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**NUDGING ESL LEARNING – IMPROVING SECOND LANGUAGE LEARNING BY IMPROVING DECISION ARCHITECTURES**

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**ABSTRACT**

The concept of Nudging describes the optimization of decision architectures. Nudging tries to improve decisions in certain situations by exploiting irrationalities in human perception as well as decision making. Nudging has been applied across a wide spectrum of areas and is currently considered one of the most potent approaches applied by administrations and governments worldwide. While Nudging and its underlying psychology has had tremendous impact on a plethora of fields, schools and the educational sector in general have barely taken up any nudge-related ideas. However, schools can be considered an ecosystem in which countless decisions are made every day by teachers, students, learners, and parents and an improvement of these decisions could have meaningful consequences for all actors involved. This paper tries to cross the bridge between the educational sector and the concept of Nudging by introducing the concept and then outlining, contextualizing, and explaining two cases from the field of ESL learning in which schools and teachers already – maybe un- or subconsciously – applied effective Nudges. This paper aims at raising awareness for the importance of decision architectures in schools and education in general and language learning in particular.

**Key Words:** Schools, Decision making, Decision architecture, Nudge, Nudging, ESL learning.

**1. INTRODUCTION**

For the longest part of modern times, it was assumed that human decision-making is primarily rational. Humans receive, process, evaluate, and consider all relevant pieces of information and ultimately come up with a decision. This rational choice paradigm – based on the works of von Neumann and Morgenstern (cf. 1944) – is often referred to as the normative model of decision-making as it assumed that humans solely decide based on their preferences and seek utility and the maximization thereof. The normative model suggests how hyperrational human beings should decide; however, the model is “is grossly inadequate as a descriptive model of individual choice behavior “(Tversky 1975, 163)as it fails to predict actual decisions. While supporters of rational choice theory argue that these deviances are mostly based on human’s incapability to properly calculate the right decision, proponents of the psychological-descriptive model of the decision-making emphasize that these “deviations of actual behavior from normative models are too widespread to be ignored, too systematic to be dismissed as random error, and too fundamental to be accommodated by relaxing the normative system” (Tversky/Kahneman 1986, 3). However, a plethora of organizations, institutions, and decision scenarios is constructed based

on the rational choice school of thought. Due to their in-built assumptions about human being's decision-making, these institutions have generated subpar results in the past.

Based on these observations, Cass Sunstein and Richard Thaler came up with a systematization of common and reproduceable errors in human decisions with a particular focus on decisions made in the public contexts. Further, the two scholars created a tool-box to improve decision scenarios helping people to make decisions which reflect their actual preferences to a higher degree. This tool-box is called "Nudging" and the concept of *Nudge* (2017) has been employed globally by a plethora of governments, institutions, and lawmakers (cf. Straßheim/Jung/Korinek 2015). While Nudging won Richard Thaler the Nobel Prize in economics in 2017, the United Kingdom created the Behavioral Insights Team (BIT), an agency solely focused on the improvement of decision scenarios; other governments purchased this expertise and translated it into regulation and decision scenarios in order to solve countless problems from contexts as diverse as medicine, finance, taxes, or environmental protection/waste pollution. However, as Damgaard's and Nielsen's (2018) overview article has illustrated, one sector which has not yet been *nudged* – or only in very moderate degrees – is the educational sector. In order to bridge the gap between nudge-psychology research and the educational sector, this article will do three things. Firstly, it will outline and explain the concept of Nudging as well as its workings in detail and provide an overview over the most common nudging principles. Secondly, it will present two case studies highlighting that nudging is already an established practice in teaching. Therefore, this contribution will draw from two well-known ESL teaching principles and recontextualize them from a nudge psychology perspective. Recontextualizing these best practice examples from a psychologically-informed perspective can help to further professionalize teaching as best practices can now be supported by evidence-based research. In the final section of this paper, Nudging's potential to improve teaching and ESL learning will be discussed hoping to raise awareness for decision architecture's importance and potency. This section will also advocate a more conscious and active construction of *good* decision architectures.

