Psychological Factors in the Evaluation of Legal Evidence

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ABSTRACT
In this paper, I present a working classification of psychological factors that may diminish the rationality of legal evidence evaluation and examples of the impact of such factors (psychological pitfalls in free evaluation of evidence) taken from research and theory in experimental psychology. The proposed classification has most of all an educational character.

KEYWORDS
evaluation, evidence, psychology, factors, pitfalls

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1. *Free evaluation of evidence*

In *Law's Empire* Ronald Dworkin casually hints that factual issues in legal cases are quite trivial: «If judges disagree over the actual, historical events in controversy, we know what they are disagreeing about and what kind of evidence would put the issue to rest if it were available» (DWORKIN 1986, 3). Meanwhile, fact-finding makes up the lion's share of everyday legal proceedings. Also many high-profile trials, with the case of O.J. Simpson at the forefront, consist mainly of disputes over evidence and facts (KADRI 2005). Herr Professor, the facts are different—evaluation of evidence is a genuine epistemological problem and often a tough practical task.

Law itself has been answering the question of how to try facts at least since, as is always the case, Roman times. The answers provided by specific legal systems could be presented on a continuum from free to legal evaluation of evidence. The latter was especially common in medieval Europe when legal acts contained detailed rules on what significance should be assigned to particular kinds of evidence, including ordeals and torture (LANGBEIN 2012). Some of those rules have survived to this day, fortunately merely in the form of lovely legal maxims such as *confessio est regina probationum* (confession is the queen of trials) or *testis unus, testis nullus* (one witness, no witness).

The idea of free evaluation of legal evidence appeared in the Digest of Justinian and as a legal principle was introduced within Napoleonic codes. Free evaluation of evidence means that the law does not prejudge if some evidence is stronger or weaker, or less or more reliable than others, let alone decisive. The basic criterion for deciding questions of fact is the inner conviction (judgment) of the fact trier. Contemporarily the principle of free evaluation of evidence is explicitly featured in the codes of civil and criminal procedure of many continental law countries[1]. Common law systems, although containing complex rules on the admissibility of evidence, also give judges and jurors freedom in the evaluation of admissible evidence (freedom of proof—TWINING 1997).

Freedom of evaluation is of course not unlimited. Firstly, the evaluation models adopted in individual legal systems are not at the edge of the above-mentioned continuum—they consist of the principle and more or less numerous exceptions, such as irrebuttable presumptions or evidentiary prohibitions (evaluation is free *in principle*). With regard to the latter (as well as to the common law admissibility rules), one could even say that the evaluation of evidence consists of two stages: the a priori assessment of admissibility which is rather formalized, and the a posteriori evaluation of credibility and significance which is free (again, in principle)[2].

[1] See e.g. art. 233 of *Kodeks postępowania cywilnego*, art. 7 of *Kodeks postępowania karnego* (Poland), art. 1358 of *Code civil*, art. 353, 427 and 428 of *Code de procédure pénale* (France), § 286 of *Zivilprozessordnung*, § 261 of *Strafprozeßordnung* (Germany), art. 116 of *Codice di procedura civile* and art. 192 of *Codice di procedura penale* (Italy).

[2] For this reason, in the presented paper I focus on the a posteriori evaluation, which does not mean, however,

Second, an arguably more fundamental legal principle exists: the principle of truth (substantive truth as lawyers sometimes say to the amusement of philosophers). The factual findings should be as true as possible, hence the evaluation can be free as long as it is rational. That is why courts of appeal may review the evaluation of evidence conducted at the first instance.

However, research in cognitive sciences, particularly psychology, shows that human thinking often falls short of rationality standards. In this paper, I present a working classification of psychological factors that may diminish the rationality of legal evidence evaluation and examples of the impact of such factors (psychological pitfalls in free evaluation of evidence) taken from research and theory in experimental psychology.

2. *A few remarks on the psychology of (legal) thinking*

According to contemporary cognitive psychologists, the human mind works in two general modes referred to as the first and the second cognitive system (STANOVICH & WEST 2000)[3]. System 1 ("intuitive cognition") includes processes that are relatively fast, effortless, unintentional, automatic, associative, metaphorical, holistic, pattern-based, context-dependent, embodied, and unconscious (one has no mental access to the process itself though may be aware of its result). This system is primal both evolutionarily (it occurs in some form in all mammals) and ontogenetically (it is innate although we develop it with experience), and almost constantly active, hence should be considered the default mode of the human mind. Within System 1 processes run in parallel (a lot of information is processed at the same time which increases the pace of work) and do not require our limited cognitive (attentional) resources. We intuitively determine, for example, the source of sudden noise, assess emotions in the voice and facial expressions of our interlocutors, or appraise newly met people. One of the fundamental mechanisms of System 1 is heuristics—simple but fallible implicit thinking strategies (see below, 3.2.2.1.1).

