Behavioral Dishonesty in the Public Sector

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ABSTRACT: We investigate the usefulness of the dice game paradigm to public administration as a standardized way of measuring (dis)honesty among individuals, groups, and societies. Measures of dishonesty are key for the field's progress in understanding individual, organizational, and societal differences in unethical behavior and corruption. We first describe the dice game paradigm and its advantages and then discuss a range of considerations for how to implement it. Next, we highlight the potential of the dice game paradigm across two diverse studies: prospective public employees in Denmark (n=441) and prospective public employees in 10 different countries with very different levels of corruption (n=1,091). In the first study, we show how individual-level behavioral dishonesty is very strongly correlated with public service motivation. In the second study, we find that widely used country-level indicators of corruption are strongly correlated with the average behavioral dishonesty among prospective public employees. The results illustrate the importance of the validated dice game paradigm to shed light on core questions that link micro- and macro-level dynamics of dishonesty and corruption in the public sector.

KEYWORDS: corruption, dice game paradigm, ethics, behavioral public administration

Introduction

Most forms of human organization rely on individual honesty. When individuals engage in dishonest or otherwise illicit forms of behavior, costs of rule monitoring and enforcement increase, common resources can be depleted, and patterns of cooperation and trust can break down. In response to this problem, social science has, since its inception, grappled with the psychological, social, and institutional antecedents of dishonest behavior. One fruitful attempt to measure and understand honesty is to develop standardized and validated behavioral measures of individual- and group-level dishonesty (Bellé and Cantarelli 2017a; Fischbacher and Föllmi-Heusi 2013; Shalvi et al. 2011).

In this article, we introduce and illustrate the relevance of the dice game paradigm to the field of public administration as a standardized measure of individual and group level dishonesty. The dice game paradigm involves experimental tasks in which subjects can increase their winnings by lying about the outcome of a die roll but face no risk of the researcher detecting their lie. Because the expected distribution of die rolls is known, however, the distribution of reports across repetitions of the game can benchmark what should have been observed if subjects were honest. This allows researchers to obtain statistical measures of the amount of dishonest behavior for some groups. Recent meta-studies have identified 72 individual studies which rely on the dice game paradigm (and related paradigms) to measure behavioral dishonesty (Abeler, Nosenzo, and Raymond 2016). However, almost none of them are conducted by public administration scholars, and few deal with issues that explicitly relate to topics in public administration (with Bellé and Cantarelli (2017b) and Christensen and Wright (2018) as very recent exceptions).

We agree with Bozeman, Molina, and Kaufmann (2018, 2) that, in "comparison to other fields, such as economics or political science, the body of Public Administration research engaging corruption as its central theme is scant." We believe that a way for public administration to add to the

interdisciplinary body of evidence on corruption and unethical behavior is by adopting standardized, incentivized measures of (dis)honesty like the dice game paradigm. We believe it is our field's task to understand how these experimental measures help understand variation in corruption between individuals, groups, organizations, and ultimately, the public sectors of different countries.

Already with the evidence currently at hand, we see plenty of very strong reasons for public administration to adopt this paradigm. First, it is an experimental task invented for lab or survey but with external validity that extends to the field. The dice game paradigm is validated against real-world dishonest behavior (Cohn and Maréchal forthcoming; Cohn, Maréchal, and Noll 2015) including corruption-like behavior among public employees (Hanna and Wang 2017). Second, country-level variation in institutional quality is correlated with cheat rates in the dice game (Gächter and Schulz 2016), and the honesty of prospective public employees matches a country's overall corruption level (Banerjee, Baul, and Rosenblat 2015; Barfort et al. 2017; Hanna and Wang 2017). Both findings highlight the micro-macro interplay between individual-level honesty and institutional variables. Finally, behavior in the dice game has been linked to fundamental individual differences in personality and motivations (Gino and Ariely 2012; Hilbig and Zettler 2015) which are also key features in recent studies in public administration (Esteve et al. 2016; Van Witteloostuijn, Esteve, and Boyne 2016).

In this paper, we introduce the dice game paradigm and the different design choices that can be made when implementing the game. To highlight the importance of behavioral dishonesty in the field of public administration, we provide evidence from two very different samples of prospective public employees. The two studies are arranged to highlight the diversity in application of the dice game and to provide a stronger case for the dice game by asking fundamental questions in which the field of public administration is already heavily invested. The overall motivating thread for the two studies is to show that the dice game can, in fact, tell, us something very important about (dis)honesty among

prospective public employees. We believe this is the ultimate benchmark for any new method that claims to improve the state of the art in a field of study.

In study 1, we ask if public service motivation (PSM) correlates with the behavioral (dis)honesty among prospective public employees. Recently, research has aimed at understanding how, in particular, PSM is correlated with various measures of ethics, honesty, and non-corruption attitudes and behaviors (Christensen and Wright 2018; Wright, Hassan, and Park 2016). We rely on an in-depth survey fielded among prospective public employees in Denmark (n=441). Denmark is a crucial case for the study of dishonesty as the country consistently has been found to be one of the least corrupt countries in the world (Transparency International 2016). We find that higher levels of PSM (in particular commitment to public interest and self-sacrifice) are all associated with substantively less behavioral dishonesty among Danish prospective public employees.

In study 2, we ask whether variation in levels of behavioral dishonesty among public employees is correlated with country-level differences in public-sector corruption. One finding in recent studies is that average cheat rates in the dice game are correlated with various country-level institutional variables capturing corruption, rule violation, and government effectiveness (Gächter and Schulz 2016; Lowes et al. 2017). We use preliminary data from an ongoing data collection effort that currently covers prospective public employees in 10 countries with very heterogeneous levels of corruption and institutional legacies (n=1,091). This provides us with insight into the relevance of the dice game paradigm across countries, cultures, and a very diverse set of public sectors. We find that lower levels of country-level corruption on various measures are all associated with substantively less behavioral dishonesty among prospective public employees.

Behavioral dishonesty as measured by the dice game paradigm and the results we find across two large studies provide three key insights to future research in public administration. As we will

discuss further in the concluding section, our results point to the immediate relevance of the dice game paradigm to (1) provide public administration research with a standard behavioral measure of honesty that can stimulate more research into ethics and corruption which is currently absent from the field (Bozeman, Molina, and Kaufmann 2018), (2) add nuance to our understanding of how PSM corresponds to important—but hard to measure—aspects of organizational performance (e.g., ethics, honesty, and corruption), and (3) highlight the importance of integrating macro-perspectives on administrative traditions, public values, and cultures of corruption with an explicit and robust micro-foundation of individual-level (dis)honest behavior (Meier and Holbrook 1992; Moynihan 2018; Olsen 2015; Roberts 2018). We also propose a set of questions that we believe the field should prioritize when moving forward in a quest to understand the causes and consequences of behavioral dishonesty.

Measuring (Dis)honesty: The Dice game paradigm

Measuring dishonesty is difficult. Official statistics will be biased due to the nature of the subject. Think, for instance, about the validity of corruption measures in highly corrupt societies. Data on rule-breaking, arrests, or convictions will be systematically biased by the very same latent concept that the measures aim to capture. Asking about dishonesty and self-reported unethical behavior in surveys will also be severely biased due to social desirability, self-serving bias, and strategic behavior.

The dice game paradigm is a constructive attempt to deal with these issues (Fischbacher and Föllmi-Heusi 2013).[2] Over the past few years, experimental tasks falling within the dice game paradigm have been applied for different purposes using a range of different implementations of probability-based designs for eliciting dishonesty. In the following, we will describe the basic structure

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[2]Other notable implementations of the game include (Ariely et al. 2014; Gneezy, Rockenbach, and Serra-Garcia 2013; Hilbig and Hessler 2013; Lewis et al. 2012; Shalvi et al. 2011)

of these experimental tasks and discuss some of the choices to be made when implementing them. In addition to specific examples of implementations, we rely particularly on a recent meta-study by Abeler, Nosenzo, and Raymond (2016), covering 72 individual studies conducted in 43 countries with a total of 32,000 subjects and more than 100,000 repetitions of experimental tasks from the dice game paradigm. For ease of exposition, we shall frame our discussion entirely in terms of games that, in fact, involve die rolls (real or virtual), even though the dice game paradigm can be (and has been) adapted to other random outcomes such as flipping coins or drawing lots.[3]

The basic structure of dice games for measuring dishonesty

The experimental tasks that fall under the dice game paradigm can broadly be categorized as belonging to one of two basic types. In the first type of experimental task, which we will refer to as "game-in-private," a subject first observes the outcome of one (or more) private die roll(s) not observed by the experimenter. Then the subject reports what they observed and receive a reward based on this report. In the canonical dice game of Fischbacher and Föllmi-Heusi (2013), for example, subjects were simply paid the same number of Swiss franc that they (claimed to have) rolled, except if they rolled a 6, in which case they received nothing.

In the second type of experimental task, which we will refer to as "game-in-mind" (Jiang 2013), the subject is first asked to make a private prediction regarding one (or more) die roll(s) but are not

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[3] The experimental tasks that we categorize as belonging to the dice game paradigm can, in principle, be conducted using any type of random outcome. In practice, however, basing the game on a die roll (or multiple dice rolls) has some clear advantageous. Dice are typically readily available, and most subjects' can be expected to be familiar with the randomness involved in rolling a die. The latter is attractive because many interpretations of behavior in the dice game rely on the idea that subjects have a reasonable understanding of the probabilistic structure of the task. In practice, experimental tasks involving dice are the most commonly used and account for 54 percent of all conducted studies (Abeler, Nosenzo, and Raymond 2016). In some cases, however, logistics may demand that a different random outcome is used. Abeler, Becker, and Falk (2014), for example, conducted their experimental task by randomly phoning German homes and asking subjects to flip a coin and report the outcome. Almost all Germans can be expected have a coin in their house.

required to record the prediction anywhere. Next, the roll(s) occurs and is observed by both the subject and the experimenter. Finally, the subject reports his or her prediction and is rewarded based on how close it was to the actual outcome.[4] The two example studies we present later fall into this category. In both studies, subjects are rewarded for correctly guessing the outcome of a die roll, but subjects are allowed to see the outcome of the roll before having to report their guess.

