

Research Statement

My research aims to expand our understanding of how psychological factors impact belief formation and decision-making. It focuses on foundational questions such as how aspects of dynamic environments and mental representations impact judgment and decision-making that are not generally included in standard models. For example, I study how recent losses and gains affect planned and actual risk-taking, and how the perceived similarity between outcomes impacts whether they are evaluated jointly within the same mental account or separately in different accounts. My work also studies more applied questions, such as the implications of these psychological phenomena for financial decisions, discrimination, and incentive design. I employ both theoretical and empirical tools to study these topics, including formal modeling, laboratory experiments, field studies, and the analysis of observational data. A key goal of my research is to improve our understanding of decision-making and utilize this knowledge to evaluate different market mechanisms and structure more effective policy. For example, better insight into a decision-maker's mental process of grouping prior outcomes with risky prospects allows managers to design contracts that more closely align their risk preferences with those of their employees; studying how discrimination evolves over time provides crucial insight into whether we expect such discrimination to be short-term or span a worker's career, and yields predictions about how interventions will impact discrimination later in the pipeline; documenting the extent to which people's observed choices agree with their initial strategies is important for identifying the origin of behavioral biases and understanding their welfare consequences in domains such as financial markets.

1 Dynamics of Judgment and Decision-Making.

Understanding the dynamics of how people respond to prior outcomes is a critical question for both economics and psychology. If the value of a stock falls below the purchase price, does this affect the investor's subsequent behavior, and if so, does it increase or decrease risk-taking? If prior outcomes do affect behavior, are decisions consistent with the investor's plans when the position was opened? Do experts and non-experts react similarly? In cases where the value of an underlying stock is uncertain, do beliefs evolve according to the normative benchmark or do they deviate systematically? My research examines these questions through a combination of experiments, observational studies, and formal analysis.

Imas (2016, *American Economic Review*) examines how prior losses affect risk-taking. A large empirical and theoretical literature has examined this topic but has produced seemingly contradictory results. Some researchers have found that people take on less risk after

prior losses (Kaustia and Knüpfner 2008; Shiv, Loewenstein, Bechara, Damasio, and Damasio 2005), while others have found the opposite, that people take on more risk—chasing their losses in response to prior setbacks (Coval and Shumway 2005; Langer and Weber 2008). The paper proposes that the realization of prior outcomes—whether the gain or loss is transferred or not—is critical for how people respond to them. Using both formal theory and empirics, I show that the distinction between realized and paper losses explains the apparent contradiction in the prior literature: after a paper loss individuals become more likely to chase their losses and take on greater risk, while after a realized loss they take on less risk.

After outlining the contradictory results on risk taking after losses, the paper derives predictions from a dynamic model of Cumulative Prospect Theory (Tversky and Kahneman 1992) with the additional assumption on how prior losses are ‘bracketed’ with prospective risky choices (Read, Loewenstein, Rabin, Keren, and Laibson 1999). Namely, that paper losses are integrated and evaluated jointly with prospects in the same mental account, while realized losses close the mental account associated with prior outcomes, reset the reference point, and are evaluated in isolation. Paper losses are predicted to increase subsequent risk-taking while realized losses are predicted to prompt more risk-averse choices. The framework also generates boundary conditions for when loss and gain chasing—and in turn, the effects of realization—should occur. Loss and gain chasing are predicted in positively-skewed environments, and require individuals to be sufficiently loss averse to take on greater risk in an attempt to avoid a negative realization, but not loss averse to the point of rejecting the first gamble.

The paper uses data from several existing experiments and five new studies to provide support for the theoretical predictions. This paper won the Society of Judgment and Decision-Making Hillel Einhorn Award, the CESifo Distinguished Affiliate Award, and was a finalist for the INFORMS Decision Analysis Best Publication Award. It has also spurred follow up work which replicates and extends the empirical the results in both the lab (Heinke, Leuenberger, and Rieskamp 2020; Merkle, Müller-Dethard, and Weber 2021) and field (Flepp, Meier, and Franck 2021; Meyer and Pagel 2019).