Cognitive processes encompassed by System 2 (reasoning, "rational system"—EPSTEIN 1994) are relatively slow (time-consuming), effortful, intentional, controllable, rule-based, logical, analytical, abstract (working on symbols), and consciously accessible (monitorable). Such processes are available only to intellectually fit humans after infancy and possibly to apes taught language. System 2 develops through cultural and formal learning, processes information serially (process by process), and requires attentional resources to function efficiently. It is primarily associated with complex cognitive activities—we use it for example, hopefully, to write papers or conduct non-elementary mathematical calculations. It should of course also be involved in endeavors such as evaluation of legal evidence or legal decision-making. However, due to high usage costs (cognitive resources, energy, time, etc.) System 2 is not constantly active. Moreover, its effectiveness strongly depends on an individual's cognitive abilities (intelligence, memory, especially working memory, cognitive control, etc.), acquired cognitive skills and knowledge as well as external factors influencing their mind's work (e.g. time pressure or cognitive load).

Both systems are involved in our thinking which is studied by psychologists as mental functions such as inference (reasoning), decision-making, evaluation (judgment), and problem-solving. People process information both automatically and intentionally, draw conclusions consciously, but also beyond awareness, make judgments and decisions based on analysis (that is, at least in the sense of mechanism, rationally) or intuition, solve problems sometimes by insight and sometimes step by step, etc. Importantly, it seems that the role of intuitive processes (System 1) is much greater than rationalists would like (HAIDT 2001).

that psychology is irrelevant in the decisions on admissibility, especially when they exercise judicial discretion (see e.g. rules 402 and 401 of the Federal Rules of Evidence).

[3] A less technical account may be found in Daniel KAHNEMAN's (2011) superb book *Thinking, Fast and Slow*.

The potential adverse impact of at least some of the System 1 processes (and errors in the operations of System 2) on the rationality of legal judgments regarding facts and the evaluation of legal evidence is evidenced by both the results of research conducted in legal contexts and experiments in general psychology. The former could be collectively referred to as the experimental psychology of law (part of empirical legal research). In general, the experimental psychology of law studies non-legal factors of legal decision-making. Participants of experiments in this field take part in simulations of court trials or are asked to make various types of judgments and decisions (in particular "verdicts") based on information they have read. Such research is of course not without methodological weaknesses (KRAMER & KERR 1989; BORNSTEIN 1999; BIENECK 2009; BORNSTEIN & KLEYNHANS 2018). It should also be noted that it is conducted primarily in the United States, where one of the key elements of the legal system is the jury. As a jury is usually composed of laypersons, experiments also involve mainly non-lawyers, and in the trial simulation experiments simulation is often limited to mock jury deliberation (DEVINE et al. 2001). The results of such studies should therefore be applied only with caution to systems where legal decisions are made by professional judges.

On the other hand, more and more research is currently being conducted (also in Europe) involving lawyers, including judges (RACHLINSKI & WISTRICH 2017). Furthermore, many psychological phenomena and regularities simply apply to the vast majority of people (and lawyers are people after all), often regardless of the context (professional, personal, etc.), education, and experience (expertise). For this reason, even where jurors play the role of potted plants (if they are involved in the trials at all), neither the results of research in the field of experimental psychology of law (even those with lay participants only) nor theories and experiments in general psychology should be disregarded. Evaluation of legal evidence (especially when free) is not only an element of legal proceedings but also a complex mental process.

3. *Psychological factors in the evaluation of legal evidence*

As the body of research that can be directly or indirectly related to the issue of legal fact-finding is extensive and grows fast, I propose a working classification of psychological factors that may influence the rationality of legal evidence evaluation. For the reasons explained in KUCHARZYK 2021, the classification is based first of all on foundherentism—a theory of epistemic justification developed by Susan HAACK (1993). According to Haack, an individual's belief (for instance, an evaluation) is influenced by evidential and non-evidential elements of its causal nexus. The former include their other beliefs, perceptual states, introspective states, and memory traces. The latter are all their other mental states, e.g. desires, fears, or being under the influence of psychoactive substances.

Within the psychological, functional conceptual grid, non-evidential elements can be associated with non-cognitive or to be more precise—as our cognition (especially System 1) is not independent of emotions, motivations, etc. (THAGARD 2008)—meta-cognitive factors. Respectively, evidential elements depend most of all on cognitive factors. Both kinds of factors can be divided into further categories (see below). Developing the classification I will also give examples of the problematic impact of such factors on rationality, that is psychological pitfalls in free evaluation of evidence. One should still remember that the proposed classification is tentative, has an academic (educational, guiding) character, and does not claim to be an exhaustive and exclusive division. The human mind works as a whole, so our mental processes (including both systems of cognition) interact in many complex ways. In addition, psychological categories are theoretical constructs ("explanations" of behavior)—therefore do not necessarily accurately reflect the mechanisms of the mind or brain, and, as the concepts invented by various researchers, are often not compatible with each other. It would also be a mistake to suppose that

meta-cognitive factors are the exclusive domain of System 1 and that cognitive ones matter only to System 2. Factors of both kinds may affect the work of both systems, in particular their cooperation and competition[4]. In general, the factors described in this paper enhance System 1 dominance and thus hinder the work of System 2 (the rational one).