The key point of both types of experiments is that they offer the subjects a way to increase their rewards dishonestly from the task without any risk that the experimenter can know that they did so. In the "game-in-private," subjects' can lie and always report an outcome that yields higher rewards. In the "game-in-mind," subjects' can lie and report that their prediction matches the observed outcome even when it does not. After observing multiple repetitions of the game, however, the experimenter can compare the actual winnings of subjects to the expected winnings that should occur if subjects reported honestly. This makes it possible to draw inferences about the amount of dishonest reporting. In the two studies we present later, we show examples of how this is done in practice. In Barfort et al. (2017), we provide a more thorough description of relevant statistical approaches.

Regarding choosing between the "game-in-private" and "game-in-mind" variation, we note that the "game-in-mind" variation offers the major advantage of being implementable online (we return to this below), although the "game-in-private" has been more common in studies conducted offline. Existing evidence suggests mixed results on whether the two implementations affect the measured level of dishonesty (Abeler, Nosenzo, and Raymond 2016).

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[4] In a slightly more general implementation, subjects are not asked to report their prediction regarding the outcome but are instead asked first to make and then later report some choice, which effects their pay-off differently depending on the random outcome. In the dice game from Jiang (2013), for example, subjects' first privately decide whether they want to be paid based on the face up side of the die or based on the opposite side. If subjects are assumed to be rational, this implementation is equivalent to making and reporting a prediction for the outcome (a rational individual will always make the choice that maximizes their payoff given their prediction for the outcome).

Binary vs. varied reward structure

The first important consideration in implementing the dice game paradigm is how the subjects report and/or the random outcome should translate into rewards. An important dichotomy here is whether the reward structure is binary (depending on the random outcome and the report, subjects either receive a fixed reward or they do not) or is more varied (subjects can receive a smaller or bigger reward depending on what is reported). The canonical dice game of Fischbacher and Föllmi-Heusi (2013) used a varied reward structure where people were paid different amounts depending on the exact die roll they report. In contrast, the example studies presented later use a binary structure by rewarding subjects a fixed amount each time they report the correct guess for a die roll.

Using a binary reward structure implies that a simple, well-defined quantity summarizes the amount of dishonesty: how often subjects misreport and dishonestly claim a reward (when discussing our two example studies later we refer to this quantity as the "cheat rate").[5] This is an advantage in experimental studies where the main aim is to characterize differences in overall dishonesty between (or within) some groups of individuals.

Using a varied reward structure instead opens up the possibility for different types of dishonesty to occur (i.e., reporting 6 when the actual die roll was a 5, as opposed to when the actual roll was a 1). This allows researchers to examine different degrees of dishonest behavior ("small" vs. "big" lies) but can make it less straightforward to compare overall differences in dishonesty within or across groups.[6]

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[5] Implicitly, this simplification assumes that subjects never choose to make themselves worse off by misreporting in order not to get a reward.

[6] A common practice is to compare overall dishonesty by simply comparing the total winnings (or some linear transformation of it) in the experimental task. While more dishonesty obviously implies higher winnings, this approach

Regarding, the exact rewards offered to subjects, the vast majority of existing studies offer some form of material gain, in most cases money. A potential concern is that the dice game paradigm, therefore, captures only the tendency for individuals to be dishonest in the face of financial gains. As we return to below, however, behavior in dice games has been shown to predict dishonest behavior also in settings without direct material rewards.

Finally, we note that behavior in the experimental tasks appears quite insensitive to the exact level of incentives. Evidence from existing studies suggests that even raising the incentives from reporting a win by 500-fold (from a few cents to 50 USD) has limited impact on both the average level of dishonesty and the distribution of dishonesty (Abeler, Nosenzo, and Raymond 2016).

In the studies we present here, we have both relatively highly incentivized games (study 1) and we also present results with lower and varying incentives matched to different countries income differences (study 2).

The likelihood of winning honestly

Another important design choice is how likely it should be for subjects to win if, in fact, they report honestly. When using a binary reward structure, this is summarized in the baseline probability of winning, which will be determined by the details of the implementation. In a "game-in-private" variant where subjects win a fixed amount if and only if the die shows 4, 5 or 6, the baseline probability will be

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implicitly also imposes the somewhat arbitrary scaling that a dishonest report which increases winnings by 2 euros is "twice as dishonest" as one that increases winnings by 1 euro.

1/2. In the example studies presented later (where subjects are rewarded if they correctly guess the exact outcome of a die roll), the baseline probability is 1/6.[7]

Barfort et al. (2017) show that the baseline probability of winning has important statistical implications for how precisely we can measure dishonest behavior. When the baseline probability is low, measures of dishonesty in the dice game are less noisy, which improves statistical precision and power. This makes it attractive to use implementations with lower baseline probabilities of winning. As noted by Abeler, Nosenzo, and Raymond (2016), however, the baseline probability of winning may also affect behavior in the experiment directly. In particular, they find that higher baseline probabilities tend to increase the level of dishonesty in the game, which might be because a higher baseline helps participants maintain a self-image of honesty while cheating (Bellé and Cantarelli 2017a). In many applications, however (including the two example studies presented below), the main focus is not on the absolute level of dishonesty but rather the relative differences across different groups or individuals within the experimental study.

Lab vs. online vs. field implementation

Most of the earlier uses of the method have been applied in a lab setting. However, more recent studies have also started to use online implementations or field experiments. For many questions in public administration, we believe online implementations may be particularly attractive. While lab experiments offer the most flexibility and field experiments may be able to increase external validity, both of these implementations are expensive and can limit the size and diversity of the samples that are

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[7] Since subjects cannot know in advance what the die will show, the probability that the die ends up matching their particular guess is always 1/6.

available. On the other hand, implementation via an online survey allows one to obtain a large sample of subjects, including subjects with special characteristics and who can be difficult to reach. As we will show later, this gives us the opportunity to reach large samples of a specialized population, as will be the case in study 1, and it also gives us the opportunity to obtain large samples from many different countries as we will highlight in study 2.

An important thing to note is that online computer implementations of the dice game paradigm are not generally possible when using the "game-in-private" variant; when dice rolls are simulated on-screen, subjects have good reason to expect that the experimenter can check the outcome of the private die roll in the software.[8] In contrast, the "game-in-mind" variant is straightforward to implement on a computer because it only involves a publicly observed die roll. This is also the primary reason why the "game-in-mind" implementation is used across both studies that we present later.

One-shot vs. repeated implementations

Dice games can be implemented as one-shot games, but each subject can also be asked to repeat several rounds. As long as the number of subjects is sufficiently large, data from one-shot games are enough to measure the overall level of dishonesty and/or compare differences in dishonesty across different groups.

However, asking subjects to repeat the dice games multiple times offers several advantages. Barfort et al. (2017) show that the dishonesty measures obtained from the dice game are less noisy when each subject repeats the game many times. Adding extra rounds to the dice game is, thus, a way

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[8] It is, of course, possible to ignore this issue and conduct the experiment anyway. However, this would negate one of the main advantages of the dice game paradigm. Alternatively, one can ask subjects to perform the die roll themselves using a real die. If some types of subjects do not readily have access to a die, however, this can introduce important biases.

to increase statistical precision and power without increasing the number of subjects. Barfort et al. (2017) also show how adding additional rounds for each subject makes it possible to estimate the full distribution of dishonesty in the population.

A potential concern could be that adding additional rounds causes subjects' behavior to change over time. However, existing studies show very small effects of repeated games on the overall level of dishonesty which, in turn, suggests limited learning or experience effects across rounds (Abeler, Nosenzo, and Raymond 2016). Moreover, researchers worried about confounding effects of additional rounds can always perform robustness checks that use only different subsets of the rounds in their data. In the two studies presented here, we have results from an implementation with a very high number (i.e., 40 rounds) of a die game (study 1), but we also show results for an implementation with five rounds (study 2), which is close to the median number of rounds in the existing studies (Abeler, Nosenzo, and Raymond 2016).

External validity of the dice-game

The critical test of any behavioral measure derived in a lab or survey setting is to understand if and how it corresponds to similar types of behaviors in a field setting. For the dice game paradigm, we find several validations against real-world dishonest behavior. Cohn and Maréchal (forthcoming) show that cheating in the dice game paradigm predicts classroom misbehavior in a sample of 162 students from eight classes in two Swiss public schools. In a very different setting, Cohn, Maréchal, and Noll (2015) show, also using the dice game paradigm, that prison inmates cheating more in the game are more likely to commit offenses against prison regulation such as aggression against others, use of illegal drugs, and weapon possession. Other notable validations with behavior in the field include Potters and Stoop (2016) and Dai, Galeotti, and Villeval (2017). Perhaps most relevant to public administration,

Hanna and Wang (2017) find, in a sample of public-sector nurses in India, that cheating on a dice task predicts fraudulent absence from work.

Overall, there is strong evidence that the experimental dice game paradigm captures individual differences in dishonesty, which in turn correlates with unethical and corrupt behavior in real-world settings. Importantly, these validations have been made with very different implementations of the game along the dimensions we previously discussed which we take as a general indication of the robustness of studying dishonesty by measuring subjects' misreporting of an otherwise random variable with known probabilities.

Study 1: (Dis)honesty and PSM in Denmark

Dishonesty in the dice game paradigm has been linked to both fundamental individual differences in personality and motivations (Gino and Ariely 2012; Hanna and Wang 2017; Hilbig et al. 2015). In study 1, we ask if behavior in the dice game is correlated with individual differences in PSM among prospective public-sector employees. PSM is used in hundreds of papers in public administration and its effects on behavior have sparked a rich academic debate with many valid criticisms of the measure (Bozeman and Su 2015; Kim et al. 2012; Ritz, Brewer, and Neumann 2016).

