**Social and Economic Factors in
Decision Making under Uncertainty**

Five Essays in Behavioral Economics

Kinga Posadzy

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To my parents

*“The purely economic man is indeed close
to being a social moron.”*

- Amartya Sen

Abstract

The objective of this thesis is to improve the understanding of human behavior that goes beyond monetary rewards. In particular, it investigates social influences in individual's decision making in situations that involve coordination, competition, and deciding for others. Further, it compares how monetary and social outcomes are perceived. The common theme of all studies is uncertainty. The first four essays study individual decisions that have uncertain consequences, be it due to the actions of others or chance. The last essay, in turn, uses the advances in research on decision making under uncertainty to predict behavior in riskless choices.

The first essay, *Fairness Versus Efficiency: How Procedural Fairness Concerns Affect Coordination*, investigates whether preferences for fair rules undermine the efficiency of coordination mechanisms that put some individuals at a disadvantage. The results from a laboratory experiment show that the existence of coordination mechanisms, such as action recommendations, increases efficiency, even if one party is strongly disadvantaged by the mechanism. Further, it is demonstrated that while individuals' behavior does not depend on the fairness of the coordination mechanism, their beliefs about people's behavior do.

The second essay, *Dishonesty and Competition. Evidence from a stiff competition environment*, explores whether and how the possibility to behave dishonestly affects the willingness to compete and who the winner is in a competition between similarly skilled individuals. We do not find differences in competition entry between competitions in which dishonesty is possible and in which it is not. However, we find that due to the heterogeneity in propensity to behave dishonestly, around 20% of winners are not the best-performing individuals. This implies that the efficient allocation of resources cannot be ensured in a stiff competition in which behavior is unmonitored.

The third essay, *Tracing Risky Decision Making for Oneself and Others: The Role of Intuition and Deliberation*, explores how individuals make choices under risk for themselves and on behalf of other people. The findings demonstrate that while there are no differences in preferences for taking risks when deciding for oneself and for others, individuals have greater decision error when choosing for other individuals. The differences in the decision error can be partly attributed to the differences in information processing; individuals employ more deliberative cognitive processing when deciding for themselves than when deciding for others.

Conducting more information processing when deciding for others is related to the reduction in decision error.

The fourth essay, *The Effect of Decision Fatigue on Surgeons' Clinical Decision Making*, investigates how mental depletion, caused by a long session of decision making, affects surgeon's decision to operate. Exploiting a natural experiment, we find that surgeons are less likely to schedule an operation for patients who have appointment late during the work shift than for patients who have appointment at the beginning of the work shift. Understanding how the quality of medical decisions depends on when the patient is seen is important for achieving both efficiency and fairness in health care, where long shifts are popular.

The fifth essay, *Preferences for Outcome Editing in Monetary and Social Contexts*, compares whether individuals use the same rules for mental representation of monetary outcomes (e.g., purchases, expenses) as for social outcomes (e.g., having nice time with friends). Outcome editing is an operation in mental accounting that determines whether individuals prefer to first combine multiple outcomes before their evaluation (integration) or evaluate each outcome separately (segregation). I find that the majority of individuals express different preferences for outcome editing in the monetary context than in the social context. Further, while the results on the editing of monetary outcomes are consistent with theoretical predictions, no existing model can explain the editing of social outcomes.

Acknowledgements

This journey has been long and demanding. Now, at the end of it, I look back at all the moments and experiences and I smile. It would be a blatant lie to say that this journey was pleasant and stress-free at all times. Instead, it had its ups and downs. However, only the positive memories remain in my head. Naturally, this is thanks to all the wonderful people that I was so lucky to meet and have on my side during the last five years. Here, I would like to thank some of them for their support, encouragement, motivation, and inspiration.

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¹ Translation from Swedish: kioskvältare

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These acknowledgements cannot be complete without thanking my family. I want to thank my parents and my grandmother, for all their love and encouragement. It is thanks to you that I am so motivated to always strive for more, strive to be the best version of myself, no matter what. I would also like to thank my dearest sister who continuously inspires me to reach my goals.