Last but not least, one should see the psychological constructs and phenomena discussed below as *risk* factors. Their actual impact may depend, inter alia, on the types of evidence being evaluated or the type, model, and course of the proceedings. Examples of such relationships will be given in the descriptions of selected pitfalls.

3.1. *Meta-cognitive factors*

Meta-cognitive factors that may influence the evaluation of evidence include affective, motivational, individual (differential), social, and situational (external) phenomena, processes, and properties. In the following subsections, I present examples of factors of each type.

3.1.1. *Affective factors*

Arguably the most important affective factors of evaluation are moods, i.e. long-term feelings of low intensity and often unspecified cause, and emotions, i.e. correlated changes in physiological arousal, feelings, cognitive processes, and behavioral reactions (including facial expressions) of an individual appearing in response to a situation assessed by them, not necessarily consciously, as important (EKMAN & DAVIDSON 1994). Both moods and emotions can influence the evaluation of oneself (self-esteem), other people, objects, and events.

The influence of mood on thinking depends on its type (valence). Among other things, it is believed that a positive mood stimulates creativity, problem-solving, and divergent thinking, while a negative mood encourages more detailed information processing, cognitive effort, and convergent thinking (BAAS et al. 2008; FORGAS 2013). From a legal perspective particularly instructive in this regard is an experiment conducted by Joseph FORGAS and Rebecca EAST (2008).

Participants in this experiment were shown videos to put them in a good (happy), neutral, or bad (sad) mood. They then watched videos of four people denying that they had committed a theft (two of whom were lying). Finally, participants were asked to assess the truthfulness (innocence) of these four people. Respondents in a negative mood were more likely than others to believe that the people in the recordings were lying. More importantly, however, these participants were more accurate in evaluating "suspects' testimonies". While the average effectiveness of detecting lies (guilt) by participants in a neutral or positive mood corresponded to the random one (50%), the participants in a negative mood were significantly (statistically) more effective. (The efficiency of "truth detection" did not depend on mood though.)

However, the results of this and other experiments described in this paper should not be interpreted too literally. A cautious conclusion here would be to say that the evaluator's mood may affect the evaluation of the credibility of explanations, testimonies, statements, etc. The direction and strength of this influence may be determined by numerous moderating variables. Let us note for example that in the experiment by Forgas and East lying occurred in as many as half of the recordings. Perhaps if the proportion of suspects telling the truth had been higher, a negative mood would lead to erroneous (too harsh) assessments of credibility.

Even more complex is the question of how emotions affect evaluation (CLORE & HUNTSINGER 2007). Various emotions can modify the mode and content of the assessment in different ways.

[4] Some factors may be considered inputs, outputs, or elements of one of the systems (for example heuristics are one of the mechanisms of System 1).

For example, Simone Schnall, Gerald Clore, Alexander Jordan, and Jonathan Haidt (SCHNALL et al. 2008) investigated the impact of disgust on moral judgments (evaluations).

In their four experiments participants rated on seven- or nine-point scales—from "perfectly fine" to "extremely bad"—issues such as marriage between closest cousins or keeping a wallet found on the street. In each experiment, disgust was induced in half of the participants. For example, in the first experiment, there was an extremely foul odor in the lab. In each case, the judgments (mean scores) in the experimental group (that is among the participants who were "externally disgusted") were more severe than in the control group.

Furthermore, research in experimental psychology of law shows that legal evidence that evokes strong (usually negative) emotional reactions, such as gruesome autopsy photos or moving victims' testimonies, increases the severity of punishment, while information about the accused's tragic life history may—depending on what the evaluators think about the responsibility of the accused and what emotions it evokes in them—decrease or increase it (SALERNO & BOTTOMS 2009).

3.1.2. *Motivational and individual factors*

The evaluation process can also be influenced by the needs, desires, preferences, expectations, attitudes, and traits of the evaluator. Traits should be understood here as, relatively constant in time and between situations, predispositions to behavior consistent with certain patterns (MISCHEL & SHODA 1995). Interindividual variation (individual differences) concerns, among others, temperament, cognitive abilities (e.g. intelligence), and personality.

An important theoretical construct on the border of the psychology of motivation and the psychology of personality that significantly affects cognitive processes is the need for closure, i.e. the desire to obtain clear and certain answers and ambiguity aversion (WEBSTER & KRUGLANSKI 1994). The need for closure may motivate the search for information—people with a high need for closure want to remove ambiguity as soon as possible and for as long as possible (KRUGLANSKI & WEBSTER 1996). However, this can lead to resistance to change of inaccurate, quickly-made (based on partial data only) assessments, oversimplification of information processing, reduced hypothesis generation, and increased susceptibility to cognitive biases. The individual level of the need for closure is relatively constant over time and between situations but it remains under the influence of external variables—for example, it is intensified by time pressure (VAN HIEL & MERVIELDE 2003).