## 2. THE INNER WORKINGS OF THE NUDGE

Decision psychology assumes that human beings have two different modes of decision making. Daniel Kahneman conceptualizes them as system 1 and system 2 (cf. Kahneman 2012). System 1 is intuitive, impulsive, and fast while system 2 can best be described as reflective, analytical, and slow. Cass Sunstein and Richard Thaler – the intellectual founding fathers of nudge theory – suggest a similar categorization; however, they labeled the systems differently. Kahneman's intuitive and fast system 1 decisions are decisions made by *Humans*, system 2 decisions are made by *Econs* as Sunstein and Thaler equate advanced analytical thinking with economic behavior (cf. 2017: 34). This differentiation is not new as Plato already argued that the human psyche/soul can be compared to a chariot with two competing horses – one horse is reflective and can be talked to, the other behaves wildly and acts solely based on instinct (cf. Zaborowski 2016). It is important to stress that both decision-making modes have their *raison d'être* as the system related to fast decision-making prevents human beings from overanalyzing familiar and/or repetitive actions while the system responsible for slow thinking helps humans to figure out unknown and new scenarios. Through repetition, system 2 decisions can steadily migrate into the

realm of system 1, an observation every educator has observed in his/her students as this is part of the regular learning process. However, problems arise when questions which would require a slow and reflective system 2 analysis are perceived, processed, and treated as system 1 questions. This kind of scenario makes it more likely that errors – ergo decisions which are not in the interest of the individual – occur. Daniel Kahneman and Amos Tversky worked extensively on the cognitive-perceptual aspects of these phenomena and isolated scenarios and settings in which errors are more likely to occur. The two psychologists found out that the presentation of data/information is crucial for the decision process. In a study on medical decision-making they confronted experts as well as amateurs with a treatment option. The potential treatment was once presented with a mortality rate attached, once with the treatment's survival rate. Even though the numerical probabilities were the same, both – the experts as well as the laypeople – “were influenced by several variations in the nature of the data and the form in which they were presented” (McNeil et al. 1982, 1262). This poses a clear violation of rational choice principles which should find its way into the literature as the *framing effect* (cf. Tversky/Kahneman 1979: 3/4; cf. Tversky/Kahneman 1981). In the following, countless more effects could be isolated. Some of these effects are well-known by teachers and educators alike, such as the *halo-effect* – a typical pars pro toto error –, the *anchoring-effect* (cf. Tversky/Kahneman 1974), or the *recency-effect* in which recent results and/or impressions have a higher impact on a final grade than impressions dating back longer (cf. Neuhaus 2020a: 76). These cognitive-perceptual cues suggest that a question belongs into the system 1 spectrum even if it actually should be treated as a system 2 question. The sum of these effects was later subsumed under the umbrella term of Prospect Theory (cf. Kahneman/Tversky 1977). However, Nudging goes a step further and enriches this strictly cognitive-perceptual perspective with insights from sociology, sociolinguistics, and social psychology (cf. Neuhaus 2020a). Irrational behavior does not only occur because of the humantendency to (mis-)use cognitive-perceptual heuristics/shortcuts but also because of human's social environment, i.e. social norms (cf. Cialdini/Schultz 2004), influence exercised by high status people (cf. Cialdini 1999), or herd mentality behavior (cf. Sunstein/Vermeule 2008, cf. Levitt/Dubner 2016: 116). The potency of peer groups' as well as social environment's influence on altering pupil's behavior is an observation, educators make each and every day independent of social and/or cultural context. Nudging analyzes decision scenarios with regard to the relevant factors of the decision in question; these factors are called the decision architecture (cf. Thaler/Sunstein 2017). In the following, nudging aims at pushing error-laden decisions into the system 1 realm while changing the decision architecture in a way that the fast and intuitive decision is also the superior decision. Thereby, nudging aims at better collective decision-making through “*alter[ing] people's behaviors in a predictable way without forbidding any options or significantly changing their economic incentives*” (Thaler/Sunstein 2017, 15). As Nudging does not change the decision itself but only the way the decision-makers perceive and categorize the involved cues and props, nudging is cheap, yet, as countless examples from the commercial world illustrate (cf. Harford 2007: 40), extremely effective. Or as Sunstein/Thaler (2017: 15) phrase it: “Putting fruit at eye level counts as a nudge. Banning junk food does not.” The opposite of nudging – making decision architectures unnecessary difficult aiming at the elimination of options – is sometimes referred to as “sludge” (cf. Thaler 2018).