Following up on this work, Heimer, Iliewa, Imas, and Weber (2021, revise & resubmit at *American Economic Review*) studies dynamic inconsistency under risk more broadly, examining whether behavior in response to losses and gains is consistent with people’s initial strategies when they begin to take on risk. The paper employs a unique data set of daily investment decisions by retail investors which contains both the traders’ intended risk-taking strategies and actual choices in response to gains and losses. We find that investors open positions as part of a ‘loss-exit’ plan—intending to close the position much earlier after losses than after gains. Behavior in response to actual gains and losses follows the *opposite* pattern:

people chase their losses for too long and cut their gains too early relative to their initial risk-taking strategies. We replicate this dynamic inconsistency in two large lab experiments which compare people’s initial risk-taking strategies to actual choices both across and within participants. We find the same discrepancy between initial ‘loss-exit’ plans and ‘gain-exit’ behavior. We then derive the dynamic predictions of models of choice under uncertainty and show that our results are most consistent with Cumulative Prospect Theory (CPT). The theoretical results also shed light on the observed contradiction in risk-taking between one-shot and dynamic environments. People are significantly more likely to accept a fair gamble as part of a dynamic sequence than in isolation. We show that accepting risk as part of a dynamic sequence is more attractive to an agent with CPT preferences because of the positive skew generated by their ‘loss-exit’ plan. Finally, we employ the Bernheim and Rangel (2009) framework for behavioral welfare analysis to explore the welfare consequences of the observed dynamic inconsistency between planned and actual choices under risk.

While these preceding papers consider decision-making when the underlying structure of uncertainty is known, an important aspect of choice under risk involves learning about this structure over time. For example, in cases where the quality of a risky asset—whether it is more likely to generate gains or losses—is unknown, seeing price movements not only affects an individual’s current wealth but may also be informative about the future prospects of this asset. In Hartzmark, Hirshman, and Imas (2021, *Quarterly Journal of Economics*), we examine whether this learning process is affected by whether the individual owns a risky good or not. Across both representative surveys and a series of laboratory experiments we find that people exhibit more extreme reactions to information about goods that they own compared to those they do not. When seeing the *same* information, ownership leads to more optimistic beliefs after receiving good news and more pessimistic beliefs after receiving bad news about the quality of the good. Our laboratory studies allow us to compare beliefs to Bayesian benchmarks. We find that compared to normative benchmarks, people over-extrapolate from signals about goods that they own, which leads to an overreaction to information; in contrast, learning is close to Bayesian for non-owned goods. Evidence suggests that this over-extrapolation appears to be driven by ownership channeling greater attention to associated information, which leads people to overweight recent signals when forming beliefs. This ‘more-is-less’ effect of attention leads owners to have less well-calibrated beliefs in our setting.

The documented relationship between ownership and beliefs also has testable implications for trade. Particularly, if owners become more pessimistic than non-owners after observing negative information and more optimistic after observing positive information, then the initial gap between non-owners’ willingness to pay and owners’ willingness to ac-

cept for a good—the endowment effect—will expand after good news and shrink after bad news. An experiment studies the evolution of the endowment effect with learning. In line with our hypotheses, we show that the endowment effect *doubles* in response to positive information and disappears with negative information. Our results have implications for models of disagreement in financial markets and the identification of parameters in behavioral data. In ongoing work with Aislinn Bohren, we are developing a framework to study what factors lead individuals to overreact versus underreact to information more broadly. The aim of this follow-up project is to organize the seemingly contradictory empirical results in the literature that documents both effects across a variety of disparate domains.