The influence of motivational mechanisms on evaluations, beliefs, conclusions, and decisions is also illustrated by three well-known psychological phenomena (illusions) aimed at maintaining positive self-esteem and well-being. The first is wishful thinking, i.e. the tendency to accept as true beliefs that are beneficial to us (KRIZAN & WINDSCHITL 2009). Wishful thinking is closely related to self-deception, which means taking actions (often unconsciously) to confirm or cause a desired belief (VON HIPPEL & TRIVERS 2011). Self-deception can involve distortions in perception, information processing, and judgment. The third important phenomenon is the reduction of cognitive dissonance (FESTINGER 1962). Having two contradictory or incompatible beliefs usually causes discomfort and the need to change one of them. Particularly strong may be postdecisional dissonance resulting from the choice of one of several comparably attractive options. In this case, a typical reaction is to overestimate the selected option and underestimate the rejected options (BREHM 1956; LEE & SCHWARZ 2010). Rationalization (ex-post justification) of a decision or evaluation may therefore be related to the cognitive omission of its true causes.

In a legal context, cognitive dissonance may be, for example, the result of the incompatibility of evidence with the initial hypothesis (theory or intuition) regarding the case (ASK et al. 2011). Potential ways to reduce this dissonance are belief change (rejection of the initial hypothesis) and its opposite: skepticism towards evidence. The latter, however, is asymmetric—the

reliability of "flexible", i.e. relatively subjective, evidence (e.g. witness statements), is rated lower than the reliability of evidence the interpretation of which is relatively objectified, e.g. DNA tests (Ask et al. 2008; Marksteiner et al. 2011). Therefore, the evaluation of flexible evidence inconsistent with the a priori hypothesis seems particularly prone to errors.

Style and efficiency of reasoning, assessing, problem-solving, etc. obviously depend on intelligence and cognitive abilities but are also (moderately) correlated with "non-intellectual" individual characteristics. The Big Five model (Costa & McCrae 1992)—arguably the most influential theory of personality—distinguishes five basic personality traits: neuroticism, extraversion/introversion, agreeableness, conscientiousness, and openness to experience, virtually each of them having cognitive aspects. For example, a high level of openness to experience is associated with intellectual curiosity, divergent thinking, creativity, and a preference for novelty and diversity (Komarraju et al. 2011), thus, in a way, is the opposite of the need for closure.

3.1.3. *Social and situational factors*

The aforementioned time pressure is not the only external factor that can influence thinking about evidence and facts. Keeping in mind the academic nature of the classifications of mental mechanisms and their moderators, it is worth distinguishing, as far as possible, the information context of evaluation and decision-making (see below, 3.2) from the "physical" (time, place, external stimuli, etc.) and social context.

The social context includes phenomena related to the actions, characteristics, or mere presence of other people. Some of them, such as groupthink syndrome (Janis 1982), concern collective evaluation and decision-making, but many affect individual assessments and decisions as well.

Conformism is a perfect example of a social mechanism that poses a serious threat to the freedom and rationality of the evaluation process. In Solomon Asch's (1956) classic experiments groups of people were asked to compare the length of lines shown to them, with rankings given individually. The actual participants in the experiment did not realize that all the other people in their group were instructed to give wrong answers at certain times (even when, and perhaps especially when, the right answer was obvious). Group pressure turned out to be so strong that real participants very often adapted their answers to the majority, and some even claimed that they saw what the group dictated. In legal contexts, conformism seems to be a problem primarily in the case of group decision-making, but even individual evaluations may be influenced by beliefs and expectations within the social environment (parties in the case, public opinion, superiors, politicians, etc.).

On the other hand, various types of characteristics of the assessed person may influence the evaluation of their statements (e.g. testimonies), in particular as to credibility. The key mechanism of this influence is the halo effect, i.e. extrapolating the assessment of one trait to other issues (Nisbett & Wilson 1977a). This effect is related to the general preference for unambiguous evaluations (the stronger, let us recall, the greater the need for closure). An example of the halo effect is ascribing high intelligence, desirable personality traits, and even happiness in life to physically attractive people (Eagly et al. 1991). People considered physically attractive are statistically more likely to find a job, earn more, or win elections (Hosoda et al. 2003; Verhulst et al. 2010).

Moreover, research in the field of experimental psychology of law suggests that attractive defendants get more favorable sentences (Stewart 1980) unless beauty has been a means to the crime (Sigall & Ostrove 1975). This relationship may be particularly strong if the accused is a woman (Efran 1974), but disappears in the case of the most serious crimes (Downs & Lyons

1991). Lower sentences can also be expected when the attractiveness of the perpetrator and the juror is similar (Darby & Jeffers 1988). See also Mazzella & Feingold 1994.

The halo effect is not limited to physical attractiveness. From the perspective of legal evidence evaluation, especially instructive are studies demonstrating the positive impact of a witness's self-confidence on the assessment of their credibility (Penrod & Cutler 1995; Bradfield & Wells 2000). One should note that the self-confidence of a witness often does not correlate or even correlates negatively with the accuracy of their testimony (Smith et al. 1989).