Nudging is a powerful tool and can change individual decisions as well as collective behaviors in significant ways. With such power – especially when working with children and young adults – comes great responsibility. However, nudging comes with an attached philosophy which is highly compatible with the ethos of modern-day teachers. The nudge-related philosophy was coined liberal paternalism (cf. Thaler/Sunstein 2017: 14/15) and understands itself as the third way to negotiate between the extremes of either complete *laissez-faire* or external control. The paternal aspects of nudging stem from the fact that the decision architecture is designed by an authority in a top-down approach (cf. French 2011: 157). In order to create such decision architectures, the authority – in this case the teacher – must assume the projected welfare for its target audience (the students). As multiple scholars have emphasized (i.e. Vallgarda 2012: 202), authorities cannot predict the target group’s needs and – due to a plethora of definitions of the concept *welfare* – thereby cannot maximize the group’s welfare. While this criticism is highly relevant for the nudging of general society, the case of teaching is different. In schools, curriculum designers as well as educational authorities have already defined what needs to be learned at which age and assume that – even if some student (sub-)population may not enjoy the topics and/or materials at the very moment – these contents are relevant for the student’s future life path. Secondly, it should be considered that the current status quo of decision-making can be considered as just another imperfect decision architecture which makes certain results more likely than others. Sunstein and Thaler (2003, 1161) on the issue:

“Our emphasis is on the fact that in many domains, people lack clear, stable, or well-ordered preferences. What they choose is strongly influenced by details of the context in which they make their choice, for example default rules, framing effects (that is, the wording of possible options), and starting points. These contextual influences render the very meaning of the term ‘preferences’ unclear.”

Based on these considerations, it can be argued that nudging features some paternalistic elements; however, these elements are highly compatible with existing school settings. On the contrary, nudging also consists of liberal (read as: freedom cultivating) elements as they are positive, avoidable, passive, and voluntary (cf. French 2011: 157). As argued earlier, nudges do not change the nature of the decision, i.e. through incentives, but only change the way decision-makers perceive the decision and the relevant aspects thereof. Thereby nudges do not cause unintended consequences through falsely set incentives (cf. Acemoglu/Angrist 2001; cf. Siebert 2002). Also, they leave all options of the decision architecture intact. Thereby, the individual still has the possibility to decide against the – from the decision architect – assumed desired outcome. These characteristics make Nudging highly compatible with schools and teaching as teachers/educators aim at the creation of a protected space for their students, in which risk-taking and thereby learning/growth is possible. Simultaneously, teachers also thrive for a classroom in which students have a – for their age and developmental level – relatively high degree of autonomy as only autonomy has the potential to transform dependent children into responsible adult. Through the conscious design of good decision architectures – a task teachers have (unconsciously) been doing ever since – teachers and educators can foster autonomy, promote/independent free choice, and cultivate growth in their students while reducing the probability of undesired future outcomes.

### 3. HOW ESL LEARNING ALREADY EMPLOYSNUDGING

As argued, the design of decision architectures has been a core constituent of the teaching profession ever since. However, the importance as well as the different aspects of decision architectures have never been spelled out explicitly. In the following, two cases of already existing nudge incidents from the realm of ESL teaching will be presented, contextualized, and explained from the perspective of descriptive psychology, behavioral economics, and psychology of persuasion – the core components of Nudge theory.