In Heimer and Imas (2021, *Review of Financial Studies*), I apply the insights from the dynamics of risk-taking to examine the role of leverage in financial markets. According to standard theories of decision-making, access to leverage should make investors (weakly) better off. The ability to borrow expands investors’ choice sets, allowing them to take advantage of trading opportunities without having to liquidate current holdings. We develop a formal model to examine the interaction between access to leverage and existing behavioral biases—specifically, the reluctance to realize losses. This framework generates the prediction that access to leverage can impair decision-making and hurt performance by decreasing the opportunity cost of holding on to losing positions. We use both field and lab data to test this prediction. First, we exploit regulation that restricts the amount of leverage available to U.S. retail traders of foreign exchange. Traders constrained by the regulation are more willing to realize losses, exhibiting a smaller disposition effect, and improve their market timing. We corroborate these findings in two lab studies using experimental asset markets. Similarly to investors in the field data, participants with access to leverage hold on to losses for longer than those without access to leverage. The experiments also allow us to derive a holding period for a Bayesian agent in our setting. Those without access to leverage have holding periods closer to the Bayesian benchmark than levered participants. Together with results from Heimer, Iliewa, Imas, and Weber (2021) that point to loss chasing as dynamically inconsistent with people’s initial strategies, our findings suggest scope for policy targeting highly levered retail traders.

Akepanidaworn, Di Masio, Imas, and Schmidt (2021, revise & resubmit at *Journal of Finance*) uses a unique data set of institutional investors (average portfolio valued at \$586 million) to examine whether financial experts are similarly affected by prior returns as non-experts. The data set includes daily trade decisions and full portfolios of holdings over time, which allows us to evaluate the performance of expert decision-makers and examine the mechanism behind any potential biases. In contrast to retail traders, the expert investors display clear skill in buying, consistently earning excess returns relative to a large set of

counterfactual strategies. However, the same investors display substantial underperformance in selling—even relative to a no-skill *random* selling strategy. These results hold across a myriad of robustness checks that construct counterfactuals matching assets bought and sold on size, value, idiosyncratic volatility, prior returns, momentum, and ‘characteristic selectivity.’

We provide evidence that this stark discrepancy in performance is driven by an asymmetric allocation of limited cognitive resources towards buying and away from selling. While buying resembles decisions made through standard portfolio optimization, selling decisions appear to be driven by a two-stage process that has elements of bounded rationality entering at both stages. First, limited attention leads investors to focus excessively on assets with extreme prior returns; from these assets, they are most likely to sell positions in which they have the least conviction. The latter effect can generate systematic underperformance if these positions happen to include neglected, but still viable investment ideas. We provide evidence that this indeed appears to be the case. Expert investors are 50% more likely to sell assets that either performed very well or very poorly in the recent past; no such relationship exists for buying decisions. Moreover, from this extreme-return set, low-conviction assets are most likely to both be sold and outperform the counterfactual portfolio. Our results have implications for the domain specificity of expertise and learning. Since being released as a working paper, it has more than 10,000 downloads and almost 40,000 abstract views on SSRN, putting it in the top 0.01% of all papers on the platform.

2 Discrimination.

My work on dynamic choice under uncertainty has led to me explore behavior in the context of discrimination. In Bohren, Imas, and Rosenberg (2019, *American Economic Review*), we demonstrate how studying the dynamics of discrimination can be used to identify its source. Discrimination has largely been studied in static settings, where observing differential treatment based on group identity is often insufficient to identify its source (Bertrand and Duflo). Particularly, discrimination can be preference-based—individuals have preferences against a particular group—or belief-based—individuals believe a particular group performs differently from other groups. Moreover, belief-based discrimination can either be statistical, i.e., based on correct beliefs, or not, such that differential treatment is driven by incorrect initial beliefs or biases in the updating process. Distinguishing between these sources of discrimination is critical for designing policy and for examining long run consequences. In the paper, we first develop a theoretical framework to show how the dynamics of discrimination can be used to identify its source. If the source is preference-based, then discrimination should remain relatively constant at different stages; if discrimination is belief-based, then

the extent of differential treatment should decrease over time. However, if discrimination is belief-based with at least some bias, we show that discrimination will not only attenuate, but may actually reverse directions at later stages of the evaluation process.

