity to in-group members. In each round of the model simulation, agents remain in their original position if their preferences regarding the proportion of neighbors who are in-group members are satisfied. Those with a proportion of in-group to out-group neighbors that fails to meet their preferences move to a

new, randomly selected position. These rounds continue until the preferences of all agents are satisfied.

In models of this type, even moderate levels of in-group preference lead reliably to segregation over time. Schelling's original demonstration was powerful because, at the time, few expected this inevitability of segregation. We have based the model used in this experiment upon Schelling's initial work but have modified it to our exploration of predicted consequences. In the present study, we predicted that participants would *overestimate* the speed of preference satisfaction by virtue of focusing too much on the intended consequences of agent movement.

In Schelling's model, agents are merely nodes in a computer program that are moved randomly, not attending to the movement of others or to where an ideal location might be. Although the intended consequence is to move agents to a location where their preferences are satisfied, new locations are chosen at random. Thus, the new location an agent is moved to might no better satisfy his or her preferences than the previous location and might lead to unintended consequences in that it might unsettle out-group members whose preferences were satisfied before the arrival of their new neighbor. In our experiment, the model was described as an elementary school classroom in which boys preferred sitting next to other boys and girls preferred sitting next to other girls. We asked participants to make predictions about how quickly the classroom would stabilize given a preference that at least two thirds of each student's neighbors shared his or her gender.

It is important to note that we took pains to make sure that all participants understood the model before they made predictions. We wanted to rule out the possibility that any error in prediction stemmed from misunderstanding the model and demonstrate, instead, that errors in prediction stemmed from focalism. Specifically, we expected that participants would focus on the intended consequence of movement—moving a student away from a seat that made him or her unhappy—and that this would lead them to neglect how movement of these students might result in unintended consequences, that is, making previously happy students unhappy. Further, we expected that this failure to anticipate the unintended consequences of movement would lead participants to overestimate how quickly the preferences of all students in the class could be satisfied.

Methods

Participants. Forty-six undergraduates completed this experiment for course credit. We excluded 3 participants who demonstrated a failure to understand the model either through poor performance on the quiz and/or through explanations of their predictions. One

additional participant provided predictions in non-numerical terms (e.g., “a lot”) that could not be analyzed. After these exclusions, our final sample was 42 participants.

Procedure. Upon arriving at the lab, participants were asked to read a detailed explanation of the model. They read that each grid represented a classroom in which girls and boys were seated randomly, each with a preference for sitting next to students who share his or her gender. “Sitting next to” was defined as sitting in a directly adjacent horizontal or vertical square. Participants were told that students next to each other diagonally were not included in preference considerations. If the student was the same gender as at least two thirds of his or her neighbors, the student was considered “happy” (the student’s preferences were satisfied) and he or she remained seated for that round. If, however, the student’s neighbors did not meet the two-thirds criterion (i.e., the student was “unhappy”), he or she would be moved to a new, randomly selected seat. In each round, all students whose preferences were not satisfied vacated their seats simultaneously and were then assigned new seats at random. The movement created a new seating configuration with, potentially, a new set of happy and unhappy students. As many rounds would be run as necessary to satisfy all students’ preferences.

We took pains to ensure that participants understood the rules of the model, including that the unhappy students—those whose preferences were not satisfied—were moved to a randomly selected new seat. To ensure that participants understood the model, they were given a brief quiz to ensure that participants (a) could correctly identify happy and unhappy students in a grid and (b) understood that movement within the model was random. For example, participants were asked to explain how the model determines the new seat for an unhappy student. A second multiple-choice question asked participants to indicate which of several possible seats was the most likely new seat for an unhappy student. To achieve a perfect score, participants had to indicate that no seat was more or less likely than any other because the new seat would be chosen at random. The experimenter scored each participant’s quiz immediately and then explained the reasoning behind each correct answer.

Once it was clear that participants understood the model, they were asked to make predictions about three hypothetical classrooms. Each classroom contained 25 seats in a 5×5 grid and 20 or fewer students seated in the room. The classrooms differed in the number of students seated (10, 15, or 20 students) but, in each room, 60% of the students were unhappy. For each classroom, participants were asked to predict the number of

students who would be unhappy after two rounds and the number of rounds required to satisfy the preferences of all students. They were also asked to describe the factors they considered while making these predictions.