One key insight from learner psychology research is that identification with learning material improves the degree of engagement. Teaching materials are designed in a way that a high degree of identification is generated. Identification with teaching materials is often times achieved by stressing the point of student/learner ownership of the material. The feeling of ownership can be created by providing the learner opportunities to personalize their materials. Thereby, learners make their materials unique and their own. The same holds true for learning products and the continued work with these. Self-created and designed portfolios, booklets, polished writing, and the alike are considered predestined to create a high level of identification and should thereby treated carefully by teachers and educators; this is of particular importance with regard to visualized/written error corrections on the products. These empirical observations stress the point that through the high degree of identification, learners are more willing to dedicate more time to revising, reflecting, and perfecting their products. Thereby, learners increase their contact time with the language which results in higher learning outcomes, ergo better and more proficient use of the target language. The here discussed relationship of ownership and invested time (and ultimately learning outcomes) can also be conceptualized from Nudge perspective as the *Endowment-effect* empirically proves the relationship between identification/ownership and perceived value.

Rational choice theory predicts that, when confronted with a potential new option, decision makers compare the status quo with the potential new status and then decide. If the new status is marginally superior and no transaction costs are involved, the decision-maker changes his/her option (cf. Tversky/Kahneman 1986: 5). The normative rational choice assumption fails to transition into reality and the endowment effect is one key explanation for this failure. Kahneman, Knetsch, and Thaler (1990 & 1991) could empirically prove that the evaluation as well as subjective pricing of items changes depending on ownership. This effect could be isolated by letting student populations evaluate the numerical value of merchandise. Once students evaluated the merchandise from a standpoint of ownership, once they did so without owning the object in question. The overvaluation of one's own possessions can be observed in multiple areas of life and business, such as trading behaviors of professional basketball franchises (cf. Lewis 2017: 13) or the hypothetical buying and selling price of sports tickets (cf. Carmon/Ariely 2000) – humans exhibit the tendency to put a premium on their possessions. The endowment effect thereby explains why change sometimes needs more and longer to manifest itself. Through the identification with a certain scenario or setting, humans ascribe more value to the status quo and thereby opt against change. This behavior can be seen in the *default-effect* – the observation that default settings (i.e. in phones or self-prolonging subscriptions) are rarely changed (cf. Dobelli 2012: 129/130) – or the status quo bias (cf. Kahneman 2012). While the



implications of the endowment effect as well as its more concrete realizations (default effect, status quo bias) can prevent improvement and change, the irrational overvaluation of items biased through ownership can also be exploited for more positive goals. As discovered by learner psychology, the personalization of learning materials and ultimately the identification with these leads to a more positive evaluation – a strategic and desired overvaluation of materials – and in turn to a higher degree of engagement and learning time. Therefore, it can be argued that the identification with learning materials and learning products constitutes one case of the endowment effect. In short: Through observation of learners, learning behavior, and the establishment of best practices, teachers and educators already exploited an irrationality in the classroom and changed the learning setting in such a way that giving in to this particular irrationality contributed to the aims of the students, the curriculum, and the school.