We complement the theoretical results with a pre-registered field experiment on a large Q & A forum that is an important resource for students and researchers in STEM fields. The setting is unique in allowing us to exogenously vary the perceived gender identity of the individual posting content and his or her reputation, which is based on prior evaluations on the same platform. We wrote a series of questions and posted them on accounts that exogenously varied in gender of assigned usernames (male and female), and their reputation (low or high). High reputation was built up by posting content until the associated account reached the top 25th percentile on the forum. We find significant initial discrimination against females, with content posted to new female accounts receiving lower evaluations than content posted to similar male accounts. However, at higher reputations, discrimination is not only mitigated but reverses direction: male account now receive lower evaluations than female accounts posting similar content. Interpreting these results through the lens of our theoretical framework, the dynamic reversal suggests that the observed discrimination is belief-based with at least some level of bias. This paper appeared as the lead article in the *American Economic Review* and received the 2020 Exeter Prize for best paper published in Experimental Economics, Behavioral Economics, and Decision Theory.

In Bohren, Haggag, Imas, and Pope (2020), we further explore the issue of incorrect beliefs in discrimination. The paper develops a theoretical framework to study what data a researcher would need to collect in order to identify the source of discrimination. We show that when the assumption of accurate beliefs is relaxed, common methods used to investigate discrimination such as outcome-based tests can no longer identify its source. An in-depth review of the empirical discrimination literature in economics reveals that despite the majority of papers aiming to examine the source of discrimination, fewer than 7% of consider incorrect beliefs. We show that when incorrect beliefs are not accounted for, inaccurate statistical discrimination will be misclassified as preference- or taste-based. An experiment is used to illustrate such misclassification in practice when employing commonly-used tests. We then examine several potential methodologies for examining the source of discrimination such as varying the information set, eliciting beliefs, and presenting accurate information, and discuss the costs and benefits of each. Our results have important implications for policy, as the types of interventions which may be effective for curbing taste-based discrimination may differ substantially from those designed to mitigate belief-based discrimination.

3 Mental Representation and Decision-Making.

While standard models tend to assume that preferences over goods and outcomes are stable (at least in the short term), research in psychology has shown that both judgment and choice behavior depends on people’s online mental representations of the relevant objects (Slovic 1995; Tversky 1996). People’s propensity to spend money depends on which mental account it is associated with (Thaler 1985), their judgment of a situation depends on which norm is activated at the time (Kahneman and Miller 1986), and their behavior changes substantially depending on the current reference point (Kahneman 1992). My research examines how mental representation impacts decision-making in the domains of intertemporal choice and valuation.

While research in behavioral economics has shown that mental accounts have a significant impact on judgment and choice behavior (Thaler 1990), there is little work on the process of how outcomes actually come to be associated with particular accounts. Additionally, the empirical predictions of mental accounting with regards to people’s preferences for integrating or segregating outcomes have received mixed support, with people seemingly preferring to segregate both gains *and* losses (Linville and Fischer 1991; Thaler and Johnson 1990). In Evers, Imas, and Kang (2021, revise & resubmit, *Psychological Review*), we argue that this is due to prior work not considering the role of cognitive representation in the mental accounting process. In the paper, we develop a formal model that represents mental accounts as categories and generates predictions on people’s valuations of multiple outcomes as a function of their similarity. Drawing on the cognitive psychology literature on similarity and categorization (Nosofsky, Kruschke, and McKinley 1992), we conjecture that perceptions of similarity are predicted to drive the bottom-up aspects of mental accounting operations through the process of categorization. We incorporate aspects of the ALCOVE model of category learning (Kruschke 1992) into a top-down evaluative framework of mental accounting. In this model, outcomes perceived to be similar are categorized together, assigned to the same mental account and evaluated jointly (i.e., as one event); outcomes perceived to be dissimilar are assigned to different accounts and evaluated in segregation (i.e., as independent events). Moreover, because perceptions of similarity are driven by what outcome-associated attributes are salient at the time of judgment, mental accounting operations are ‘online’ in the sense that they are influenced by environmental cues which affect attribute salience. From this model we derive the *hedonic accounting hypothesis*, which makes behavioral predictions on people’s preferences over the timing of outcomes as a function of their valence and level of similarity.