To create accuracy criteria, we created a computer simulation of the model. Given an initial seating configuration, the program ran a series of rounds in which unhappy students were identified and moved to randomly determined new seats. The program repeated this task until the preferences of all students were satisfied. We calculated accuracy criteria for each classroom by averaging across the results of 100 simulation trials.¹

Results and Discussion

Before beginning analyses, we created composite measures of the degree to which participants over- or underestimated the speed with which students’ preferences were satisfied. Specifically, we calculated the degree to which participants over- or underestimated the number of unhappy students in Round 3 and the total number of rounds necessary to satisfy all agents’ preferences for each classroom, expressed as a percentage of the relevant accuracy criterion. We then averaged across error percentages for the three classrooms to create two composite measures for each participant—the percentage by which they under- or overestimated the number of unhappy students in the third round and the percentage by which they under- or overestimated the number of rounds necessary for all students’ preferences to be satisfied. Participants’ estimates of the number of rounds necessary to satisfy student preferences were positively skewed. To satisfy the assumptions of normality, we first created the relevant composite measure of predictive error. We then added a constant and log-transformed this percentage error. All reported analyses were conducted on this log-transformed data. We then reversed this transformation to calculate and report mean values from the analyses.

We predicted that participants would focus on the needs of unhappy students in the model and, as a result, underweight the possibility of unintended consequences stemming from their movement. As a result, we expected that participants would underestimate both the number of unhappy students in the third round and the number of rounds necessary for student preferences to be satisfied. Indeed, participants underestimated the number of unhappy students in Round 3, on average, by

¹Across 100 trials in our model simulation for each classroom configuration, the average number of unhappy students after Round 3 was 5.96 in the 10-student classroom, 10.0 in the 15-student classroom, and 16.04 in the 20-student classroom. The average number of rounds before total segregation was 10.62 in the 10-student classroom, 15.6 in the 15-student classroom, and 24.5 in the 20-student classroom.

TABLE 1
Underestimation and Consideration of Unintended Consequences in a Modified Schelling Task

% Underestimation of:	Mentioned Possibility	Did Not Mention Possibility	Difference
Unhappy students in Round 3	21.02%	34.63%	13.64%
Rounds until preferences satisfied	71.67%	91.61%	19.94%

31.23%, $t(40) = -12.22^2$, $p < .001$, and the number of rounds necessary to satisfy all students preferences by 83.92%, $t(41) = 28.17$, $p < .001$ (see Table 1).

Next, we explored whether this error in predictions stemmed from a tendency to focus on unhappy students and, as a result, neglect the unintended consequences of their movement on other students. Two coders read participants' open-ended descriptions of the thought processes behind their predictions and rated whether, across their descriptions for any of their predictions, participants specifically mentioned that movement of the "unhappy" students could upset the stability of the "happy" students ($\alpha = .81$). As expected, those participants who mentioned that such unintended consequences might occur (only 26% of the sample) made more accurate estimates than those who made no mention of unintended consequences with respect both to the number of rounds required to satisfy all students' preferences, $t(38) = -2.45$, $p < .05$ and, marginally, the number of "unhappy" students in Round 3, $t(40) = 1.95$, $p < .10$. These results support our argument that participants often focused on movement of the unhappy participants in a way that led to a neglect of unintended consequences of that movement and, consequently, inaccurate predictions.

Discussion

Participants underestimated the number of unhappy students in Round 3 and the total number of rounds needed to satisfy all students' preferences. These errors in prediction are in exactly the direction one would expect if participants gave insufficient weight to the possibility of unintended consequences of student movement. An analysis of participants' explanations of their predictions provides further evidence that a focus on the intended consequence of improving the situation of unhappy students contributed to errors in prediction. Only one fourth of our sample mentioned the possibility of unintended consequences of movement, and those individuals made more accurate predictions regarding

the model than did those who did not mention this possibility.

Elsewhere we have shown that people also overlook unintended consequences when they work in groups (Ehrlinger, 2004). For instance, in one study, participants shot basketball free-throws first individually and then in teams of three. Participants anticipated that joining a team would result in a better score than each individual could achieve alone. However, they tended to overlook how joining a team would produce unintended consequences in the form of coordination problems. Predictions of the team score were overconfident in exactly the way one would expect if participants placed too much weight on the presence of additional shooters and too little on the possibility of coordination errors. Further, an analysis of participants' thought listings suggested that overconfidence was confined to those who failed to anticipate the possible unintended consequences of working together. Those teams who anticipated that crowding, balls bouncing off each other, and other difficulties coordinating efforts might occur, in contrast, tended to make accurate estimates of their team's score.