Confusing self-confidence with credibility is just one of many problematic tendencies in evaluating the accuracy of witness statements. Another example is ignoring the influence of external factors (e.g. suggestions) on the form and content of testimonies (Memon et al. 2003). The accuracy of testimonies is, as a rule, simply overestimated (Lindsay et al. 1981). It is worth a mention that contradictions in testimonies may lead to lower assessments of their credibility and accuracy without affecting legal decisions (Berman et al. 1995).

In the case of expert opinions (expert witness testimony), the influence of the status of the expert on the evaluation of their opinion may be significant (Pornpitakpan 2004). The evaluation is usually not independent of the assessments of previous opinions and the expert's reputation (the prestige of the institution to which they are affiliated may also matter). Empirical confirmation is found, for example, for common intuition about the benefits of having the label of a "good student" (Darley & Gross 1983). It is in particular for this reason that reviewers of scientific papers should not know the names of authors. However, anonymization is not always possible or even desirable. One should remember that the halo effect leads to errors of judgment when in fact there is no correlation between the issue being assessed and the issue affecting the evaluation (or there is a correlation opposite to the applied). Due to the specialist nature of the matter, a judge evaluating the credibility of an expert opinion often has few cognitive tools at their disposal. In such a situation, relying (among other things) on the expert's carefully assessed achievements seems reasonable. However, it is certainly advisable to limit the impact of personal relationships (including simple liking) between judges and experts.

The evaluation may also be influenced by variables related more to the situation of assessment than to its participants (situational factors). An obvious example here is distractors, i.e. stimuli that divert attention from the object of reflection. By engaging cognitive resources they hinder the use of System 2. Distractors can be external (e.g. noise) or internal (e.g. perseverative thoughts). Their influence is particularly strong in the case of cognitive overload (time pressure, fatigue, stress, excess of information and tasks, etc.—Lavie 2010).

Other situational factors may operate in more complex ways. As to trials, it has been demonstrated, for example, that the use of a computer presentation in court may increase the understanding of presented evidence, the evaluation of its credibility, and favor for the party presenting it (Hewson & Goodman-Delahunty 2008; Feigenson 2010). In the case of witness testimonies, their order may be important—the presentation of witnesses according to the chronology of events in the case generally gives better results (rather in terms of benefits for the particular party than the accuracy of factual findings) than according to the importance of their testimonies (Pennington & Hastie 1988 and 1990).

3.2. *Cognitive factors*

Affective, motivational, individual, social, and situational factors are in necessary, complex, and mutual relations with mechanisms traditionally defined as cognitive (thus the former are rather meta- than non-cognitive). Building on Haack's (1993) account of evidential elements of belief's causal nexus, I divide cognitive factors into experiential and belief-related, i.e. directly associated with the formation and content of beliefs.

3.2.1. *Experiential factors*

Experiential factors could be further divided into perceptual, introspective, and mnemonic. However, the vast majority of research, significant from the perspective of legal fact-finding, on perception and memory concerns not the process of evidence evaluation, but witnesses (in particular eyewitnesses) and their mistakes. Knowledge of witness psychology is certainly invaluable for the evaluator of testimony (lack of it may be considered another psychological pitfall), yet due to the limited volume of this paper, let me refer the Reader to the relevant literature (e.g. GUDJONSSON 1992; LOFTUS 1996, 2005, 2019; MEMON et al. 2003; WIXTED & WELLS 2017).

Introspection instead seems to be of little importance for legal fact-finding which is based primarily on external empirical evidence. Legal evidence is a document or testimony, but not a judge's thought, even if related to the case. On the other hand, introspection provides the subject of cognition with insight into their cognitive processes and beliefs. The quality (accuracy) of this insight, however, is debatable.

Research on introspection shows that people's sincere explanations for their actions may be untrue. Richard NISBETT and Timothy WILSON (1977b) gave numerous examples of this phenomenon in their classic work *Telling More Than We Can Know: Verbal Reports on Mental Processes*. We often lack access to what is happening in our mind, so we interpret our behavior using folk psychology—common (a priori) theories about the human psyche (GOLDMAN 1993; KOZUCH & NICHOLS 2011). In particular, some "reasonings" may be only post hoc justifications of intuitively made judgments or decisions (HAIDT 2001). From a legal perspective, this leads to questions about the reliability of the reasons given for legal decisions, including explanations of factual findings. As rightly pointed out by Richard POSNER (2010), judges' reports on their cognitive processes should be considered only a source of hypotheses.

3.2.2. *Belief-related factors*

The content of new beliefs (in particular evaluations) depends both on the way they are formed and the content of already-held beliefs. Therefore belief-related factors involve the principles of functioning and systematic errors (tendencies) of the human mind related to the formation of beliefs, as well as the beliefs themselves (knowledge, opinions, etc.).

3.2.2.1. *Belief-formation factors*

From the perspective of identifying psychological pitfalls in legal evidence evaluation arguably the most interesting belief-formation factors are heuristics and cognitive biases.