We focus on the case of prospective public employees in Denmark. As noted in the introduction, Denmark is to be regarded as one of the least corrupt countries in the world (Transparency International 2016). As is the case for other Scandinavian welfare states, Danish public employees score higher on many motivational variables relative to public-sector workers in Anglo-Saxon welfare regimes (Houston 2011). Denmark is suitable as a lot of previous studies on PSM have been conducted in a Danish setting (Andersen 2009; Andersen et al. 2013; Andersen, Heinesen, and

Pedersen 2014) which increases the importance of understanding how these measures correspond with behavioral (dis)honesty in this particular context.

Linking dishonesty and PSM adds to the growing number of studies looking at core individual differences in the motivations to engage in dishonest behavior. Across six behavioral experiments, including a dice game, Hilbig and Zettler (2015) find strong correlations between the honesty-humility personality dimension and cheating.[9] Interestingly, studies have also found correlations between other personality dimensions and various measures of corrupt behavior (Callen et al. 2015). These results tap into recent attempts in public administration to relate PSM and other motivational variables to personality traits (Nørgaard 2018)—including the honesty-humility dimension (Van Witteloostuijn, Esteve, and Boyne 2016).

Recently, there has been an interest in understanding the relations between PSM and unethical behavior. The general prediction here is that, overall, PSM should encourage more ethical, honest, and non-corrupt behavior (Brewer and Selden 1998; Christensen and Wright 2018; Lim Choi 2004; Maesschalck, Van der Wal, and Huberts 2008; Stazyk and Davis 2015; Wright, Hassan, and Park 2016). This prediction stems both from the concept's relation to a specific pro-social motivation to help others via public service and from the concept's relation to the notion of serving broader societal and public values of fairness and equity. However, a recent study by Christensen and Wright (2018) fails to find a link between PSM and ethical behavior after experimentally priming subjects with the idea of PSM. On the other hand, Wright, Hassan, and Park (2016) find in a US context that leaders with higher

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[9]Honesty-humility is part of the six-dimensional HEXACO personality trait model and captures individual differences in sincere/sly, faithful/deceitful, and honest/dishonest personality traits (Ashton and Lee 2009). HEXACO takes its name from the six dimensions: Honesty-Humility, Emotionality, eXtraversion, Agreeableness, Conscientiousness, and Openness to Experience.

PSM are more likely to be evaluated by their employees as exercising ethical leadership.[10] At the same time, such leaders are more likely to attract employees with higher levels of PSM, and these employees are more willing to report unethical behavior in the workplace. Accordingly, we should expect that the PSM sub-scales of commitment to public interest and self-sacrifice are correlates of honesty as the former corresponds to a commitment to the equity and fairness values of public service while the latter captures specific pro-social motivations linked to public service.

Data

Study 1 draws on data from Barfort et al. (2017) who looked at how differences in dishonesty corresponded with preferences for work in the public or private sector. In short, the study found that those who prefer a job in the public sector cheat substantively less than those with a preference for private-sector work. As we will return to, this is an important backdrop for interpreting the results we present here.

Subjects were recruited from a large public university in Denmark during the winter of 2014. From the university administration, we obtained complete lists of all students who enrolled as undergraduates in law, economics, or political science. From these lists, we randomly sampled 1,000 students who enrolled over the years 2009-2011 and 2013-2014 from each of the three fields of study. Subjects were invited to the survey via their student e-mail addresses. The e-mail included a link to the survey along with a user name and password to make sure that each student participated only once in the survey. A translation of the recruitment mail can be found in Appendix A1.

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[10]There are also some exceptions that show how pro-social motivation can increase certain types of unethical conduct (Bolino and Grant 2016).

The students enrolling in law, economics, or political science usually graduate with a master's degree about five years after enrolling. Some 46% of them end up in the public sector, and as many as 60% of all state employees with administrative tasks have a degree in one of the three fields. Therefore, we find these graduates at all level of government including at the very top. At the time of the study, all of the 20 deputy secretaries and 40% of the members of the Danish parliament were graduates in law, economics, or political science—many of them from the same university from which we sample students.

In total, 862 subjects completed the survey. In this study, we focus on the 441 students who gave the highest rank for working in public administration (among eight other possibilities) or estimated that their probability of getting a job in public administration was higher than 50 percent. This gives us a sample of prospective Danish public employees who, at the time of the study, were enrolled at a university. With the findings in Barfort et al. (2017) in mind, it is important to note that this group is, on average, considerably more honest than the rest of the sample which preferred a private sector job. Accordingly, we set the dice game on a difficult test as we ask if dishonesty is correlated with PSM in a sample which, on average, is quite honest and also has higher levels of PSM. It will give us some idea of how well the dice game paradigm can capture correlation with PSM within a subset of the honesty distribution.

A sample of 441 is relatively large if we compare to the median sample size of the 72 dice games reported by Abeler, Nosenzo, and Raymond (2016) and also the 73 behavioral ethics studies reported by Bellé and Cantarelli (2017a). Furthermore, we improve our ability to detect individual-level dishonesty by doing a very extensive implementation of the dice game as we elaborate on in the next section.

Design and Measures

To undertake our study, we rely on two measures: an elaborate version of the dice game paradigm which allows us to measure dishonesty at the individual level and a 16-item standard battery to measure public-service motivation.

For the dishonesty measure, we rely on a game-in-mind implementation of the dice game (Jiang 2013). Following Hanna and Wang (2017), we rely on a repeated dice game. The exact survey screens with translations are provided in Appendix A2. In total, subjects played 40 rounds of the dice game. These rounds were divided into sessions of 10 which were placed in intervals in between the other items in the survey. On the first screen of the survey, the subjects were told that the survey dealt with their attitudes to various topics and "how they acted in situations characterized by uncertainty". The subjects were provided with the following instructions for the game:

You have now responded to the first series of questions. The purpose now is to see how you guess in situations marked by randomness.

You will play 10 rounds of a dice game in which you can win money in each round. You have to guess what the die will show.

The more die rolls you guess, the more money you will win. Each round of the game proceeds like this:

1. First, you will have to guess a number of dots from 1 to 6. When you have made your guess, you can press the continue button.

2. Hereafter, a die will roll, and you will be asked to report the number of dots which you guessed earlier.

3. The next screen will show the result of the round. If your guess matched the number of dots on the die, then you will win 3 DKK, else you will win 1 DKK.

You should avoid using the back bottom during the dice games as it might delete your total winnings.

Note: It is important that you are careful about remembering and reporting the exact number of dots which you guessed prior to rolling the die.

In other words, subjects are asked to think of a number between 1 and 6, then the die rolls with an animation, the result is revealed, and the subject is asked to report the initial guess. Subjects won an

additional 2 DKK (33 US cents) for every correct guess of the die, amounting to an additional 13 dollars for those who guessed correctly on all 40 rounds. In addition to the dice game, subjects received a flat fee for participating in the survey (2.5 USD), and they could win additional money in a lottery. Subjects were informed that the average subject would earn no less than 50 DKK (8 USD) and that the survey would take approximately 20 minutes to complete. This constitutes a generous incentive structure as a typical student job pays an hourly wage of about 110 DKK (18 USD), corresponding to 37 DKK (6 USD) per 20 minutes. All payments were transferred directly into the subjects' bank account. The range of potential monetary rewards was stated in the recruitment email (see Appendix A1).

Summary statistics for this sample are reported in Table 1. There are different ways to measure subjects' behavior in the dice game. First, we can count the number of wins, that is, correct guesses. Subjects report 19.5 wins with substantial variation (SD=12.8). For 40 die rolls, the expected number of wins under full honesty is 6.7, indicating that the sample contains plenty of cheating. Alternatively, we can rescale the total number of wins into a win rate by dividing the number of correct guesses by the total number of die rolls (in this case 40).[11] In the sample, this amounts to 49% (SD=32%) which is well above the full honesty benchmark of 16.7%.

Since even honest individuals will have a one-in-six chance of guessing each dice roll, however, the total number of wins and the win rate will count both instances of dishonesty as well as pure lucky guesses. As shown in Barfort et al. (2017), however, we can apply a simple linear transformation to the win rate to arrive at an unbiased estimate of how often each individual has cheated.[12] We use this

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[11] There is no substantive difference in cheating across the forty rounds.

[12] The transformation takes the form of:

transformed win rate as our main measure of dishonesty in the analysis. For clarity and comparison with other evidence, we will also present some of our key results in terms of the number of wins and win rate. Because each of the three measures is linear transformations of each other, however, we note that the results stemming from the different measures will just be rescaled and mathematically equivalent versions of each other.

Table 1. Summary Statistics for the Danish Sample (study 1)

	N	Mean	SD	Min	Max
Age	441	23.09	2.82	18	40
Gender (female)	441	0.53	0.50	0	1
No. of wins	441	19.45	12.81	2	40
Win rate	441	0.49	0.32	0.05	1.00
Cheat rate	441	0.38	0.38	−0.14	1.00
Public service motivation (PSM)	440	0.63	0.13	0.00	0.98
-Commitment to the public interest (CPI)	440	0.72	0.17	0.00	1.00
-Self-sacrifice (SS)	441	0.49	0.17	0.00	1.00
-Compassion (CP)	441	0.77	0.19	0.00	1.00
-Attraction to policy making (APM)	441	0.59	0.22	0.00	1.00

The core task of the study is to correlate behavior in the dice game with an individual's public service motivation. We rely on a 16-item battery covering the four public service motivation sub-scales of commitment to public interest, self-sacrifice, compassion, and attraction to policy making. We used a translation which has been fielded before in a Danish context (see Andersen et al. 2014). In the analysis, we rely on both a combined PSM of all four sub-scales and each of the four scales individually. As the dice game was done in rounds of 10 in four different instances throughout the survey, we can observe dishonesty both before and after the PSM items were answered. Generally,

$$CheatRate = \frac{6}{5} \cdot \left(\frac{Y_i}{40} - \frac{1}{6}\right)$$

With Y_i being the number of correct guesses for each subject i. For additional information on this measure, see Barfort et al. (2017). Here, the measure is referred to as the estimated cheat rate.

there is no substance change in the cheat rate across the four rounds of 10. For the analysis, we standardize all the above-mentioned motivational measures on a scale from 0 to 1 (see Table 1). It is worth noting that the sample scores higher on commitment to public interest and compassion than on self-sacrifice and attraction to policy making.