These studies provide initial evidence that people fail to foresee unintended consequences and that this failure relates to errors in prediction. In Studies 2 and 3, we sought to balance the experimental control available in the lab in Study 1 with demonstrations involving judgments about current political events. Studies 2 and 3 also offer experimental manipulations of focus to directly investigate the degree to which a failure to foresee unintended consequences stems from focusing too much on the intended consequence and too little upon alternative possibilities.

Studies 2 and 3 employ manipulations that draw attention away from the point of focus with the goal of increasing consideration of alternative outcomes. Indeed, past researchers have successfully reduced the tendency to place too much weight on the focal point when making judgments (e.g., Wilson, Wheatley, Meyers, Gilbert, & Axsom, 2000). The tendency to overestimate the longevity of emotional reactions to a favorite sports team's performance, for example, is attenuated after people complete a diary outlining the events they were likely to experience on a day soon after the game (Wilson et al., 2000). Completing this diary, Wilson and colleagues argued, reminded participants to focus on additional life events, thus reducing focus upon the game and producing more accurate estimates of future happiness.

In Studies 2 and 3, participants completed tasks in which they assessed the importance of variables either individually or in a way that highlights their interrelations. We expected that highlighting the degree to which each variable is related to all others in the system would lead participants to think more about how a change in one variable would have unintended consequences on

²Degrees of freedom vary across analyses because participants left some questions blank.

other variables. As a result, we expected participants in this “defocused” condition to make predictions of the overall consequence of change in ways less consistent with the intended consequence, relative to control participants.

STUDY 2

In 2003, California held a gubernatorial recall election sparked, in part, by a \$38 billion budget deficit. Although Californians were quite troubled by the existence of this deficit, opinion polls suggested that they rejected every cut in service proposed to reduce the deficit as well as nearly every proposal to increase taxes (Baldassare, 2003). When these attitudes are considered in isolation, they make perfect sense. It is the rare person who, if asked in isolation, would prefer to pay higher taxes. However, people might be willing to pay higher taxes to reduce a dangerous budget deficit if, by so doing, they will protect a favored government program from budget cuts. We argue that people tend to focus narrowly on the proposal at hand (e.g., a proposal to raise or lower taxes) without consideration of how that proposal might affect other aspects of the budget.

National opinion polls suggest that question framing can be used to highlight the interrelations between budget categories. Gallup and *Investor's Business Daily*, for example, each asked respondents about approaches to stimulating the economy during the winter of 2001–2002. The Gallup poll (2002) asked a question that highlighted the interrelations among possible strategies. They asked, in a single question, whether participants thought the economy should be stimulated primarily through tax cuts or primarily through increased spending on, for example, “benefits for recently unemployed workers and construction projects.” Roughly even numbers of participants favored tax cuts versus increased spending, but fewer than 8% of respondents said that Congress should pursue both strategies. When *Investor's Business Daily* and the *Christian Science Monitor* (2001) asked participants about the same strategies in separate questions, 66% favored cutting taxes to stimulate the economy and 72% favored increased spending. Without specifically highlighting the degree to which Congress might have to choose primarily one or the other strategy, we argue, respondents focused on each strategy in isolation rather than as part of a larger, limited budget.

Study 2 offers an experimental analog of how people might think about categories of national spending in isolation. Participants were asked to first indicate how much money each national spending category should, ideally, receive. Half of the participants were assigned to allocate national spending in terms of percentages of the total budget. This task forces attention to the interrelations among spending categories in that spending more in one category leaves less for other categories.

After completing this budget allocation task, we asked participants to rate the consequences of two proposals—a large tax cut and a large increase in social welfare funding. Each proposal represents something very valuable if considered in isolation, but each would require a substantial amount of money. Thus, a strong commitment to one should suggest a weaker commitment to the other. We expected participants in the defocused condition, relative to control participants, to more often think about how a tax cut might limit the money available for desired government services. We also expected defocused participants to more often think about the cost of an increase in welfare spending and, as such, to wonder about where that money would come from. Generally, we expected defocused participants to more often mention possible unintended consequences of the proposals and, as a result, to make predictions of the overall effect that were less in the direction of the intended effect.

Method

Participants. Fifty-six undergraduates participated in exchange for extra credit in psychology courses.