We empirically test the predictions of the model across six studies. Consistent with the framework, people prefer to group similar losses close together in time and to separate dissimilar losses across time. Similarity has the opposite effect for preferences over the

timing of gains: people choose to separate similar gains across time while preferring to group together dissimilar gains. Importantly, our results shed light on prior work that has found mixed support for the predictions of mental accounting and prospect theory on people’s preferences over the timing of outcomes, particularly in the domain of losses (Linville and Fischer 1991; Thaler and Johnson 1990). We show that this evidence is consistent with the hedonic accounting hypothesis when outcome similarity is taken into account.

In Imas, Kuhn, and Mironova (2021, *American Economic Journal: Microeconomics*), I build on research in psychology and economics which argues that mental representations of future outcomes are noisier than outcomes closer to the present (Gabaix and Laibson 2017; Gilbert and Wilson 2007). My co-authors and I test the conjecture that prompting greater deliberation leads to more precise mental representations, which will reduce myopia in intertemporal choice. Using studies in an online labor market, the laboratory, and a field experiment in the Democratic Republic of Congo, we show that the introduction of waiting periods—designed to prompt deliberation by temporally separating news about choice sets from choices themselves—cause a shift towards substantially less myopic decisions. Experimental participants were tasked with allocating effort tasks across periods, where postponing tasks to future periods increased the total amount the participant had to do. In our main treatments of interest, people were given the option of making the allocation decision either directly after receiving information about the choice or after a one-hour delay. Since the total length of the experiment was kept constant between conditions, the choice set was the same with or without a waiting period. Nonetheless, participants allocated significantly more tasks to the earlier work period with a waiting period than without one. A third treatment allows us to compare the effects of waiting periods to making planned choices over future time periods—a commonly used impulsivity intervention in the time preference literature. We find that the former has a substantially larger impact on reducing myopia than the latter. We formally show that these results cannot be captured by standard models of exponential discounting or behavioral models of hyperbolic discounting and present bias.

A field experiment in the Democratic Republic of Congo illustrates how deliberation prompts in the form of a waiting period can be used to reduce myopia in practice. Shoppers at a grocery store were given coupons that could be redeemed for one bag of flour at a pre-specified date. Each day that the coupon was saved after this date increased the redemption amount by one additional bag of flour (up to five bags total). In one condition, customers had the opportunity to redeem the coupon on the same day it was received; in the other, they had to wait one day before being able to redeem the coupon. The introduction of a waiting period led to a substantial reduction in the proportion of people redeeming the coupon on the earliest possible date. Together, our results shed light on the role of deliberation in

decision-making and have implications for policies aimed at reducing myopic choices.

Brownback, Imas, and Kuhn (2021, revise & resubmit at *Review of Economics and Statistics*) extends this work, as well as my other research on agency and self-signaling (Gneezy, Imas, Brown, Nelson, and Norton, 2012, *Management Science*; Gneezy, Imas, and Jaroszewicz, 2020, *Nature: Communications*), to the design of behavioral interventions in the field. Specifically, we examine whether psychologically-motivated changes can enhance the efficacy of healthy food subsidies among low-income shoppers. Our unique experimental design employs a mobile platform that allows us to run the study at the point of purchase—in the aisles of grocery stores across the country. We tested two interventions: introducing a waiting period to prompt deliberation about the shopping decision and giving shoppers greater agency over their subsidy choice (allowing them to choose between healthy and unhealthy food subsidies). We found a dramatic effect of the behavioral food subsidies on healthy shopping. Combined, our interventions increased healthy food purchases by 61% compared to a standard healthy food subsidy at virtually no cost. Our results on the waiting period intervention corroborate the findings from Imas, Kuhn, and Mironova (2021), showing that a period of deliberation between learning about a future choice and making the choice prompts more future-focused choices—in our case, healthier food purchases. This project was funded by the Robert Wood Johnson Foundation.