Results

The key results are reported in Table 2. Here, we regress PSM and the four sub-scales on the cheat rate. Overall PSM is strongly and negatively correlated with dishonesty. Moving from the minimum to the maximum values of PSM corresponds to a reduction in the cheat rate by about 70 percentage points (pp). Looking at the sub-scales, we can observe how this correlation is particularly strong for sub-scales of commitment to public interest (CPI) and self-sacrifice (SS) which both lower the cheat rate by approximately 40 pp.

Compassion (CP) and, in particular, attraction to policy making (APM) are substantively less correlated with the cheat rate. In sum, across all sub-scales, we find significant and substantive correlations with honesty and in particular among those sub-scales that we theoretically would expect to vary with more behavioral honesty. Importantly, these correlations are found *within* a subgroup of prospective public employees in the Danish public sector—a group which already is relatively honest (Barfort et al. 2017). This illustrates the ability of the dice-game paradigm to capture quite subtle differences in (dis)honesty within relatively homogeneous groups.[13]

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[13]If all four PSM sub-scales are added to the same model at once, then self sacrifice and commitment to public interest still have the largest coefficients and, together with attraction to policy making, the only ones with a significant correlation ($p<.10$).

Table 2. Dishonesty and Motivations Among Future Public Employees in Denmark

	Cheat rate				
	(1)	(2)	(3)	(4)	(5)
Public service motivation (PSM)	−0.71**				
	(0.14)				
Commitment to public interest (CPI)		−0.42∗∗			
		(0.11)			
Self-sacrifice (SS)			−0.44∗∗		
			(0.10)		
Compassion (CP)				−0.27∗∗	
				(0.10)	
Attraction to policy making (APM)					−0.19∗
					(0.08)
Constant	0.83∗∗	0.69∗∗	0.60∗∗	0.59∗∗	0.50∗∗
	(0.09)	(0.08)	(0.05)	(0.08)	(0.05)
N	440	440	441	441	441
R²	0.06	0.03	0.04	0.02	0.01

Notes: OLS coefficients with standard errors. *p<.05; **p<.01

To get a more in-depth sense of the correlation between PSM and dishonesty, we compare behavior in the dice game on various outcome variables for prospective employees who score above and below the median for the motivational variables with the largest effects (as found in the previous table), namely overall PSM, CPI, and SS. We can view behavior on the die game on three outcomes that, by definition, show the exact same results but along different metrics, namely the cheat rate, win rate, and number of wins. These results are provided in Table 3.

For the cheat rate, we can observe how those scoring above the median on various PSM measures cheat between 8 to 13 percentage points (pp) less. If we capture the effect in terms of win rate, we get estimates in the same pp range. Finally, we can view behavior on the dice game as the number of wins out of the 40 die rolls. Those with an above median level of overall PSM win 4.3 fewer die rounds. For the same group for commitment to public interest, the number is 2.8, and for self-

sacrifice, it is 4 die rounds. These different metrics are completely mathematically equivalent but illustrate different ways of taking stock of the behavior in the game. In summary, prospective public employees with above median levels of PSM, commitment to public interest, and self-sacrifice are substantially more honest.

Table 3. (Dis)honesty for Prospective Public Employees with Above Median PSM Values

	Cheat rate			Win rate			No. of wins		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Above median PSM	−0.13∗∗			−0.11∗∗			−4.25∗∗		
	(0.04)			(0.03)			(1.21)		
Above median CPI		−0.08∗∗			−0.07∗			−2.79∗	
		(0.04)			(0.03)			(1.22)	
Above median SS			−0.12∗∗			−0.10∗∗			−3.96∗∗
			(0.04)			(0.03)			(1.21)
Constant	0.45∗∗	0.43∗∗	0.44∗∗	0.54∗∗	0.52∗∗	0.54∗∗	21.57∗∗	20.85∗∗	21.44∗∗
	(0.03)	(0.03)	(0.03)	(0.02)	(0.02)	(0.02)	(0.85)	(0.86)	(0.85)
N	440	440	441	440	440	441	440	440	441
R^2	0.03	0.01	0.02	0.03	0.01	0.02	0.03	0.01	0.02

Notes: OLS coefficients with standard errors. *p<.05; **p<.01.

In Figure 1, we exploit the fact that the 40 rounds of the dice game allow us to show correlates with motivations as differences in the distributions of the number of correct guesses. Again, we show these for the three motivations with the strongest correlations: general PSM and the sub-scales of commitment to public interest and self-sacrifice. In each panel, the solid histogram shows the distribution of correct guesses, and the blank histogram shows the expected distribution of correct guesses under perfect honesty. The top row shows data for individuals above the median on each scale. The bottom row shows data for individuals below the median.

In the top panels, across all three motivational variables, we see a greater overlap between the observed number of correct guesses and the expected distribution under full honesty than is the case in the lower panels. In the lower panels, on the other hand, we observe a much larger fraction of correct

guess in the right tail of the distribution among those who cheat on most or all of the 40 rounds of the dice game. At the same time, the overlap in the number of correct guesses with the honest distribution is visibly lower in the bottom panels.
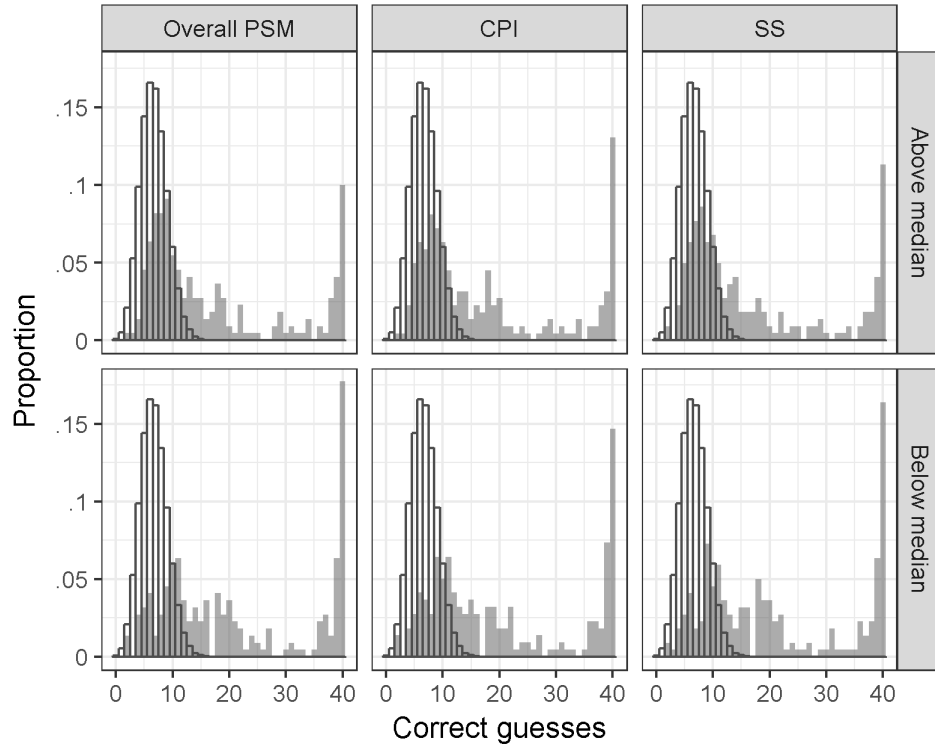

Figure 1. Distribution of correct guesses for varying levels of PSM and PSM sub-scales. In each panel, the solid histogram shows the distribution of correct guesses, and the blank histogram shows the expected distribution of correct guesses under perfect honesty. The top row shows data for individuals above the median on each scale. The bottom row shows data for individuals below the median. Individuals higher in PSM or PSM sub-scales have distributions of correct guesses distinctly closer to the distribution under perfect honesty.

Study 2: Honesty and Macro-level Corruption in 10 Countries

For a standardized experimental paradigm to be relevant for a broader research agenda, it will need to be valid and reliable across languages, cultures, and borders. Most of the existing dice game studies are single-country studies with a few exceptions (Abeler, Nosenzo, and Raymond 2016). Furthermore,

from a conceptual point of view, it is important to know if micro behavior in the dice game in any way reflects macro-level variables.

In study 2, we ask whether the differences in behavioral dishonesty among public employees are associated with differences in society-wide corruption levels. One finding in very recent studies is that average cheat rates in the dice game are correlated with various country-level institutional variables capturing corruption, rule violation, and government effectiveness (Gächter and Schulz 2016; Hugh-Jones 2016; Lowes et al. 2017). On the other hand, other studies downplay cross-country differences in dishonesty (Pascual-Ezama et al. 2015), even when relying on the dice game (Mann et al. 2016).

Our approach in study 2 is inspired by Gächter and Schulz (2016). They conducted the dice game in student samples in 23 countries with great institutional diversity. They find that their own country-level Index of the Prevalence of Rule Violations (PRV), which is a multi-dimensional measure of rule-breaking, is strongly correlated with the average cheat level in the dice game. These results fit the overall view of the importance of the transmission of norms legitimizing dishonest behavior (Gino, Ayal, and Ariely 2009; Gino and Bazerman 2009), and they raise the important question about the self-fulfilling character of dishonesty, that is, if 'corruption corrupts' (Shalvi 2016).