Procedure. Participants were asked to first complete a federal budget task. They were seated at a computer and asked to read a Web page on which there was a list of the spending categories that make up the federal budget (as cited at <http://www.nathannewman.org/nbs/> as part of a similar national budget allocation task). The list included information regarding how the budget was allocated in 2001 both in terms of the dollar amount allotted to each category and what those dollar amounts translated to in terms of a percentage of the total budget. Participants could learn more about each category by clicking on its name to find a paragraph describing the types of spending making up that category.

Participants were asked to indicate how they thought the national budget should be allocated in one of two ways. In the control condition, there was a pull-down menu next to each category that participants used to indicate whether they thought funding should remain the same, be increased, or be decreased. Each pull-down menu constituted a scale ranging from increasing funding by 100% to decreasing funding by 100%.

In the defocused condition, pull-down menus were replaced with textboxes in which participants wrote a percentage of the total budget that they wished to allocate to that category. A calculator at the bottom of the page displayed what percentage of the total budget had been spent thus far. Participants were not allowed to continue to the next task until they had allotted exactly 100% of the budget, no more and no less. Because this task requires some decrease in funding in some category

for every increase in funding elsewhere, it was meant to highlight the degree to which the categories were not independent and, instead, were part of a system.

After completing the budget allocation task, participants were asked to imagine two measures that might be introduced to Congress. The first described a large tax cut, intended to ease the tax burden paid by Americans. Participants predicted how positive the overall effect of this tax cut would be on a scale from 1 (*extremely negative*) to 9 (*extremely positive*). They were also asked to explain the reasons for this prediction. Finally, participants answered the same two questions with respect to a proposal for a large increase in social welfare funding.

Results and Discussion

We expected participants who were defocused, in that they allocated the national budget as percentages, to hold less positive expectations of both proposals than controls. Indeed, those encouraged to think about the budget as a system made predictions of the overall effect of both proposals that were less positive. Defocused participants made less positive predictions of both the effect of the tax cut (4.82 vs. 5.44), $t(53)=1.75$, $p < .10$, and of the increase in social welfare spending (5.52 vs. 6.33), $t(54)=2.02$, $p < .05$, than did controls. The intended effects of both proposals, explicitly stated within the question, were quite positive. Thus, reducing focus on the intended effect led participants to make predictions that were less in the direction of that intended effect.

To determine whether the observed difference was due to differences in consideration of possible unintended consequences, open-ended responses were read by two coders, blind to condition. Coders first made a judgment about whether each response made reference to any type of unintended consequence ($\alpha = .75$) and then, separately, coded for the mention of two specific types of consequences. They coded for whether participants mentioned (a) how the tax cut might indirectly affect the availability of government services ($\alpha = .88$) and (b) how an increase in social welfare spending might indirectly affect future taxes or the availability of other government services ($\alpha = .85$).

As expected, defocused participants were more likely than control participants to mention possible unintended consequences of both the tax cut (75.0% vs. 44.0%), $\chi^2(2)=5.77$, $p < .05$, and of the increase in social welfare spending (46.4% vs. 16.0%), $\chi^2(2)=5.79$, $p < .05$. In particular, defocused participants were more likely to specifically mention one category of spending having an indirect, unintended consequence on another category than controls. Relative to control participants, defocused participants more often spoke of possible unintended consequences of a tax cut on government

services (64.3% vs. 24.0%), $\chi^2(2)=9.11$, $p = .01$, and of an increase in social welfare spending on taxes or other areas of spending (17.9% vs. 0%), $\chi^2(2)=4.93$, $p < .10$. One defocused participant provides a particularly clear example of how the manipulation led to decreased focus. While explaining the logic behind her prediction, she said, "Doing the budget balancing exercise earlier just showed how many things our federal budget has to pay for. If taxes were decreased, where would money for all those programs come from? Lots of things would suffer as a result."

We conducted an analysis to determine whether consideration of unintended consequences mediated the condition effect on expectations for the overall outcome. First, we converted participants' predictions regarding the outcome of the proposed tax cut and of the proposed increase in welfare spending to z scores and averaged them to create an index of predicted impact. We created an index of participants' consideration of unintended consequences in the same way, computing z scores for consideration of each proposal and then averaging the individual z scores together. The defocusing manipulation predicted expectations regarding the overall consequences of the proposals, $\beta = -.34$, $p < .05$. Defocusing also led to greater consideration of unintended consequences, $\beta = .41$, $p < .005$. However, consideration of unintended consequences failed to significantly predict expectations of the overall effect in a multiple regression controlling for the effect of condition, $\beta = -.16$, $p = .28$. Thus, consideration of unintended effects did not appear to mediate the relationship between condition and expected consequences although the data were in the predicted direction.