Closely related to the endowment effect, yet slightly different, is the phenomenon of loss aversion. From a rational choice perspective, it could be assumed that losses and gains are calculated equally. A unit gained should be as valuable as a unit lost. However, empirical observations seem to negate this hypothesis. Human bookkeeping of gains and losses deviates from rational choice considerations as losses are perceived twice as powerful as gains (cf. Tversky/Kahneman 1991 & 1992) – roughly speaking, \$1 lost hurts as bad as a \$2 gain delights. This tendency could be explained evolutionary as losses threatened human survival much more than gains could guarantee our continued existence (cf. Neuhaus 2020b: 24). Partially, the potential of loss aversion has been researched in the context of schools. Multiple studies (Smith et al. (2018), McEvoy (2016), Apostolova-Mihaylova et al. (2015)) have highlighted the potential of loss aversive testing scenarios to improve test scores. Here however, an already existing teaching practice should be framed from a loss aversion perspective. Teachers and educators are well aware that positive feedback and praise are crucial to keep children, young adults, and learners in general on the path of learning. Simultaneously, negative feedback – in school but also in other areas of life – is suspected to decrease motivation (cf. Kim 2011). Therefore, teachers try to provide negative feedback/corrections through implicit means, such as recast, mirroring, or verbal highlighting (cf. Leeman 2003). Even though learners primarily learn through positive reinforcement – this is particular true for foreign language learning –, attention must also be directed at errors and mistakes (cf. Schachter 1986 & 1991) and feedback on such errors/mistakes is a key component of (ESL) learning (cf. McDonough 2005: 94). Loss aversion suggests that the ratio of positive to negative feedback has to be at least 2:1 in order to not slide into the perceived area of losses. Another insight from Prospect Theory is that risk aversion changes depending on the perceived status of the decision maker. In the case of sure losses, decision makers tend to become more willing to engage in unreasonable risks. Ergo: If the student's mental bookkeeping suggests that s/he is in the realm of losses, his/her brain corresponds – through cortisol releases – with feelings of anxiety and stress, which could result in either retreat or decreased risk sensitivity; both can be considered unwanted reactions in a positive and stress-free learning environment. In order to prevent stress and negative feelings while simultaneously sensitizing the learner for his/her errors, educators should reflect on the negative to positive feedback ratio and keep the 2:1 rule in mind. In fact, this insight has long been used as peer but also teacher feedback is often structured in the following way: Start with a positive feedback, highlight one point of criticism, and end on a positive note – another best

practice example which highlights the fact that nudging is, at least partially, already part of well-established educational conduct.

#### 4. DISCUSSION

The prior section could hopefully show that nudging and ESL teaching are highly compatible and that measures which qualify as nudges are already actively used in ESL classrooms. The list of employed nudges could easily be expanded as teachers employ anchors (i.e. for text length) or priming (i.e. for the activation of word fields) and exploit the herd mentality to improve and/or modify student learning behavior and ultimately learning outcomes. This section discusses why, even though some nudges are already best practices, the study of Nudging has tremendous potential for practicing teachers. The first section of this discussion will focus on improvements in the classroom and potentials for teaching, the second section will focus on teachers, their biases, and how in-depth knowledge of Nudging could help improving teacher performance on multiple spectrums.

If conducted intelligently and consciously, teachers attempt to direct the entire classroom – all relevant cues, props, settings etc. – towards the goals of learning. The concept of the decision architecture can help teachers to structure their classrooms accordingly. Decision architectures focus on all relevant aspects of a decision setting and zoom in on cognitive and social aspects. Thereby, decision architectures can serve as a means of systematization for teachers highlighting the seemingly tiny aspects of their lessons, such as wording, the kind of questions being asked, social settings etc. Further, in consciously and actively designed decision architectures all aspects direct towards the same goal. This could also serve as a reminder to actively change classrooms and the associated settings to serve the desired purpose. By directing all available cues towards the goal of learning, nudge inspired teaching tries to get the best out of every setting. As most teachers know, the classroom and teaching need to adapt to the learning group. However, by applying universal nudge principles, teachers have a starting point of strategies with a high probability of working, independent of context, time, and learning groups as Nudging targets universal human traits and tendencies (cf. Neuhaus 2020b: 14). Lastly, by supporting best practice examples with universal and (on a large scale) empirically proven behavioral principles, the teaching profession bases its actions on empirical and evidence-based principles and can ultimately legitimize its actions more profoundly. Thereby, nudging fits excellently into the currently perpetuated paradigm of evidence-based classroom practices.