3.2.2.1.1. *Heuristics*

Heuristics, i.e. practical, intuitive, not necessarily conscious rules of assessment, decision-making, or problem-solving (GIGERENZER & GAISSMAIER 2011) are the basic mechanisms of shaping beliefs within System 1. Heuristics are simple, fast, and frugal (in terms of cognitive resources), but also fallible—not in all cases they bring the correct results.

In a classic article, Amos TVERSKY and Daniel KAHNEMAN (1974) described three commonly used heuristics of judgment under uncertainty: the representativeness heuristic, the availability heuristic, and the anchoring and adjustment heuristic (effect). Each of them can be presented as replacing the question to be answered with a simpler one (KAHNEMAN 2011). The fallibility of heuristics is related to the fact that even a correct answer to the latter question does not always solve the original problem.

The representativeness heuristic replaces the question "What is the probability that object X belongs to class Y?" with the question "To what extent is X representative of Y?". The person using it relies then on the similarity of X to their prototype or stereotype of Y.

One of the pitfalls related to the representativeness heuristic is the base rate fallacy (neglect). In a study by Kahneman and Tversky participants read the following description: «Steve is very shy and withdrawn, invariably helpful, but with little interest in people, or in the world of reality. A meek and tidy soul, he has a need for order and structure, and a passion for detail» (Tversky & Kahneman 1974, 1124).

The participants were asked to rank a list of occupations that Steve could have, from most to least likely. Rare occupations with stereotypes fitting Steve's description (e.g. librarian) were rated as more likely than much more common professions "not matching" the description (e.g. farmer). Probability was therefore assessed more based on representativeness (similarity to the stereotype) than the base rates (ratios in the population, e.g. farmers to librarians).

The base rate neglect may be of fundamental importance for the rational evaluation of legal evidence. Participants in another Kahneman and Tversky study were presented with the following case:

> «A cab was involved in a hit and run accident at night. Two cab companies, the Green and the Blue, operate in the city. You are given the following data:
>
> (a) 85% of the cabs in the city are Green and 15% are Blue.
>
> (b) a witness identified the cab as Blue. The court tested the reliability of the witness under the same circumstances that existed on the night of the accident and concluded that the witness correctly identified each one of the two colors 80% of the time and failed 20% of the time» (Tversky & Kahneman 1982, 156).

The participants were asked to assess the probability that the cab involved in the accident was blue rather than green. The most common answer was 80%. Most therefore based their estimates solely on the credibility of the witness, completely ignoring the a priori probability resulting from the ratio of both types of cabs in the city, i.e. the base rate. The correct solution—calculated with the use of Bayes' theorem—is only about 41%[5].

Contrary to the testimony of a fairly credible witness, it is then more likely that the accident was caused by a green cab. This experiment points out the potential dangers of disregarding statistical evidence (Wells 1992). Statistical information may prove valuable in the process of finding the facts of the case, and in particular help in evaluating the credibility and accuracy of other evidence. In a case such as the above, only by taking into account the base rate one can avoid a serious error in fact-finding and a violation of the rational evaluation of evidence principle. In practice, of course, it is not so much about specific numbers (which, in principle, are unavailable) but about thinking within System 2, and thus, among other things, checking the correctness of heuristic solutions, including taking into account statistical data and regularities.

Interestingly, when in another experiment the base rate was presented as the proportion of accidents caused by the cabs of both companies, the participants were much more likely to apply it. Humans are generally better at causal inferences (or inferences with a semblance of causality) than at probabilistic reasoning (Kunda et al. 1990).

The second of the heuristics described by Kahneman and Tversky in their 1974 paper—the availability heuristic—is based on replacing the question about the frequency of a particular

[5] Of course, this solution is precise only with a certain idealization, including in particular the assumption that all information from the description is true and accurate. Moreover, one must ignore the possibility that not all cab drivers in the city work for one of the two companies, that the cab came from another city, etc. However, even without idealization, taking into account the adequate base rate increases the probability of the conclusion being correct.

category or the probability of a particular event with the question about the ease of recalling or imagining respective examples. This ease is in turn influenced by individual experiences, emotions, media, and other factors. A well-known example of the availability heuristic in action concerns the fear of air travel. Statistics prove that the plane is the safest means of transport, but media coverage or movies on plane crashes strongly affect memory and imagination. In research by Paul Slovik's team, the majority of respondents believed, among other things, that whirlwinds were a more likely cause of death than asthma (LICHTENSTEIN et al. 1978). Meanwhile, in the United States deaths from asthma were at that time twenty times more common than deaths from whirlwinds. The frequency of unusual (rare but spectacular) events is overestimated, and the frequency of common (frequent) events is underestimated, which directly translates into probability assessments.

The availability heuristic can affect the evaluation of legal evidence. The authors of the Dahlem Workshop 2004 report on the role of heuristics in litigation indicate, for example, that attorneys try to present evidence in such a way that the facts and conclusions most favorable to their clients are the easiest to remember and the most emotionally charged (PIPERIDES et al. 2006). One should thus note that the actions of parties' lawyers generally hinder the effective use of heuristics by judges and jurors and they may be intentionally aimed at taking advantage of cognitive biases and fallacies. Emotional, picturesque evidence can have a much greater impact on the decision than abstract information of objectively greater probative value (GUTHRIE 2006).