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List of Essays

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<https://doi.org/10.1007/s10683-017-9540-5>)

Essay II: Kinga Posadzy, Camilla Josephson, Peter Martinsson. *Dishonesty and Competition. Evidence from a stiff competition environment*

Essay III: Jan Hausfeld, Kinga Posadzy. *Tracing Risky Decision Making for Oneself and Others: The Role of Intuition and Deliberation*

Essay IV: Emil Persson, Kinga Posadzy, Andreas Meunier, Per Aspenberg, Gustav Tinghög. *The Effect of Decision Fatigue on Surgeons' Clinical Decision Making*

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Introduction

It is hard to disagree with Aristotle's statement that humans are social animals. People do not live their lives in isolation; instead, most of our time is spent in the company of other people, be it friends, family, or strangers. Thus, the decisions we make are frequently influenced by social factors.¹ Even purchases are not done merely to satisfy one's physiological needs but also to satisfy other desires, such as acquiring status (Veblen 1899). Yet, most of the standard economic models portray individuals as isolated decision-makers removed from the decision environment. While contextless models of behavior have a clear advantage of parsimony and tractability, too little context might reduce the external validity of the model, i.e., the generalizability of the results to real-life situations (Loewenstein 1999). The goal of behavioral studies should be to design a context and incentive structure that are similar to the ones in which humans actually operate. This thesis contributes to the better understanding of human behavior in the field of behavioral economics that goes beyond extrinsic motivations. In particular, it investigates the influence of different social aspects of life on individuals' perception of outcomes, as well as decisions in situations that involve coordination, competition, and deciding for others.

The most discussed person in economics, *homo economicus*, is a selfish (in the narrow sense), rational agent that utilizes her unlimited cognitive resources to make decisions that maximize her utility function with stable and well-defined preferences. However, as previously shown by both economic and psychological literature, individuals sometimes make choices that are suboptimal from the economic perspective and their rationality is bounded due to, amongst other things, limitations to their cognitive capacities (e.g., Simon 1959; Becker 1962; Thaler 1980). For instance, people frequently act on emotions (e.g., Elster 1998; Loewenstein 2000; Loewenstein and Lerner 2003; Rick and Loewenstein 2008), care about others' welfare and fairness (e.g., Fehr and Schmidt 1999; Bolton and Ockenfels 2000; Charness and Rabin 2002), are influenced by the context of the decision (e.g., Tversky and Kahneman 1981; Ross and Ward 1996), use heuristics, and make biased judgments (e.g., Tversky and Kahneman 1974; Kahneman et al. 1991; Conlisk 1996; Charness and Levin 2005; Gigerenzer and Brighton 2009). The essays included in this thesis explore some of these phenomena.

¹ Social factors refer here to a broad category of aspects related to how other individuals influence one's beliefs, preferences, and decision making. The social influence can be exerted via multiple channels, e.g. by the presence of others, interaction with others, etc.

Economic decisions, typically involve a social component, in the sense that they involve or have consequences on other people. It is thus surprising that most of the research in economics focuses on monetary incentives and to a large extent neglects the impact of social factors on individuals' behavior. Given the importance of social influences in the decision-making process, a better understanding of these effects is needed. Behavioral economics has already made big attempts to incorporate social factors in the economic models, for instance, by accounting for inequity aversion, reciprocity, fairness, or social reputation (e.g., Fehr and Schmidt 1999; Bolton and Ockenfels 2000; Rabin 1993; Becker 1974; Bénabou and Tirole 2006). However, social factors can influence behavior in manifold ways and the true underlying mechanism of social influences is still relatively underexplored in economics, although there has been a fast development of the field of behavioral economics over the last two decades.² For example, interactions with others are usually modeled merely as a means to reach one's goal (e.g., building reputation in a coordination game) and it is not clear what value a social interaction has in itself. While economic factors, such as profit maximization, might have an impact on individuals' behavior, multiple studies have showed that individuals frequently do not respond proportionately to the stake of monetary incentives, indicating that there are other factors that motivate their behavior (e.g., Camerer and Hogarth, 1999). Indeed, sometimes social motives outweigh economic motives. At the same time, psychologists have been very interested in the impact of social factors, such as the presence of others (audience effects), on individuals' behavior (e.g., Asch 1951; Zajonc 1965), while largely neglecting economic factors, such as monetary incentives. In contrast to these two approaches, I argue that both economic (monetary) and social factors drive people's behavior. Isolating either economic or social context when investigating decision making reduces the external validity of the study. Hence, to improve the understanding of human behavior, it is important to study settings in which economic and social factors coexist. In essence, behavioral economics bridges findings from other disciplines of social science into the traditional economic model framework resulting in formalized and testable models of human behavior. This thesis aims to incorporate advances in behavioral economics to paint a more accurate picture of individuals' behavior. In other words, I investigate how economic and social factors affect choices in specific decision situations modeled after real-life situations.