Summary

Spending money in one area has the indirect effect of ensuring that less money will be spent on some other area. Most voters know on some level that the government does not have an endless supply of money and, as such, know that policy decisions require some degree of weighing and balancing which areas of spending are more important. Still, Study 2 demonstrates that they may not think about how spending in one area indirectly affects others. By asking participants to allocate the national budget as a percentage, the degree to which variables were interrelated was highlighted such that, when they were asked to consider specific issues, participants more often thought about how each proposal might indirectly affect other important responsibilities of the government. The manipulation successfully reduced focus, leading to greater consideration of possible unintended consequences as well as less positive expectations of the proposal. Study 3 serves as a conceptual replication, using a different means of manipulating focus.

STUDY 3

College admissions officers are faced with a very difficult task in that they must identify the students, out of many applicants, who most deserve to attend their university. Much like balancing a budget, admissions officers need to do more than just identify qualities that they think important. Instead, they must also determine the relative weight to be placed on each characteristic. If the interrelations between factors that go into the decision process are highlighted, will laypeople adopt an approach more similar to that of admissions officers? Will this understanding of how the factors are interrelated promote consideration of possible unintended consequences? We explore these questions in Study 3 by asking participants to indicate the degree to which they thought a series of factors were important to consider when making admissions decisions.

As in the previous study, participants indicated their belief about the importance of these attributes in one of two ways. Control participants were asked to rate the degree to which each characteristic was important to consider. Participants in a “defocused” condition were also asked to indicate how important they thought each characteristic but did so by making a pie chart rather than responding to individual questions. We predicted that constructing a pie chart would highlight the systemic nature of the problem because allocating a large wedge to one characteristic leaves much less room to allocate to all other characteristics.

We expected that people would, generally, consider the importance of each potential factor in admissions decisions in isolation. As in the previous study, however, we expected that a relatively simple manipulation would highlight the degree to which different characteristics are interrelated. Further, we expected that highlighting the systemic nature of the problem would lead people to more often consider possible unintended consequences of changes to the admissions decisions and, as a result, make less positive predictions about the overall impact of such changes.

Methods

Participants. Participants were 49 undergraduates who received extra credit for their participation.

Procedure. Participants were asked to imagine themselves as members of an advisory board for a local college who wished to reevaluate their criteria for college admissions. In that hypothetical role, they indicated the relative importance of 10 factors relevant to admissions decisions (e.g., high school grade point average, standardized test scores, participation in extracurriculars). Control participants rated the importance of each factor on

a series of scales ranging from 1 (*unimportant*) to 9 (*extremely important*). Participants in the “defocused” condition, instead, indicated the importance of each factor through a pie chart. They were provided a circle (16.5 cm diameter) divided by lightly dotted lines marking wedges for each 5% of the chart. Participants were asked to label wedges in whatever way they thought appropriate to indicate the importance of each factor for the final admissions decision.

After indicating the importance of each factor, participants were asked to imagine that the board was considering placing greater emphasis on participation in extracurriculars. They were asked to predict how positive the consequences of this change in emphasis would be on a scale from 1 (*very negative*) to 9 (*very positive*). As in previous studies, they were also asked to explain the logic behind their prediction.

Results

We predicted that “defocused” participants would consider unintended consequences of this change more often than control participants and, as a result, be less optimistic about the overall effects of this change. As expected, defocused participants made predictions of the overall effect of the proposed change that were less positive ($M = 4.96$) than predictions made by controls ($M = 6.31$), $t(47) = 3.05$, $p < .005$. To examine whether this difference stemmed from a difference in consideration of unintended consequences, two coders, blind to condition, read through open-ended responses and noted whether each participant mentioned possible unintended consequences ($\alpha = .75$). As predicted, defocused participants were far more likely to talk of unintended consequences than were controls, $\chi^2(2) = 7.89$, $p < .05$. Indeed 47.8% of defocused participants made some mention of possible unintended consequences, compared to only 19.2% of controls.