In Imas and Madarasz (2020, revise & resubmit at *Review of Economic Studies*), I build on the notion that the mental representations of a good’s value may be a function of one’s social environment. The paper develops a formal model based on the premise that a person’s desire for an object is linked to the desires of others, in that her pleasure from consuming a good is increasing in others’ *unmet* intrinsic taste for the same object. Our framework departs from the assumption that desires are autonomous and instead links them to a form of dominance-seeking, whereby the unmet desire of others for an object changes the possessor’s mental representation of it—boosting her perceived value from keeping and consuming it. We show that this dominance-seeking motive helps explain a host of market anomalies and generates novel predictions in a variety of domains. In bilateral exchange, there is a reluctance to trade, and people exhibit a ‘social’ endowment effect. The value of consuming a good increases in its scarcity, which generates a motive for exclusion. Randomly excluding potential consumers from the opportunity to acquire a product will increase profits for a classic monopolist and a seller’s revenue in first-price auctions. These results can explain seemingly-puzzling phenomena such as the reluctance of firms to expand supply despite excess demand (Becker 1991), the prevalence of advertising that highlights a product’s scarcity rather than its quality (Cialdini 1987), and the preference for exclusionary policies despite their negative material consequences.

We experimentally test the predictions of the model in both competitive and non-competitive environments. When auctioning a private good, randomly excluding people from the opportunity to bid substantially increases bids among those who retain this option. Notably, exclusion leads to bigger gains in expected revenue than increasing competition through inclusion. Consistent with our theoretical framework, such effects are absent when those excluded are known to have lower valuations. In basic exchange, a person's willingness to pay for a good increases substantially when others are excluded from the opportunity of buying the same kind of good. Jointly, our experiments also allow us to rule out a host of alternative explanations such as perceptions of scarcity, informational effects linked to interdependent values, and other types of social preferences such as inequity aversion. Our results have implications for both non-price and price based methods of exclusion: the model generates 'Veblen effects,' rationalizes attitudes against redistribution, immigration, and trade, and provides a novel motive for social stratification and discrimination.

Papers by Alex Imas

- Klakow Akepanidaworn, Rick Di Masio, Alex Imas, and Lawrence Schmidt. Selling Fast and Buying Slow: Heuristics and Trading Performance of Institutional Investors. 2021.
- J Aislinn Bohren, Alex Imas, and Michael Rosenberg. The Dynamics of Discrimination: Theory and Evidence. *American Economic Review*, 2019.
- J Aislinn Bohren, Kareem Haggag, Alex Imas, and Devin G Pope. Inaccurate statistical discrimination: An identification problem. Technical report, 2020.
- Andy Brownback, Alex Imas, and Michael Kuhn. Behavioral food subsidies. 2021.
- Ellen Evers, Alex Imas, and Christy Kang. On the Role of Similarity in Mental Accounting and Hedonic Editing. 2021.
- Ayelet Gneezy, Alex Imas, Amber Brown, Leif D Nelson, and Michael I Norton. Paying to be nice: Consistency and costly prosocial behavior. *Management Science*, 2012.
- Ayelet Gneezy, Alex Imas, and Ania Jaroszewicz. The impact of agency on time and risk preferences. *Nature: Communications*, 2020.
- Samuel M Hartzmark, Samuel D Hirshman, and Alex Imas. Ownership, learning, and beliefs. *The Quarterly Journal of Economics*, 2021.
- Rawley Heimer and Alex Imas. Biased by Choice: How Access to Leverage Exacerbates Financial Mistakes. *Review of Financial Studies*, 2021.
- Rawley Heimer, Zwetelina Iliewa, Alex Imas, and Martin Weber. Dynamic inconsistency in risky choice: Evidence from the lab and field. 2021.
- Alex Imas. The Realization Effect: Risk-Taking after Realized versus Paper Losses. *American Economic Review*, 2016.
- Alex Imas, Michael Kuhn, and Vera Mironova. Waiting to choose: The role of deliberation in intertemporal choice. *American Economic Journal: Microeconomics*, 2021.