Study of and knowledge on Nudging can help to modify the classroom/decision architecture in order to make it more efficient and goal-oriented. Yet, nudging mostly attempts to exploit irrationalities caused by external factors – errors which do not spare teachers. Most teachers are well aware of some biases they exhibit, i.e. in the area of grading. May it be the *recency*-effect or the *halo*-effect, teachers know that their grades are much more dependent on external factors than they would admit. The inconsistencies of grading are well recorded and seem to appear across cultures (cf. Annerstedt/Larsson 2010). However, there is a plethora of heuristics, biases, and errors humans and thereby also teachers fall for. Being aware of effects of order, consistency biases, authority nudges, confirmation biases, Dunning-Krueger effects, or herd mentality behavior – just to name a few – can help teachers to sharpen their view on performances and

behavior, trigger reflection of established practices, and can ultimately lead to a fairer and more meritocratic (educational) system. Simultaneously, decision architectures are not limited to the classroom but can also play a role in other school related decisions. May it be the cafeteria's design, budget considerations, recruitment procedures, or the alike, decision architectures play a tremendous role in all of these school-related decisions. Knowledge about human's general tendencies, biases, and heuristics can help school staff to make better decisions in all of these realms.

## REFERENCES

- Annerstedt, C., & Larsson, S. (2010). 'I have my own picture of what the demands are ... ': Grading in Swedish PEH — problems of validity, comparability and fairness. *European Physical Education Review*, 16(2), 97–115
- Acemoglu, D./Angrist, J. D. (2001). Consequences of Employment Protection? The Case of the Americans with Disabilities Act. *Journal of Political Economy*, 109(5), 1-43
- Apostolova-Mihaylova, M./Cooper, W./Hoyt G./Marshall, E. (2015). Heterogeneous gender effects under loss aversion in the economics classroom: A field experiment. *Southern Economic Journal*, 81(4), 980-994.
- Carmon, Z. & Ariely, D. (2000). *Focusing on the Forgone: How Value Can Appear So Different to Buyers and Sellers*. *Journal of Consumer Research*. 27 (3): 360–370.
- Cialdini, Robert B. (1999). *Influence* (Rev. ed.). New York: Quill.
- Cialdini, R./Schultz, W. (2004). Understanding and motivating energy conservation via social norms. (pp. 1-6, Rep. No. 2001-7396). Arizona: William and Flora Hewlett Foundation.
- Damgaard, M. T./Nielsen, H. S. (2018). "Nudging in education," *Economics of Education Review*, 64: 313-342.
- Dobelli, R. (2012). *Die Kunst des klugen Handelns*. München: Carl Hanser Verlag.
- French, J. (2011). Why nudging is not enough. *Journal of Social Marketing*, 1(2), 154-162.
- Harford, T. (2007). *The Undercover Economist*. London: Abacus.
- Kahneman, D. (2012). *Schnelles Denken, langsames Denken* (Vol. 8). München: Penguin/Random House.
- Kahneman, D./Tversky, A. (1977). Prospect Theory. An Analysis of Decision Making Under Risk. doi:10.21236/ada045771
- Kahneman, D./Knetsch, J. L./Thaler, R. H. (1991). Anomalies: The Endowment Effect, Loss Aversion, and Status Quo Bias. *Journal of Economic Perspectives*, 5(1), 193-206. doi:10.1257/jep.5.1.193
- Kahneman, D./Knetsch, J. L./Thaler, R. H. (1990). Experimental Tests of the Endowment Effect and the Coase Theorem. *Journal of Political Economy*, 98(6), 1325-1348. doi:10.1086/261737.
- Kim, T.-Y. (2011). *Sociocultural Dynamics of ESL Learning (De)Motivation: An Activity Theory Analysis of Two Adult Korean Immigrants*. *Canadian Modern Language Review*, 67(1), 91–122.
- Leeman, J. (2003). Recasts and second language development: Beyond negative evidence. *Studies in Second Language Acquisition*. 25. 37–63.