As in the previous study, we conducted a mediational analysis to determine whether the effect of the defocusing manipulation on predictions of the overall outcome was mediated by the tendency to consider possible unintended consequences. As predicted, the defocusing manipulation strongly predicted expectations regarding the overall consequences of the change. Further, the defocusing condition predicted greater consideration of unintended consequences. Finally, a multiple regression formula including both condition and consideration of unintended consequences revealed that consideration of unintended consequences does lead to less positive predictions of the overall effect even after controlling for the effect of condition (see Figure 1). Inclusion of consideration of unintended consequences in the model resulted in a weaker relationship between the condition and predictions of the overall effect, Sobel $z = 2.00$,

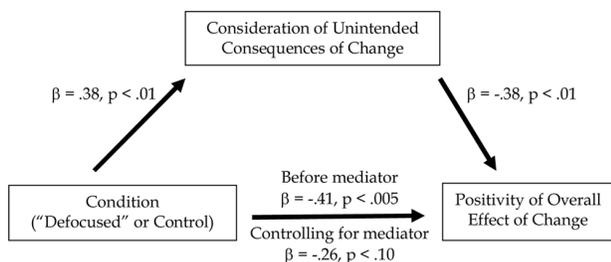


FIGURE 1 A model of how reduced focus affects predictions regarding admissions decisions.

$p < .05$. Thus, it seems that a difference so small as constructing a pie chart rather than rating features on separate scales highlights the degree to which possible factors are interrelated such that greater emphasis on one requires less emphasis placed elsewhere. The defocusing condition led to less optimistic predictions by leading people more often to consider possible unintended consequences of the proposed change.

GENERAL DISCUSSION

This article provides evidence that a failure to foresee unintended consequences stems, in part, from a tendency to focus on the intended consequence in isolation, rather than as part of a system of interconnected variables. In Study 1, focus on the intended consequence led to predictions that did not sufficiently account for the possibility of unintended consequences. Participants who did consider potential alternative consequences made more accurate predictions. Studies 2 and 3 provided more direct evidence that focus on the intended consequence leads to predictions reflecting confidence that it will come to pass.

In Studies 2 and 3, simple manipulations were used to highlight the degree to which the variables under consideration are related and increased weight given to one requires that less weight be given to the others. Individuals who were defocused in Study 2 were less optimistic about potential consequences of a hypothetical tax cut and a hypothetical increase in social welfare funding. After completing a task that highlighted the degree to which different areas of government spending were interconnected, individuals more often considered how advocating one category of spending might impact other categories. This simple change led to more frequent consideration of unintended consequences and fewer positive judgments. Similarly, participants in Study 3 more often recognized the possibility of unintended consequences stemming from a change in admissions decisions when defocused through a task that highlighted the interrelations between factors in an admissions decision, relative to control participants.

Encouraging Greater Accuracy in Predictions

The final two studies are important both because they demonstrate how focus on intended consequence leads predictions astray and because they suggest a tool for improving predictions. Studies 2 and 3 suggest that decision makers who seek to make the best choices possible should seek to highlight the relationships between variables in the system of interest. This might be a difficult task in many cases. It is considerably easier to identify all relevant variables in a budget or in an admissions decision than it is to identify all relevant variables in an ecosystem. Thus, it might be impossible to highlight interrelations in a meaningful way as the system becomes highly complex. Still, defocusing manipulations such as those used in Studies 2 and 3 might improve predictive accuracy so long as the system in question remains relatively simple and easily defined. It may be that we can adopt means of highlighting the systemic nature of a problem to more often anticipate and, thus, take steps to avoid unintended consequences.

To identify additional means of anticipating unintended consequences, we should review how nonpsychological factors influence the likelihood of anticipation. Merton argued that a failure to foresee unintended consequences stems, in part, from ignorance and error in understanding the system under consideration. We can learn from past experiences and educate others about the ways in which variables within a system interact and about the potential for unintended consequences within that system. Indeed, memorable unintended consequences from the past might also serve much the same function as the defocusing manipulations used in Studies 2 and 3. Highlighting previous strings of consequences should remind participants of the degree to which variables are interrelated and, as a result, improve anticipation of unintended consequences.

CONCLUSION

In this article, we have shown that the failure to foresee unintended consequences stems, in part, from the psychology of the predictor. In particular, we have shown that the failure to anticipate unintended consequences stems from a tendency to focus on what one intends in a way that blinds one to alternative possibilities. As a result, individuals tend to be overconfident that the intended consequence will come to pass and that there will be no additional unwanted consequences. This work represents one of the first attempts to understand psychological sources of the failure to foresee unintended consequences. Further, it suggests intriguing ways in which one might encourage more accurate predictions and, consequently, better decisions within complex systems. Given the prevalence of unintended consequences

stemming from acts big and small, the means of improving judgment suggested by the present work can provide important contributions both at the level of basic psychological research and in terms of applications.

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