² The importance of behavioral economics has been further acknowledged by awarding the Nobel Prize in Economic Sciences to the pioneers of behavioral economic research in 2002 (Daniel Kahneman and Vernon L. Smith) and 2017 (Richard H. Thaler).

The common theme of the essays included in this thesis is research on decisions that relate to uncertainty. The next section shortly introduces the perspective on decision making under uncertainty.

Decision making under uncertainty

Although it sounds cliché, it is true that uncertainty is pervasive in everyday decisions. From finding the ripest avocados when grocery shopping, through choosing your partner, to trading millions on the stock market – most of the decisions individuals make contain an element of uncertainty. It is thus of no surprise that there exists a vast literature on decision making under uncertainty. The economic models of decision making under uncertainty include both normative theories (e.g., expected utility theory proposed by Bernoulli 1954) and descriptive theories (e.g., prospect theory developed by Kahneman and Tversky 1979). The multiplicity of studies within this area also resulted in a great assortment of risk preference elicitation tasks (see for example Charness et al. 2013 and Crosetto and Filippin 2016 for detailed reviews). There are also studies that use self-reported values to measure risk preferences and attitudes towards risks (see for example Weber et al. 2002; Dohmen et al. 2011). While a great variety of the elicitation methods can be of advantage to researchers, as it allows them to choose the method that fits best with their experimental study, the results obtained using these methods vary across different choice tasks (Crosetto and Filippin 2016) and to some degree across outcome domains (e.g. Weber et al. 2002; Blais and Weber 2006; Dohmen et al. 2011).³ This implies that risk preferences may not entirely be a stable individual trait, as previously believed, but partly depend on the context of the decision. Given the inconsistencies in risky choices, further exploration of decision making under uncertainty in various decision environments is desirable.

In this thesis, I investigate a diverse range of situations in which individuals face one of two types of uncertainty, strategic uncertainty or risk. In essays I and II, individuals face strategic uncertainty. Strategic uncertainty is present when interacting with others and concerns the actions and beliefs of other individuals. In essay I individual's payoffs depend on her choice as well as the choice of another person. When communication between subjects is not allowed, coordination might be difficult to achieve, especially if the interests of subjects are not perfectly aligned. In essay II individuals participate in a winner-take-all competition and

³ These authors found that while varying across outcome domains, risk preferences are also correlated to some extent across domains.

have possibility to over-report their performance. In this case, subjects face uncertainty about the performance of their competitors as well as their decision to be dishonest. Essays III and IV involve decisions under risk. Risk is the uncertainty with known probability distribution that arises due to chance (i.e., luck).⁴ In contrast to strategic uncertainty, risk is present when making individual decisions. These decisions concern the choice between risky lotteries in essay III and the choice of a medical treatment for a patient (operative vs. non-operative) in essay IV. Lastly, essay V studies riskless choices, however, it uses advances in prospect theory, which describes individual's behavior under risk, in order to make the predictions about how individuals mentally account different outcomes.⁵

Methodology

The data used in this thesis was collected using a wide variety of experimental methods. Behavioral experiments are one of the main sources of data in the social sciences. Experiments can be classified into three broad categories of laboratory experiments, field experiments, and online surveys. Experiments allow researchers to draw causal inferences in a controlled environment (Falk and Heckman 2009). By varying one aspect at a time, it is possible to study its effect on the outcome variable. One of the most frequent arguments against experiments is the self-selection of subjects. Individuals who volunteer to participate in experiments might behave differently than other people who are not willing to participate. Exadaktylos et al. (2013) find evidence for self-selection bias, however, they notice that this effect is economically small since the behavior of students who self-select into the experiments is fairly similar to the behavior of other people. implying that their findings do not disqualify the use of self-selected students in experiments.