Mental availability affects judgments on the likelihood of events, the relevance of ideas or information (KURAN & SUNSTEIN 1999), and perhaps even the truth of statements. An extreme example of this third relationship may be the illusory truth effect, i.e. the tendency to consider information repeated many times true or trustworthy (HASHER et al. 1977; POLAGE 2012). The evaluation of the truth of a statement is influenced, among other things, by the impression of its familiarity and comprehension. Repetition makes it easier to process information, increases its (subjective) comprehensibility, but above all makes it more familiar. The impression of truthfulness (credibility, accuracy) of a given piece of information may also be the result of recalling it from memory (OZUBKO & FUGELSANG 2011). Therefore, known (familiar), mentally accessible, and easy-to-process statements seem true to us. Moreover, such subjective and insignificant properties of information as the ease of pronouncing the name of its source may also have an impact on the evaluation of credibility (NEWMAN et al. 2014). One may note that even prior knowledge may not protect against the illusory truth effect—someone's (true) belief may change as a result of their repeated contact with its negation (FAZIO et al. 2015).

The third of the heuristics of judgment (assessment) under uncertainty described by Kahneman and Tversky is the anchoring and adjustment heuristic (effect). When estimating numerical values, people often adjust—usually not enough—their guesses starting from the first number that comes to their mind (the anchor). They associate more or less appropriate values with the task (for example as a result of suggestion or priming) and then adjust the estimate until it no longer seems to be too low or too high, but usually fail. People asked to quickly estimate the product 1 x 2 x 3 x 4 x 5 x 6 x 7 x 8 give a much lower number than those given the inverse equation: 8 x 7 x 6 x 5 x 4 x 3 x 2 x 1 (in the first case the anchor is 1, in the second 8). In addition, both groups give estimates significantly lower than the actual product—40320 (TVERSKY & KAHNEMAN 1974). Note that the anchor may have nothing to do with the estimated value.

Even professionals are not free from the influence of anchors. The anchoring effect was observed inter alia in studies involving real estate agents (NORTHCRAFT & NEALE 1987), physicians (BREWER et al. 2007), and—which is of importance in the context of legal fact-finding—judges. One of the experiments by Birte Englich, Thomas Mussweiler, and Fritz Strack (ENGLICH et al. 2006) involved experienced German judges and prosecutors (on average

over 13 years in the profession). They were asked to evaluate evidence (including the opinion of a forensic psychologist, explanations of the accused, and witness testimony) in a case of multiple theft and to estimate the appropriate penalty. At the same time, they were informed that the penalty proposed in the indictment was determined randomly (half of the participants were suggested 3 months of community service, the other half—9 months). Despite this information, the numbers from the indictment influenced the decisions. Participants who had been suggested 9 months proposed significantly harsher sentences (on average 6 months) than those who were suggested 3 months (on average 4 months). Professional lawyers (as a group) thus turned out to be—arguably within their expertise—susceptible to the anchoring effect despite receiving information on the randomness (irrelevance) of the anchor.

Evaluation (and misevaluation) of legal evidence can be also associated with several heuristics described by researchers other than Kahneman and Tversky, among others the affect heuristic (SLOVIC et al. 2007; RACHLINSKI 2006) and the take-the-best heuristic (GIGERENZER & GOLDSTEIN 1999; PIPERIDES et al. 2006).

To sum up, according to Kahneman and Tversky heuristics are rather effective in everyday life but, as they answer simplified questions, in more cognitively demanding contexts systematically lead to mistakes and, as a result, to the formation of false beliefs. They may therefore limit the rationality of fact-finding, evaluation of evidence, and decision-making. This view is to some extent questioned by, among others, Gerd Gigerenzer (GIGERENZER 2006; GOLDSTEIN & GIGERENZER 2002; TODD & GIGERENZER 2012).

3.2.2.1.2. *Cognitive biases*

Among belief-formation factors (and pitfalls) one can also include cognitive biases—general, mostly subconscious tendencies in human thinking leading (even in everyday life) to systematic, predictable errors (HILBERT 2012). In the context of the evaluation of legal evidence, the confirmation bias and the hindsight bias are especially worth discussing.

Confirmation bias consists in researching, memorizing, recalling, and interpreting information in such a manner as to confirm already-held beliefs or hypotheses (NICKERSON 1998). It is thus a tendency to check assumptions, test hypotheses, or evaluate evidence in a biased way. The possible explanations of this tendency are cognitive parsimony in relation to limited information processing resources (STANOVICH 2009) and wishful thinking, whereas the resulting issues include, for example, polarization of views and attitudes (aggravation of disputes even if the parties have the same data at their disposal), perseverance of beliefs (upholding beliefs despite the supporting evidence having been undermined), primacy bias (relying on prior more than on later information) and illusions of correlations[6] (perceiving non-existent relationships between phenomena, persons, properties, etc.—GOLDING & RORER 1972).