- Levitt, S. D./Dubner, S. J. (2016). *Think Like a Freak* (Vol. 1). München: Riemann Verlag/Goldmann.
- Lewis, M. (2017). *The Undoing Project: A Friendship that Changed Our Minds*. New York: W.W. Norton & Company.
- McDonough, K. (2005). *IDENTIFYING THE IMPACT OF NEGATIVE FEEDBACK AND LEARNERS' RESPONSES ON ESL QUESTION DEVELOPMENT*. *Studies in Second Language Acquisition*, 27(01).
- McEvoy, D. (2016). Loss Aversion and Student Achievement. *Economics Bulletin*, 36(3), 1762-1770.
- McNeil, B./Pauker, S./Sox, H., Jr./Tversky, A. (1982). On the elicitation of preferences for alternative therapies. *New England Journal of Medicine*, 306, 1259-1262.
- Neuhaus, T. (2020a). *Nudging Education – The (Potential) Role of Decision Architectures in Improving Educational Setting*. *International Journal of Education and Research*. Vol. 8 (9). 73-86.
- Neuhaus, T. (2020b). A (Nudge) Psychological Reading of the Nigerian Scam. *Brolly – Journal of Social Science*. Vol. 3, 3. 7-28.
- Schachter, J. (1986). Three approaches to the study of input. *Language Learning* (36). 211–225.
- Schachter, J. (1991). Corrective feedback in historical perspective. *Second Language Research* (7). 89–102.
- Siebert, H. (2002). *Der Kobra-Effekt: Wie man Irrwege der Wirtschaftspolitik vermeidet* (Vol. 2). DVA.
- Smith, B./Shrader, R./White, D./Wooten, J./Dogbey, J./Nath, S./O'Hara, M./Xu, N./Rosenman, R. (2018). *Improving Student Performance through Loss Aversion*. Available at SSRN: <https://ssrn.com/abstract=3048028>
- Sunstein, C./Vermeule, A. (2008). *Conspiracy Theories*. *Law & Economics Research Paper Series #387*, , 1-29. Retrieved from <http://ssrn.com/abstract=1084585>
- Sunstein, C. R./Thaler, R. H. (2003). *Libertarian Paternalism Is Not an Oxymoron*. *The University of Chicago Law Review*, 70(4), 1159-1202.
- Straßheim, H./Jung, A./Korinek, R. L. (2015). *Reframing Expertise: The Rise of Behavioral Insights and Interventions in Public Policy*. In A. B. Antal, M. Hutter, & D. Stark (Eds.), *Moments of Valuation*. Oxford: Oxford Publication Press.
- Thaler, R. H./Sunstein, C. R. (2017). *Nudge - Wie man kluge Entscheidungen anstößt* (Vol. 7). Berlin: Ullstein/Econ Verlag.
- Thaler, R. H. (2018). Nudge, not sludge. *Science*, 361(6401), 341.
- Tversky, A./Kahneman, D. (1974). Judgment under Uncertainty: Heuristics and Biases. *Science*, 184, 1124-1131.
- Tversky, A./Kahneman, D. (1979). The Framing of Decisions and the Rationality of Choice. *Engineering Psychology Programs, Office of Naval Research*, 1-28.
- Tversky, A./Kahneman, D. (1981). The Framing of Decisions and the Psychology of Choice. *Science*, 210, 453-458.
- Tversky, A./Kahneman, D. (1986). Rational choice and the Framing of Decisions (pp. 1–47). Office of Naval Research.
- Tversky, A./Kahneman, D. (1991): *Loss Aversion in Riskless Choice: A Reference-*

- Dependent Model, The Quarterly Journal of Economics, Volume 106, Issue 4, Pages 1039–1061
- Tversky, A./Kahneman, D. (1992): Advances in prospect theory: Cumulative representation of uncertainty. *J Risk Uncertainty* 5, 297–323.
- Tversky, A. (1975). A Critique of Expected Utility. *Erkenntnis*, 9(2).
- Vallgarda, S. (2012). Nudge – A new and better way to improve health? *Health Policy* (104), 200-203.
- Von Neumann, J./Morgenstern, O. (1944). *Theory of games and economic behavior*. Princeton: Princeton University Press.
- Zaborowski, R. (2016). Two Neglected Details in Plato's Chariot Allegory. *Organon*, 48, 191-224.