The analysis in studies in chapters I-III is based on the laboratory experiments, using both pen and paper and computerized tasks. Laboratory experiments allow for tight control of decision environment. In laboratory settings, researchers can rule out confounding effects (e.g., multiple incentives, building reputation) that can be present when decision makers operate in their natural environment, and thus isolate the causal effect of interest. Further, in comparison to field experiments, lab experiments can be used to test theoretical predictions, establish empirical regularities as a basis for new theories, as well as study institutions, at relatively

⁴ Risk is frequently juxtaposed with ambiguity, the uncertainty with unknown probability distribution that arises due to chance.

⁵ Prospect theory can also explain anomalous behavior when individuals face certain outcomes, for example, endowment effect (Thaler 1980).

low cost. In the study *Fairness Versus Efficiency: How Procedural Fairness Concerns Affect Coordination*, we use a laboratory experiment to tightly test the game-theoretical predictions of correlated equilibrium in a setting, in which individuals might be motivated by both, self-interest and fairness. The choice of experimental design with treatments with fair and unfair coordinating devices allows to disentangle the effect of each of these motivations. Study *Dishonesty and Competition. Evidence from a stiff competition environment* creates in a laboratory setting two distinct competitive environments: one in which dishonest behavior is not allowed, and one in which dishonesty is possible and behavior is unmonitored. This design makes it possible to test whether the decision to enter competition is affected by the possibility to behave dishonestly and whether competitive incentive schemes ensure efficient allocation of resources in both cases. Lastly, the paper *Tracing Risky Decision Making for Oneself and Others: The Role of Intuition and Deliberation* compares individual's risk preferences when deciding for oneself with risk preferences when deciding on behalf of another person. Laboratory setting allows to disentangle the effect of intrinsic motives from image concerns on decisions made for others that might be present in the natural decision environment.

The study *Decision Fatigue in Medical Decision Making* in chapter IV takes advantage of a natural experiment thanks to the random assignment of patients to doctor's appointment with respect to patient's characteristics. Natural experiments can be seen as a special case of field experiments. However, in contrast to field experiments, in natural experiments the randomization of subjects into treatment and control conditions happens without the intervention of the experimenter. A big advantage of natural experiments over laboratory experiments is that the observed decisions are made in a standard decision environment and that individuals face the real consequences of their decisions (Harrison and List 2004). For instance, in essay IV these consequences concern the health status and well-being of patients. A disadvantage of natural experiments is the lack of control by the experimenter, which means that the analysis might be affected by potential confounding factors. Hence, it is important to control for potential confounders when analyzing the data from a natural experiment.

The last chapter in this collection of essays is based on a large-scale online survey conducted with a sample of over 2000 individuals in Sweden who are representative with respect to gender, age, and region of residence. The main advantage of online surveys is their relatively low cost per observation. Thus, the datasets based on web-based surveys are frequently large

and allow researchers for high-powered statistical analysis. Considering the recent replication crisis in social sciences (e.g., Camerer et al. 2016; Open Science Collaboration 2015), it is especially important to reduce the risk of both Type I and Type II errors in statistical analysis. Furthermore, online surveys allow subjects to take the survey when it is convenient for them in the privacy of their own homes. The use of online surveys (e.g., mTurk, see Paolacci et al. 2010) is popular in psychology, while it is frequently criticized in economics for the lack of incentives when answering questions (Duersch et al. 2009). However, previous studies show that individuals are not merely motivated by monetary incentives (Bénabou and Tirole 2006) and economic game experiments conducted online are comparable to those run in the laboratory (Amir et al. 2012).