Using the same approach, we ask a question that more directly stresses the correlation between dishonesty among prospective public employees and country-level measures of public-sector corruption. Thus, while study 1 looked at the ability of micro-level differences in PSM to correlate with dishonesty, study 2 aims to understand if macro-level variables on corruption are correlated with micro-level cheating in the future public-sector workforce.

For public administration scholars aspiring to unpack the deeper historical and institutional origins of corruption (Bozeman, Molina, and Kaufmann 2018), these findings are of key interest as

they build a bridge between behavioral and experimental approaches to corruption and more macro-oriented observational data.

Data

In study 2, we rely on preliminary data from an ongoing, large-scale data collection effort spanning multiple countries. Here, we rely on data from 10 countries: Denmark, Singapore, Sweden, United Kingdom, Germany, Morocco, Egypt, Algeria, Indonesia, and Thailand. The country selection is highlighted in Figure 2. The countries were chosen to satisfy a number of criteria including data availability and variation in corruption levels. In all countries, we relied on the polling company YouGov which gave us the opportunity to standardize surveys, incentives, and sample quality across all 10 countries.
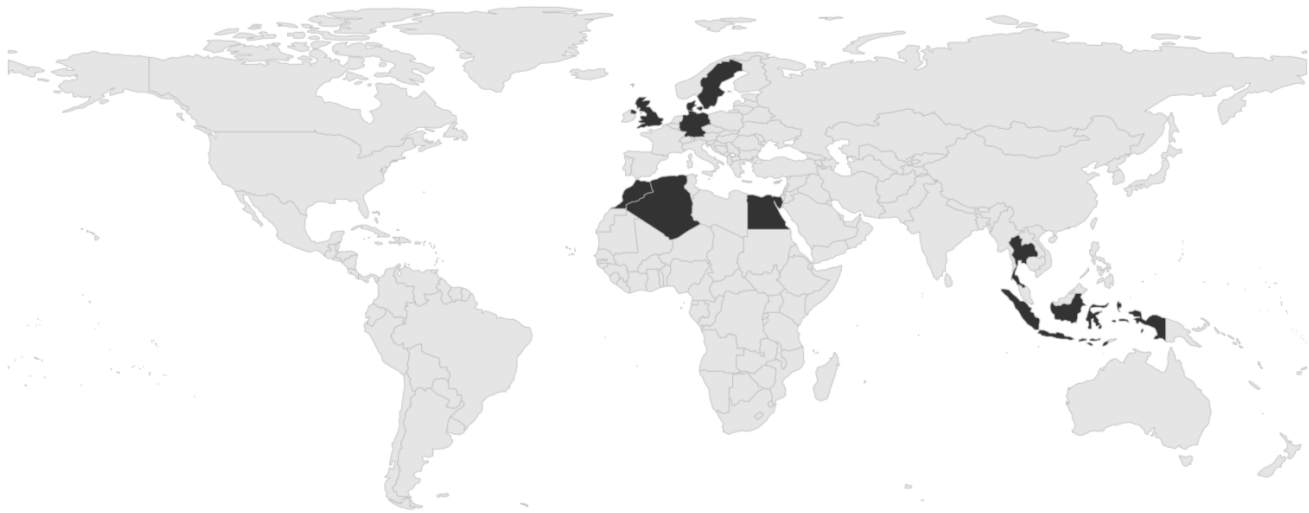
Figure 2. World map with the 10 counties included in study indicated in black (from west to east): Morocco, United Kingdom, Algeria, Germany, Denmark, Sweden, Egypt, Indonesia, Thailand, and Singapore.

Using Transparency International's corruption perception index from 1998 to 2017, we can map how different our 10 countries are in terms of corruption levels. These data are shown in Figure 3. The red

lines indicate the 10 countries in our sample while the gray lines represent all other countries in the

data. Here, we can clearly observe how five of the countries were chosen due to their very low levels of

corruption: Denmark, Sweden, Singapore, United Kingdom, and Germany. At the same time, the other

countries are all placed in the lower end of the index which resembles the high level of corruption in

these countries: Morocco, Thailand, Egypt, Algeria, and Indonesia. It is also worth noting that while

there might be year-to-year changes and shifts in rank between countries in the two groups, the overall

trend for the 20 years is one of stability: The five "clean" countries were also very non-corrupt 20 years

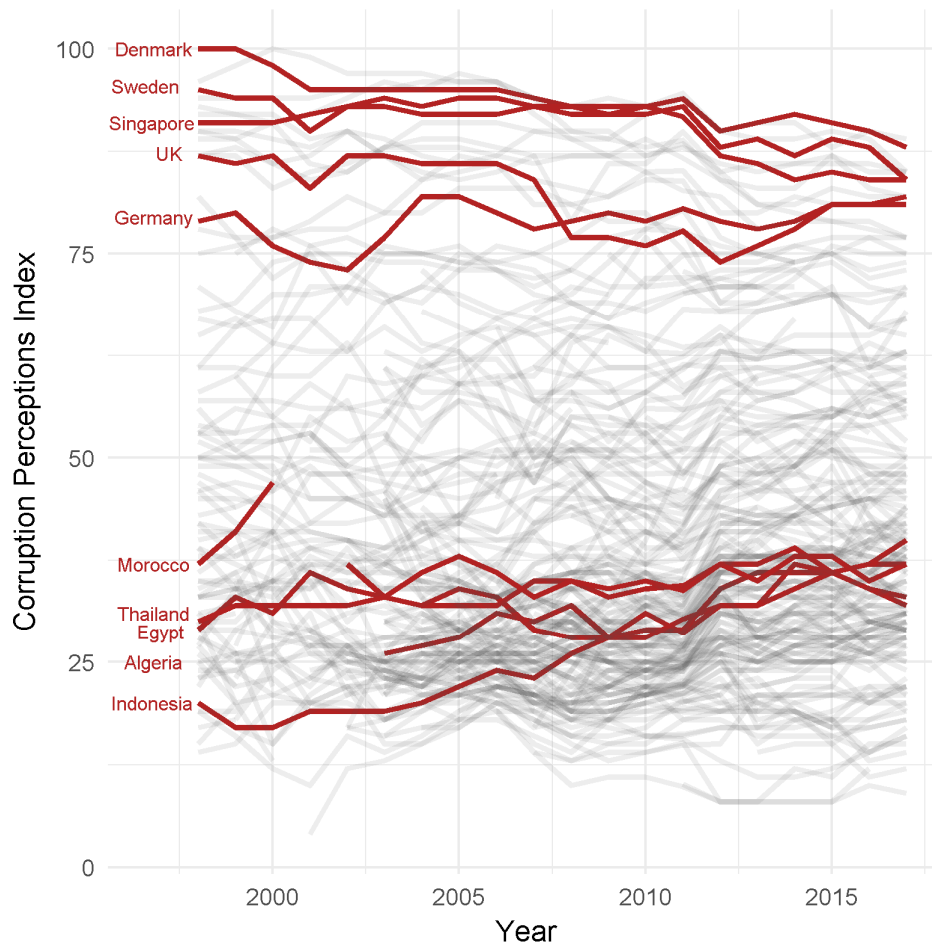ago, and the same is true for the highly corrupt ones.

Figure 3. Data from all countries included in one or more of the yearly Transparency International corruption perception indexes from 1998 to 2017. Data before 2012 has been transformed to match the

later scale. Higher values equal less corruption. Red lines indicate the 10 countries in the study. Grey lines indicate all other countries in the world. Data for Algeria is missing for the first five years. For Morocco data is missing for two years after 2000.

The surveys conducted in each country were identical in terms of layout, number of items, and sequence of items. In each country, subjects answered the surveys in their native language which was professionally translated from an English version of the survey. Accordingly, the survey was translated from English into Danish, Swedish, German, Arabic, Indonesian, and Thai.

All subjects were recruited via YouGov's panels in each country. Invitations were sent by mail, and the survey was completed online. All data collection in all 10 countries was initiated and finalized between April and September 2017. In each country, we restricted the subject pool to full-time male students between 18 and 30 years of age. By relying on students, we study a group with limited experience and socialization from the actual labor market. We exclusively study males as they are consistently found to be much more dishonest than females (Abeler, Nosenzo, and Raymond 2016), and at the same time, the gender gap in the labor market and educational participation varies enormously between the 10 countries in our study. Accordingly, if the sample included both genders, we would end up with very different gender compositions in each country, and any cross-country differences in dishonesty would largely be explained by differences in gender composition.

In the analysis, we rely only on subjects with a preference for a job in the public sector. In the survey, all subjects were asked in which sector they would prefer a full-time job after the completion of their current education. Subjects could then choose between the public sector, the private sector, or private non-profit. Here, only subjects choosing the first category are included which gives us a total of 1,091 subjects ranging from 65 in Denmark to 188 in Morocco. These country-level sample sizes are of

the same magnitude as found in the 23-country study in (Gächter and Schulz 2016). Accordingly, we end up with a large sample of prospective public employees spanning 10 countries.

Design and Measures

As in study 1, we rely on a game-in-mind implementation of the dice game (Jiang 2013). Each subject completed five rounds of a dice game.[14] The five rounds were placed at the very end of the survey. Subjects earned extra points by correctly guessing the die roll in each round. The points can be transferred to cash, lottery tickets, donations, or vouchers, depending on the rules and regulations in each country (see Appendix A4 for country-specific rules). A survey screen from the UK version is provided in Appendix A3. As an extra effort to not prime subjects to be dishonest, we included a screen in which the subjects had to mark a field whereby they pledge to have decided on a number between 1 and 6 *before* they could observe the value of the die. They had to do this before each of the five die rolls. Given the many different countries, cultures, and languages, we wanted to make sure that each subject understood the basic logic of the game.