References

- Gary S Becker. A note on restaurant pricing and other examples of social influences on price. *Journal of Political Economy*, 1991.
- B Douglas Bernheim and Antonio Rangel. Beyond revealed preference: Choice-theoretic foundations for behavioral welfare economics. *The Quarterly Journal of Economics*, 2009.
- Marianne Bertrand and Esther Duflo. Field experiments on discrimination. *Handbook of Economic Field Experiments*.
- Robert B Cialdini. *Influence*. A. Michel Port Harcourt, 1987.
- Joshua D Coval and Tyler Shumway. Do behavioral biases affect prices? *The Journal of Finance*, 2005.
- Raphael Flepp, Philippe Meier, and Egon Franck. The effect of paper outcomes versus realized outcomes on subsequent risk-taking: Field evidence from casino gambling. *Organizational Behavior and Human Decision Processes*, 2021.
- Xavier Gabaix and David Laibson. Myopia and discounting. Technical report, National Bureau of Economic Research, 2017.
- Daniel T Gilbert and Timothy D Wilson. Propection: Experiencing the future. *Science*, 2007.
- Rawley Heimer, Zwetelina Iliewa, Alex Imas, and Martin Weber. Dynamic inconsistency in risky choice: Evidence from the lab and field. 2021.
- Steve Heinke, Adrian Leuenberger, and Jörg Rieskamp. This time is different: On similarity and risk taking after experienced gains and losses. *Available at SSRN 3691829*, 2020.
- Alex Imas, Michael Kuhn, and Vera Mironova. Waiting to choose: The role of deliberation in intertemporal choice. *American Economic Journal: Microeconomics*, 2021.
- Daniel Kahneman. Reference points, anchors, norms, and mixed feelings. *Organizational Behavior and Human Decision Processes*, 1992.
- Daniel Kahneman and Dale T Miller. Norm theory: Comparing reality to its alternatives. *Psychological Review*, 1986.
- Markku Kaustia and Samuli Knüpfer. Do investors overweight personal experience? evidence from ipo subscriptions. *The Journal of Finance*, 2008.

- John K Kruschke. Alcove: An exemplar-based connectionist model of category learning. *Psychological Review*, 1992.
- Thomas Langer and Martin Weber. Does commitment or feedback influence myopic loss aversion?: An experimental analysis. *Journal of Economic Behavior & Organization*, 2008.
- Patricia W Linville and Gregory W Fischer. Preferences for separating or combining events. *Journal of Personality and Social Psychology*, 1991.
- Christoph Merkle, Jan Müller-Dethard, and Martin Weber. Closing a mental account: The realization effect for gains and losses. *Experimental Economics*, 2021.
- Steffen Meyer and Michaela Pagel. Fully closed: Individual responses to realized gains and losses. Technical report, National Bureau of Economic Research, 2019.
- Robert M Nosofsky, John K Kruschke, and Stephen C McKinley. Combining exemplar-based category representations and connectionist learning rules. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 1992.
- Daniel Read, George Loewenstein, Matthew Rabin, Gideon Keren, and David Laibson. Choice bracketing. In *Elicitation of Preferences*. Springer, 1999.
- Baba Shiv, George Loewenstein, Antoine Bechara, Hanna Damasio, and Antonio R Damasio. Investment behavior and the negative side of emotion. *Psychological Science*, 2005.
- Paul Slovic. The construction of preference. *American Psychologist*, 1995.
- Richard Thaler. Mental accounting and consumer choice. *Marketing Science*, 1985.
- Richard H Thaler. Anomalies: Saving, fungibility, and mental accounts. *Journal of Economic Perspectives*, 1990.
- Richard H Thaler and Eric J Johnson. Gambling with the house money and trying to break even: The effects of prior outcomes on risky choice. *Management Science*, 1990.
- Amos Tversky. Rational theory and constructive choice. In *IEA Conference Volume Series*. THE MACMILLAN PRESS LTD, 1996.
- Amos Tversky and Daniel Kahneman. Advances in prospect theory: Cumulative representation of uncertainty. *Journal of Risk and Uncertainty*, 1992.