The above described experimental methods are a valuable data source in economic studies and provide information about individuals' behavior, i.e., they are outcome-based. However, behind every decision, there is a process. Studying the mechanisms behind the decision making enables researchers to better understand individuals' behavior. In essay III, *Tracing Risky Decision Making for Oneself and Others: The Role of Intuition and Deliberation*, I and my collaborator complement choice data with information processing obtained using eye-tracking methodology in order to improve our understanding of the underlying cognitive processes that shape decisions.

Process tracing methods have gained more popularity in recent years, as researchers have noted that the investigation of choice data does not give a full picture of what drives individuals' behavior. Eye-tracking allows researchers to track information search patterns by measuring eye-movements in a non-intrusive way. Moreover, eye-movements can be used as a proxy for cognitive processes (e.g., Just and Carpenter 1984). It enables researchers to look not only at the decisions themselves, but also how individuals arrive to these decisions, and thus gain more insights into how and why specific choices are made. The decrease of costs of the eye-tracking tools greatly increased the frequency of its use in judgement and decision making literature (Ashby et al. 2016). Eye-tracking research has significantly contributed to the better understanding of behavioral patterns related to the endowment effect (e.g., Ashby et al. 2012), preferences for taking risks (e.g., Fiedler and Glöckner 2012), social preferences (e.g., Jiang et al. 2015), and the use of decision strategies (e.g., Glöckner and Herbold 2011), to name a few. Eye-tracking, as every other data collection method, has its caveats. While it offers a great richness of information available, it also gives researchers many degrees of

freedom, for instance, as to how eye-movements are defined and classified. However, as eye-tracking gains attention, researchers work on providing unified guidelines on how to collect and analyze eye-tracking data. In essay III, I and my co-author follow closely the most recent suggestions in this matter.

To conclude, this thesis takes advantage of a rich economist toolbox in order to investigate decision making under uncertainty. Controlled variation in the lab environment allows for causal inferences, while the large-scale data set with a representative sample of the general population in Sweden and the hospital registry data give a better picture of how decisions are made in subjects' natural environment, increasing the external validity of the results. All the methods used in this thesis can be seen as complements (Falk and Heckman 2009). None of the methods is superior to the others and all of them combined with an adequate econometric analysis can improve the understanding of how social and economic factors may affect decision making under uncertainty.

Summary of the thesis

Essay I, *Fairness Versus Efficiency: How Procedural Fairness Concerns Affect Coordination*, co-authored with Verena Kurz and Andreas Orland, studies whether procedural fairness affects efficiency in situations requiring coordination, such as the provision of threshold public goods. We define procedural fairness as sensitivity towards the differences in expected payoffs. Our study answers the following questions: Does inequality in expected payoffs affect the probability of successful coordination? Do differences in expected payoffs reduce efficiency gains of coordination mechanisms? Finally, does the behavior of disadvantaged individuals differ from the behavior of advantaged individuals?

In a laboratory experiment, subjects play a two-player Volunteer's Dilemma in which subjects can choose to volunteer or not. This game has two pure strategy Nash equilibria, in which one person volunteers and the other does not. While volunteering ensures a positive payoff, it also imposes a cost on the volunteer. Subjects maximize their payoffs if the other person volunteers and they abstain from it. This gives possibilities of miscoordination. Further, we introduce external action recommendations that aim to facilitate coordination and improve the efficiency in two out of three treatments. Subjects can follow the recommendations, but are not obliged to do so. We additionally manipulate the fairness of this coordination mechanism by varying the probability of receiving a recommendation to volunteer. By doing so we vary

the differences in expected payoffs between subjects, provided that they both follow the recommendations. Even though some individuals are put at a disadvantage by following recommendations, it is still payoff maximizing to follow them.