Subjects received a flat rate for participating in the survey, and by reporting a maximum number of wins (i.e., five), they could exactly double their pay for participating. Accordingly, their monetary incentive for cheating was balanced against the usual pay structure of the country's YouGov panel. This pay level is partly a reflection of income differences between countries. On average, subjects in the five low corrupt countries received 7.4 cents per correct guess, while subjects in high corrupt countries got 11.2 cents. Maximum winners got, including base pay, a total of 1.12 dollar in high corrupt countries and 74 cents in low corrupt countries. These pay levels also reflect the fact that

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[14]There is no substantive difference in cheating across the five rounds.

the survey took an average of only five minutes to complete. However, it is important to note that the size of the monetary incentives is generally found to have a limited impact on cheating levels in the dice game (Abeler, Nosenzo, and Raymond 2016). As in study 1, we transform the simple win rate over the five rounds of the dice game to a linear transformation which can be interpreted as a cheat rate but show selected results also using the raw win rate and total number of wins. Summary statistics are provided in Table 4. Here, we can note a lot of variation across countries regarding behavior in the dice game. In countries like Egypt and Indonesia, subjects on average guess the correct die number in more than four out of five games. On the other hand, in Denmark and Sweden, the same number is just 2.4 wins out of five.

For the country-level measures, we rely primarily on two indicators. First, the corruption perception score (CPS) provided by Transparency International which is one of the most widely used measures of society-wide corruption (Transparency International 2016). It aggregates corruption indicators from 13 sources of various expert assessment of corruption including from the African Development Bank, the World Bank, and the World Economic Forum. These are then standardized on a scale of 0 to 100 with 100 being the least corrupt. We rely on the measure compiled in 2017. Second, we use the control of corruption (CoC) indicator from the World Bank (Kaufmann, Kraay, and Mastruzzi 2011). It captures "perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as 'capture' of the state by elites and private interests." This measure also aggregates information from 30 different sources including both expert surveys, surveys of businesses, and surveys of citizens' perception of corruption. CoC is scaled from -2.5 to 2.5 with a mean of 0 and higher values indicating less corruption. Many of the sources are overlapping with those included in the CPS. Accordingly, we do not view the two measures as distinct

but rather as a robustness check to understand if any correlation with the country-level cheat rate is contingent on the measure of corruption.

As an additional analysis, we also rely on three other indicators from the World Bank (in total they provide six governance indicators). The three are not directly related to corruption but can be expected to be correlated with the honesty of the civil service. The indicators are government effectiveness (GE), regulatory quality (RQ), and rule of law (RoL). As with CoC, these measures aggregate information from a larger number of sources and are scaled in the same way. All World Bank indicators are from 2016. We also include a simple measure of wealth by using the gross domestic product (at purchasing power parity) per capita. It will give us some indication of how strongly the cheat rate is correlated with the average income of a country. Summary statistics are provided in Table 4. Here, we can see how the 10 countries are divided in two groups of five countries each with low and high levels of corruption.

Table 4. Summary Statistics for 10-country study

	Country	N	Age	No. of wins	Win rate	Cheat rate	CPI	CoC	GE	RQ	RoL	GDP
1	ALG	116	21	3.39	0.68	0.61	34	-0.70	-0.50	-1.20	-0.80	15,075
2	DE	111	22	3	0.60	0.52	81	1.80	1.70	1.80	1.60	48,730
3	DK	65	29	2.37	0.47	0.37	90	2.20	1.90	1.60	1.90	49,496
4	EG	89	19	4.21	0.84	0.81	34	-0.60	-0.70	-0.90	-0.40	11,132
5	ID	177	20	4.11	0.82	0.79	37	-0.40	0	-0.10	-0.40	11,612
6	MOR	188	19	3.67	0.73	0.68	37	-0.10	-0.10	-0.20	-0.10	7,838
7	SE	66	20	2.39	0.48	0.37	88	2.20	1.80	1.90	2	49,175
8	SG	74	22	3.51	0.70	0.64	85	2.10	2.20	2.20	1.80	87,856
9	TH	98	23	3.99	0.80	0.76	35	-0.40	0.30	0.20	0	16,917
10	UK	107	25	1.93	0.39	0.26	81	1.90	1.60	1.80	1.60	42,609

Results

The results are shown in Figure 4 and Table 5. Here, we correlate the various country-level indicators of corruption and related measures with the average cheat rate in each country for subjects with a preference for a job in the public sectors. Corruption perception index and control of corruption both show strong and robust correlations with the estimated cheat rate. The cheat rates are substantively lower in the five countries that are the cleanest on these measures. Slightly lower but still strong correlations are also found for rule of law, government effectiveness, and regulatory quality. They are all negatively correlated with the cheat rate. Finally, GDP per capita is negatively correlated with the cheat rate but not significantly on conventional levels. In sum, country-level measures of corruption are strongly correlated with the average cheat rate of prospective public employees in a country. Furthermore, the fact that we find the strongest correlations for those particular country-level measures that conceptually are closest to (dis)honesty, namely corruption perception and control with corruption, speaks to the relevance of the dice game paradigm for linking micro-level honesty and macro-level corruption.[15]

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[15]The results are substantively the same if we weight each country by sample size.
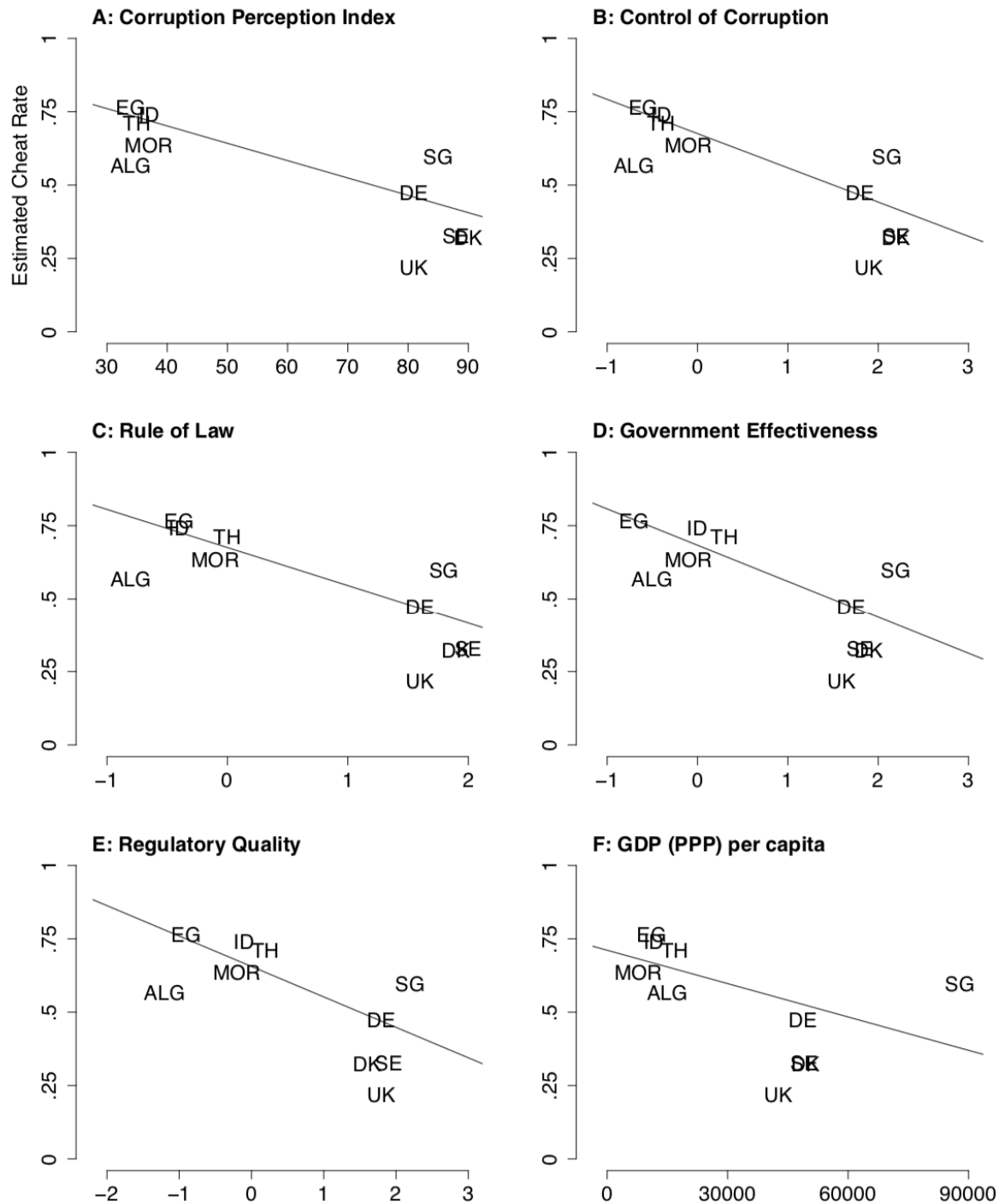
Figure 4. Panel A applies the corruption perception score from Transparency International 2017. Panels B to E rely on World Bank Gov Indicators from 2016. Panel F applies the GDP (PPP) per capita as provided by the World Bank in 2016. All lines are fitted with ordinary least squares. Abbreviations: Morocco (MOR), United Kingdom (UK), Algeria (ALG), Germany (DE), Denmark (DK), Sweden (SE), Egypt (EG), Indonesia (ID), Thailand (TH), and Singapore (SG).

Table 5. Results: Micro-level (dis)honesty and Macro-level Corruption

	Cheat rate					
	(1)	(2)	(3)	(4)	(5)	(6)
Corruption perception	−0.01∗∗					
	(0.002)					
Control of corruption		−0.12∗∗				
		(0.03)				
Rule of law			−0.13∗∗			
			(0.04)			
Government effectiveness				−0.12∗		
				(0.04)		
Regulatory quality					−0.10∗	
					(0.04)	
GDP per capita (10,000s)						−0.04
						(0.02)
Constant	0.94∗∗	0.68∗∗	0.68∗∗	0.68∗∗	0.66∗∗	0.73∗∗
	(0.10)	(0.05)	(0.05)	(0.06)	(0.05)	(0.09)
N	10	10	10	10	10	10
R^2	0.65	0.64	0.59	0.52	0.48	0.30

Notes: OLS coefficients with standard errors. *$p<.05$; **$p<.01$.