We find no significant differences in following the recommendations between treatments with fair and unfair recommendation procedures. We demonstrate that the existence of coordination mechanisms, such as action recommendations, increases efficiency, even if one party is strongly disadvantaged by the mechanism. However, we find that disadvantageous recommendations are followed more frequently than advantageous ones, potentially because they ensure a safe payoff. Moreover, we find that even though there are no differences in following recommendations, beliefs about other people's actions are more pessimistic in the treatment with recommendations inducing unequal expected payoffs compared to recommendations inducing equal expected payoffs.

In essay II, *Dishonesty and Competition. Evidence from a stiff competition environment*, co-authored with Camilla Josephson and Peter Martinsson, we set out to investigate whether and how the possibility to misreport one's performance affects the willingness to compete and who the winner is in a stiff competition environment. Competitive incentive schemes are popular, because they are believed to ensure the efficient allocation of resources. For instance, they award the job to the best applicant, the bonus to the best employee, or the golden medal to the best athlete. However, it is unsure whether their purpose is fulfilled if contestants can resort to unfair actions, such as over-reporting their performance or doping. The issue is especially important in a stiff competition between similarly skilled individuals, where marginal performance change can have a great impact on the probability of winning. In such situations, dishonest behavior can be strongly motivated by monetary gains in case one wins; however, it affects other contestants negatively. Furthermore, individuals who are averse to lying, but do not believe in others' honesty, can shy away from potentially unfair competition, thus giving up the opportunity to win.

In a pen-and-paper experiment, we ask subjects to perform a maze-solving task three times under different incentive schemes. First, they are paid according to a piece rate scheme, then they are paid according to winner-take-all competition, and lastly, they can choose either of these incentive schemes before performing the task once more. Each subject participates in one of two conditions: subjects in the control condition are paid based on their actual

performance, while subjects in the dishonesty condition are not monitored and are paid based on their self-reported performance.

In our study, almost 18% of subjects over-reported their performance. We find no evidence that willingness to compete differs between conditions or between honest and dishonest individuals. However, on average, every fifth reportedly “best-performing” subject in the dishonesty condition did not actually have the highest score. We attribute this inefficiency to the fact that the propensity to behave dishonestly varies between subjects. Our findings show that in order to ensure that it is indeed the best-performing individual who wins, it is essential to monitor winners and runners-up in competitions.

Essay III, *Tracing Risky Decision Making for Oneself and Others: The Role of Intuition and Deliberation*, co-authored with Jan Hausfeld, explores how individuals make decisions for themselves and others in a risky environment. In an eye-tracking laboratory experiment, we test whether the use of intuitive or deliberative processing (i.e., dual-process theory) can help explain choices and cognitive processes involved in deciding for oneself and on behalf of another person. Two theories make contrasting predictions concerning choices for others. Dual-process theory posits that decisions are a result of an interplay of intuitive processes (judgement based on intuition and feelings) and deliberative processes (judgment based on calculation). Multiple studies on judgement and decision making show that individuals are influenced by emotions when deciding. This is especially true when they are directly affected by the consequences of their decisions. According to the affect heuristic, emotions experienced during the decision-making process can inhibit deliberative processing and lead to decisions based on intuitive processes. In line with this strand of literature, it is expected that emotions will overshadow meticulous calculations and lead to more intuitive processing (less deliberation) when deciding for oneself compared to when deciding for others. In contrast, decisions made by economic agents are assumed to be calculated and utility maximizing. However, behavioral economists recognize that deliberation is costly. Thus, individuals are expected to optimize the level of cognitive effort spend on the task with respect to the utility they can derive from it. Arguably, the potential utility gains are higher when an individual decides for oneself than for another person, as the consequences of her choices will directly affect her monetary payoff. This will result in more cognitive processing (i.e., more extensive deliberation) when deciding for oneself than when deciding on behalf of

others. The differences in cognitive processing can result in different risk preferences when choosing for oneself or on behalf of others.

In a between-subjects design, we experimentally induce an intuitive and a deliberative type of decision processing. Each subject makes choices between risky lotteries that affect her own payoff as well as choices that affect the payoff of another anonymous individual. Using structural estimations, we investigate individuals' risk preferences and decision error. We complement behavioral data with information-processing measures recorded by eye-trackers.