It is worth noting that these findings are largely in line with Gächter and Schulz (2016). In their 23-country study, they construct their own Index of the Prevalence of Rule Violations (PRV) which is a multi-dimensional measure of rule-breaking that includes some of the governance indicators for control of corruption which we rely on here.[16] They estimate Spearman rank correlations based on country mean claims in a single dice game. Their main Rho value is 0.66, indicating a strong positive correlation between mean claims and PRV. If we calculate Rho values for our core findings, we obtain very similar values with a Rho of 0.69 (p<0.05) for the transparency international score and a Rho of

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[16]In short, they combine three indicators: (a) the Political Rights indicator by Freedom House as a proxy for the honesty of the political system, (c) estimates for the shadow economy, and (b) the World Banks' governance indicator control of corruption. All measured in 2003.

0.69 (p<0.05) for the control of corruption measure. We can also compare the cheating in Gächter and

Schulz (2016) with cheating in our sample for the five countries that also were part of our sample. The

two studies vary greatly in terms of sample, implementation of the dice game, and the way the data

were collected. However, as Figure 5 indicates, the average cheat rates for the five countries are

strongly correlated across the two studies (Rho=0.87, n=5). We again interpret this as a sign of the

robustness of the dice game paradigm.
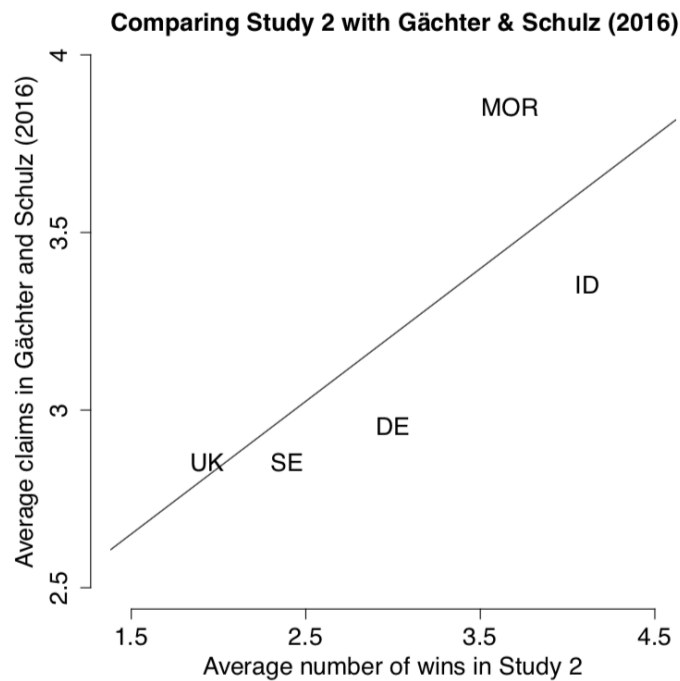
Figure 5. Comparing wins in study 2 with wins in Gächter and Schultz (2016) for the five countries
that were part of both studies: Morocco (MOR), United Kingdom (UK), Germany (GE), Sweden (SE),
Indonesia (ID). The x-axis reports the average number of wins out of five in study 2. The y-axis is the
mean claims in Gächter and Schultz (2016) which indicate the mean number reported for a six-sided
die. Higher values on the die earned the subjects larger payments.

Another validation can be done by comparing how the dice game results compare across studies 1 and

2. We can calculate the average cheat rate for male subjects in study 1 to make the sample comparable

to study 2. This gives us a cheat rate in study 1 among male prospective public employees of 41.6%

which is very close to the 36.9% for the Danish sample in study 2. Importantly, the samples vary greatly in terms of average educational level of subjects and implementation of the dice game.

The 10 countries were purposefully chosen as five high corrupt and five low corrupt—as the panels in Figure 5 also clearly indicate. Another way of capturing the difference in cheat rates in the design game is by comparing average cheat rates between high and low corrupt countries. In Table 6 we do this for three different measures of behavior in the dice game.

Starting in Column (3), we see that prospective public employees in low corruption countries report 1.23 fewer correct guesses than in high corruption countries. In the low corruption countries, the average number of wins over the five games is 2.6, while it is 3.9 in the high corruption countries. In Column (2), we see that this corresponds to a 25 pp lower win rate among prospective public employees in low corruption countries. Finally, in Column (1), we further translate this into the implied difference in propensity to cheat. The cheat rate in low corruption countries is 30 pp lower than in high corruption countries (43 percent vs. 73 percent).[17] With this being said, there is still substantive amounts of cheating in low corrupt countries.

Table 6. Difference in (dis)honesty in low and high corrupt countries:

	Cheat rate (1)	Win rate (2)	No. wins (3)
Low corrupt countries	−0.30**	−0.25**	−1.23**
	(0.08)	(0.06)	(0.32)
Constant	0.73**	0.77**	3.87**
	(0.05)	(0.04)	(0.22)
N	10	10	10
R^2	0.66	0.66	0.66

Notes: OLS coefficients with standard errors. *p<.05; **p<.01.

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[17] The results are substantively the same if we weight each country by sample size.

Finally, we can illustrate the substantial and significant difference in cheating behavior for prospective public employees in low and high corrupt countries by comparing the distribution of correct guess (i.e., wins). In Figure 6, the solid histogram shows the distribution of correct guesses and the blank histogram shows the expected distribution of correct guesses under full honesty. Here, we can observe how different the behavior in the dice game is between prospective public employees in high and low corrupt countries. In low corrupt countries, the distribution is close to uniform, while in the high corrupt countries the proportion of correct guesses cluster in the higher end with four and five wins (out of five).
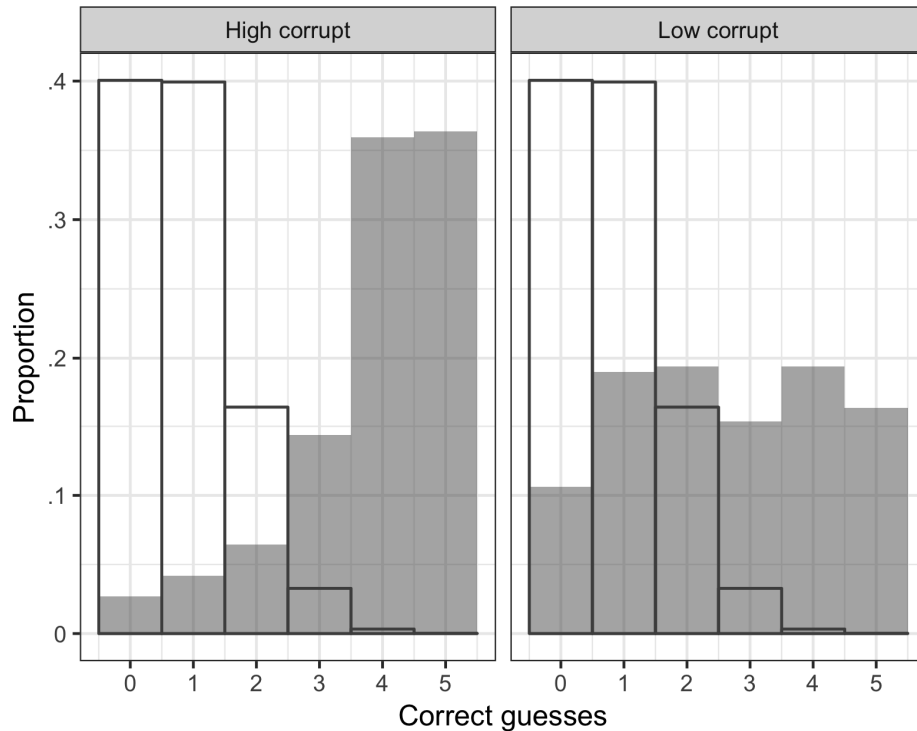

Figure 6. Distribution of correct guesses for varying levels of country-level corruption. In each panel, the solid histogram shows the distribution of correct guesses, and the blank histogram shows the expected distribution of correct guesses under perfect honesty. Low/high corrupt countries are defined by their corruption perception score. Low corrupt countries: Denmark, Germany, United Kingdom, Singapore, and Sweden. High corrupt countries: Algeria, Egypt, Indonesia, Morocco, and Thailand. The same categorization of countries would apply if the World Bank indicator for control of corruption were used.

Discussion and Conclusion

This article aimed to introduce and illustrate the dice game paradigm as a method of measuring and understanding individual and group-level (dis)honesty in a public administration context. We first describe the dice game paradigm and its advantages and then discuss a range of considerations for how to implement it. We highlighted the potential and validity of the dice game paradigm in two studies: prospective public employees in Denmark (n=441) and prospective public employees in 10 different countries with very different levels of corruption (n=1,081). The two studies showed the diversity and possibilities when implementing the dice game paradigm in practice in a public administration setting. At the same time, the two studies provided several important insights about behavioral dishonesty in administrative organizations which we believe is the ultimate benchmark for any new method's innovation:

In study 1, we found that the micro-level dice-game measure of behavioral dishonesty among public employees strongly correlated with PSM and, in particular, the sub-scales that previously have been linked to ethical behavior (Christensen and Wright 2018; Wright, Hassan, and Park 2016). Importantly, this correlation was found in a sample of Danish prospective public employees who have been found to be relatively honest compared to their private-sector counterparts (Barfort et al. 2017). It hints at the ability of the dice game to pick-up individual differences in honesty for even specific parts of the overall societal distribution of (dis)honesty which, to us, makes it suitable for many core questions about individual-level honesty in organizations and sectors within the field of public administration.