We find no evidence of different risk preferences when deciding for oneself and on behalf of others, however, individuals have greater decision error (i.e., make less consistent choices) when deciding for others. Analysis of the process data reveals that individuals spend less time, have less fixations, and acquire less information when deciding for others compared to when deciding for themselves. Similar patterns are detected when comparing intuitive and deliberative decision making. We argue that deciding for others is less effortful and involves less extensive deliberation than deciding for oneself. Lastly, we find that spending more cognitive effort when deciding for others is related to lower decision error. Our results indicate that individuals deciding for others should be encouraged to deliberate on their choices in order to reduce the decision error.

In essay IV, *The Effect of Decision Fatigue on Surgeons' Clinical Decision Making*, co-authored with Emil Persson, Andreas Meunier, Per Aspenberg, and Gustav Tinghög, we investigate how mental depletion caused by long sessions of repeated decision making affects the quality of medical decisions. Long work shifts with few or even no breaks are common in medicine, and hence it is important to understand how decision fatigue influences both efficiency and fairness in health care. The objective of our study is to investigate whether decision fatigue affects orthopedic surgeons in their clinical practice. We test whether orthopedic surgeons' decisions to operate depend on the sequence of patient appointments throughout the day.

To this end, we exploit natural experiment, in which patient allocation to appointment time slots is plausibly randomized at the patient level. We find that patients who meet doctors close to the end of their work shifts (i.e., just before lunch or in the late afternoon), are 33 percentage points less likely to be scheduled for a surgery than those who are seen first (i.e., in the morning or just after lunch). Using regression analysis, we find that the probability of

operation decreases by about 2.1 percentage points for each additional patient during the work shift. The decreasing pattern in the probability of suggesting a surgery is consistent with the notion of decision fatigue. While the objective assessment of the quality of decisions taken by orthopedic surgeons is difficult and should be made on a case-by-case basis, our results suggest that the choice of medical treatment is affected by incidental factors. From a societal point of view, this is an arguably unfair use of medical resources.

Essay V, *Preferences for Outcome Editing in Monetary and Social Contexts*, acknowledges that people behave differently when making choices that involve monetary outcomes than when they make choices that involve social outcomes. For example, some individuals are willing to take more risks in the social context than in the financial context. Given the importance of social outcomes (e.g., good friendships) for individuals' well-being, surprisingly little research has been done to better understand how social outcomes are experienced in comparison to financial outcomes. When making choices, individuals first create their mental representations of the decision problem, i.e. conduct mental accounting. These mental representations are then subject to evaluation which constitutes the basis for decision making. Thus, understanding how individuals conduct mental accounting is an essential step in understanding their choices. Outcome editing, one of the operations in mental accounting, describes whether people prefer to integrate multiple outcomes and evaluate them jointly or segregate them and evaluate them separately. In this study, I investigate whether individuals edit monetary outcomes in the same way as they edit social outcomes.

Using a representative web-based survey with more than 2000 adults (aged 20-75) in Sweden, I compare outcome editing patterns within and between outcome contexts. In addition, I test how well the two most popular theories, the hedonic editing model and the renewable resources model, explain whether individuals integrate or segregate multiple outcomes in monetary and social contexts. The hedonic editing model is based on the value function from prospect theory and posits that individuals segregate and integrate multiple gains and losses in order to maximize subjective value derived from them. The renewable resources model additionally accounts for limited but renewable cognitive resources that help people deal with impactful events.

Results show that the majority of individuals have different preferences for editing of monetary outcomes and social outcomes. In fact, only 25% of subjects express the same editing preferences across these two contexts. Further, individuals' preferences for the editing

of monetary outcomes can be described well with the renewable resources model. This means that individuals prefer to experience two gains or two losses with some time in-between to be able to cope with them. Moreover, they prefer to integrate positive with negative outcomes to cancel or decrease the pain of the loss. Preferences for the editing of social outcomes cannot be explained by either of the models. Our results imply that mental accounting of social outcomes differs from mental accounting of monetary outcomes.

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