In study 2 we found that the micro-level dice-game measure of behavioral dishonesty among public employees strongly correlated with macro-level corruption indicators. This correlation may reflect that the selection of more or less dishonest individuals into the public service can be a driver of

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corruption in itself (Banerjee, Baul, and Rosenblat 2015; Barfort et al. 2017; Hanna and Wang 2017), or it may reflect that behavioral dishonesty is generally more pervasive throughout corrupt, rule-violating societies (Gächter and Schulz 2016). In either case, it reaffirms the crucial relevance of the dice game paradigm within the field of public administration.

Moving forward, we believe that a robust framework for measuring individual- and group-level dishonesty poses several benefits for futures research in the field of public administration:

First, with the dice game paradigm, public administration now has a standardized measure of behavioral dishonesty which has been validated against real-world behavior among public employees (Hanna and Wang 2017) and which, with our results, are found to be very strongly correlated with motivational measures that public administration has relied on for close to three decades. In particular, we propose that public administration research should rely on behavioral dishonesty measures to become a much more active voice in the broader corruption literature spanning economics, psychology, political science, and sociology (Bozeman, Molina, and Kaufmann 2018).

Second, our key results speak to the relevance of PSM for understanding differences in ethical, honesty, and non-corrupt behavior in public organizations (Christensen and Wright 2018; Wright, Hassan, and Park 2016). More broadly, our results respond to calls for a better understanding of how motivations correspond to observed behaviors that are important to public organizations (Bozeman and Su 2015; Houston 2005; Moynihan, Vandenabeele, and Blom-Hansen 2013; Ritz, Brewer, and Neumann 2016). In particular, our results add to the debate about links between PSM and performance (Andersen 2009; Andersen, Heinesen, and Pedersen 2014; Bellé 2013; Christensen et al. 2013) as our measure of dishonesty potentially is relevant for aspects of organizational performance which are difficult to measure, namely ethics and corruption.

Third, comparing the results between low and high corrupt countries also points to the importance of integrating micro and behavioral findings with macro theories (Grimmelikhuijsen et al. 2017; Moynihan 2018). Validated and standardized measures which work across contexts and countries are the foundation for building a body of evidence with high generalizability and important real-world implications. It not only informs us about the validity of these measures, but it also adds to our understanding of the interplay between micro- and macro-level variables in studies of ethics and corruption in the public sector. The strong correlation found in this study between individual dishonesty among public employees and macro-level corruption indicators might hint at the powerful feedback mechanisms that underlie the great stability in corruption levels between countries.

The dice game paradigm opens a wide horizon of interesting topics and questions for future research. We can think of at least three substantive areas of research that could benefit from a standardized measure of dishonesty:

First, we can approach questions about leadership and ethics (Bellé 2013; Wright, Hassan, and Park 2016) in particular, puzzle about how the intrinsic (dis)honesty of leaders has trickle-down effects on public employees or shapes the attraction to an organization. Recent world events raise legitimate concerns about how the behavior of political and bureaucratic leaders may change the ethical landscape of public organizations.

Second, behavioral dishonesty opens up questions about how we can avoid dishonesty in public organizations. For example, we can study how interventions, like changes to including monitoring, norms, or work environment, change dishonest behavior in public organizations (Bellé and Cantarelli 2017a). This would reflect a more general constructive in behavioral public administration that emphasizes how various behavioral interventions can improve public organizations (Moynihan 2018).

Third, the increasing digitization of the public sector raises important questions of how dramatic changes to monitoring and lower levels of interpersonal contact affect dishonesty in public organizations. Recent evidence from the private sector suggests that loss of direct human interaction has very profound negative effects on individual honesty (Cohn, Gesche and Marechal 2018).

The current public pessimism about democracy, the decline of state institutions in developed countries, and the disappointment with reforms of bureaucracies in developing countries are all raising the stakes for public administration to provide answers to fundamental questions about honesty, ethics, and corruption in the public sector around the world. We believe the dice game paradigm provides our field with a powerful tool to tackle some of these developments head-on.

Supplementary material

Supplementary data are available at Journal of Public Administration Research and Theory online.

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Supplementary material for online publication:

Appendix

A1. Translation of the initial survey invitation mail (study 1)

From: Survey research, University of Copenhagen

Subject: You are invited to a scientific survey from the University of Copenhagen

Dear XXX,

We would very much like you to participate in a scientific survey. You will receive money for participating in the survey.

The survey deals with opinions about the world and how you guess in situations characterized by randomness. It will take 20 minutes to complete.

It is very important to us that many participate, and we will be grateful if you take the time to participate. For the same reason, the remuneration will be high: The average participant will earn at least 50 DKK, but the maximum reward will be more than 300 DKK.

Press this link to participate in the survey: XXX

You will have to provide a user name and password to participate:
Your user name is: XXX
Your password is: XXX

If you have any questions or comment for the survey, you are welcome to respond to this email address: (XXX).

Thank for your participation.

Kind regards,
Department of Economics
University of Copenhagen
Oster Farimagsgade 5
Building 26
1353

A2. Dice Game Design in Study 1

UNDERSØGELSE BLANDT STUDERENDE VED KØBENHAVNS UNIVERSITET

Du har nu svaret på den første serie af spørgsmål.

Formålet er nu at undersøge hvordan du gætter i situationer præget af tilfældighed. Du skal derfor spille 10 runder af et terningespil, hvor du i hver runde kan vinde pengebeløb.

Du skal gætte, hvad terningen slår. Jo mere rigtigt du gætter, desto større beløb vinder du.

Hver runde af terningespillet foregår således:

1. Først skal du gætte et antal øjne fra 1 til 6. Når du har lagt dig fast på et gæt, trykker du på fortsæt-knappen

2. Der vil herefter blive slået med en terning, og du vil blive bedt om at indtaste det antal øjne, du gættede på tidligere

3. Den næste skærm viser resultatet af runden. Hvis dit tal matcher terningens øjne, vinder du **3 kr.**, ellers vinder du **1 kr.**

Under terningsspillene skal du lade være at bruge din browsers "back"/"tilbage" knap da dette kan komme til at slette noget af din gevinst.

Bemærk: det er vigtigt, at du er grundig med at huske og angive netop det tal, du tænkte på før du slog med terningen.

Rules of the game screen: See translation in the methods section of study 1.

UNDERSØGELSE BLANDT STUDERENDE VED KØBENHAVNS UNIVERSITET

Gæt på et tal mellem 1 og 6. Tryk derefter på knappen forneden for at slå med den digitale terning.

Slå!

Intro screen (translation): Guess a number between 1 and 6. Hereafter, press the bottom below to throw the digital die.

UNDERSØGELSE BLANDT STUDERENDE VED KØBENHAVNS UNIVERSITET

Gæt på et tal mellem 1 og 6. Tryk derefter på knappen forneden for at slå med den digitale terning.

Terningeslaget blev en 6'er.

Hvilket tal gættede du på? Indtast i feltet:

Submit

Guess report screen (following a three-second animation of the spinning die, translation): The die throw was six. Which number did you guess? Please report in the field:

UNDERSØGELSE BLANDT STUDERENDE VED KØBENHAVNS UNIVERSITET

Dit gæt matchede ikke terningeslaget. Du vinder 1 kr.

Din samlede gevinst for undersøgelsen hidtil er nu 16 kr.

Fortsæt

Payoff screen (in case of wrong guess, translation): Your guess did not match the die. You win 1 DKK. Your combined winnings in the survey amounts to 16 DKK.

A3. Dice Game Design in Study 2

YouGov

We would like to know how you guess in situations characterized by randomness.

We will therefore ask you to complete five rounds of a dice task in which you can earn YouGov points in each round. The points you earn will be added to your regular compensation after completing this survey.

The purpose of the dice task is to guess what the die will show. Each round of the task proceeds like this:

1. You will have to guess what number from 1 to 6 the die will show.
2. Hereafter a die will roll and you will be asked to report your guess.
3. The next screen will show the result of the round. If your guess matched the number of dots on the die you will receive 10 YouGov-points. If your guess did not match the number of dots you will receive no YouGov-points.

It is important that you are careful about remembering and reporting the exact number on which you guessed prior to rolling the die.

> [**>**]

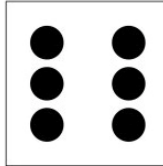The introduction screen that subjects saw once before the five rounds of the dice game.

YouGov

Please think of a number between 1 and 6 corresponding to the number that you think the die will show.

◯ Yes, I have decided on a number now.

> [**>**]

Subjects could not proceed in the survey before they had signed the "pledge" to have decided on a number.

Screen with the outcome of an individual die roll. Subjects have to report their prior guess before they can proceed.

Screen in case the guess matched the die.

Screen in case their guess did not match the die.

A4. Incentives in Each Country

The points can be used as follows in each market:

- Denmark and Sweden: Points can be used to buy items in the point shop or convert points to lottery tickets in the monthly lottery where prizes are iPhones/iPads

- Germany: Points can be redeemed and transferred to cash (50 EUR), Amazon Voucher (50 EUR), USB-stick, or a donation to a cause.

- UK: Panelist may redeem points for either a 50 GBP payment upon reaching 5.000 points, or enter into the monthly prize drawing for a chance of winning cash prizes

- Morocco, Egypt, and Algeria: There is only one way to redeem the points being collected by panelists, in cash, once a panelist reaches 5.000 points, which is the minimum number of points, they can cash-out. They are issued a payment with an amount that is sent to the panelist via Western Union.

- Indonesia and Singapore: Points are rewarded and can be redeemed and transferred to PayPal cash, AirAsia BIG points, Gift Cards, or UNICEF (donation).

- Thailand: Points are rewarded and can be redeemed and transferred to PayPal cash, AirAsia BIG points or UNICEF (donation).