Confirmation bias can influence thinking in legal contexts (NICKERSON 1998, 193 f). Judges and juries may favor certain, especially intuitive, conclusions and disregard alternatives. Extensive and complex evidence is fertile ground for the polarization of views (MYERS & LAMM 1976). Confirmation bias is also strictly associated with the prosecutor's fallacy (THOMPSON & SCHUMANN 1987; LEO & DAVIS 2010). In general, it is an error in statistical inference consisting of the assumption that a low probability of event A occurring given event B [P(A|B)] implies a low probability of event B occurring given event A [P(B|A)]. As the name suggests, this error may easily appear in the arguments of the prosecution in criminal trials. A typical example is inferring that a low probability of finding a particular piece of evidence (e.g. a DNA match) when the accused is innocent indicates a low probability of the accused being innocent when

[6] They should not be confused with the correlation fallacy, i.e. the illusion of causality.

this piece of evidence appears (THOMPSON et al. 2003; FENTON et al. 2016). A real-life instance is the terrible Sally Clark case—see e.g. NOBLES & SCHIFF 2005.

The hindsight bias (also known as the saw/knew-it-all-along effect or creeping determinism) consists in evaluating past or present events (including the results of decisions one made) as more probable and predictable than they had been before occurring (ROESE & VOHS 2012). It is a manifestation of a more general tendency to overestimate one's own achievements, capabilities, and knowledge—overconfidence (MOORE & HEALY 2008). In some cases, it may be even associated with changes in the content of memories (STAHLBERG & MAASS 1997). The hindsight bias plays a role in historical, economic, or sociological analyses, but also in medical and legal practice. In the context of law, it primarily concerns the attribution of responsibility or the ability to predict certain events. The hindsight bias may result in the accused or the defendant being wrongly found responsible. On the other hand, the plaintiff (or even the victim) may be assessed as insufficiently prudent—events with negative consequences are retrospectively perceived as riskier (OEBERST & GOECKENJAN 2016). The hindsight bias is also one of the explanations of the inadmissible evidence effect, i.e. the impact of information disclosed in a trial and then excluded from it on the verdict (see e.g. KUCHARZYK 2017).

3.2.2.2. *Belief-content factors*

Evaluation of legal evidence may be also influenced by the very content of the beliefs held by the evaluator, from knowledge through opinions and views to stereotypes and prejudices (BODENHAUSEN 1988; YOURSTONE et al. 2008; SMALARZ et al. 2016). Fact-finding should be based on reliable knowledge and proper experience and take into account the information context (e.g. expert opinions) and normative context (in particular the procedural rules). Also with these "substantial" belief factors one can associate psychological phenomena that may hinder the rationality of evaluation.

Some pitfalls are related to the properties of expert knowledge (expertise), i.e. extensive and deep knowledge in a specific field (ERICSSON et al. 2018). In addition to the scope expert knowledge is distinguished by its structure (hierarchical with many levels of abstraction), high degree of proceduralization with preserved access to declarative knowledge (possibility of verbalization), and schemes (heuristics) for solving problems specific to the domain (experts quickly and aptly recognize patterns specific to such problems and usually use effective heuristics).

These properties generally give experts an advantage over laypersons and novices in the field. Experts recognize patterns (categorize problems) more accurately, analyze more information, and use the strategy of falsifying (rather than confirming) hypotheses more often. However, they sometimes lack flexibility when solving non-routine problems (LEWANDOWSKY & KIRSNER 2000). The reason for that may be automatization—as experience in the domain increases, relevant cognitive processes gradually become uncontrolled and unconscious (FRENSCH & STERNBERG 2014). When a problem is misrecognized as typical for the field, the triggered scheme may prove ineffective and at the same time hard to quit or modify. As legal fact-finding (evidence proceedings) is a kind of expert problem-solving, such rigidity may appear in authorities collecting evidence, expert witnesses as well as judges evaluating evidence (BLASI 1995; MENKEL-MEADOW 2000).

Moreover, experts, like virtually everyone, make mistakes in assessing their knowledge. They display both the hindsight bias (GUILBAULT et al. 2004) and the common overconfidence (ANGNER 2006).

In experimental studies, the accuracy of answers is, as a rule, significantly lower than the level of certainty declared by respondents (KORIAT et al. 1980). This effect depends neither on intelligence nor on expertise (LICHTENSTEIN & FISCHHOFF 1977). Of the answers given with 100% self-confidence, an average of 20-30% turns out to be false. Research involving experts (e.g.

physicians) shows that the subjective certainty of assessments increases with the acquisition of information. However, the accuracy often remains unchanged or even—when there is a lot of information (cognitive overload)—decreases. Hindsight bias and overconfidence occur of course also in lawyers (ANDERSON et al. 1997; GOODMAN-DELAHUNTY et al. 2010).

Finally, one should note that legal (in particular judicial) expertise seems to concern primarily the normative domain, i.e. it consists of the knowledge of legal norms and the ability to interpret and apply them. The expertise of judges (as a group) in evaluating evidence and fact-finding is, however, quite uncertain (SPELLMAN 2007; PORTER & TEN BRINKE 2009).

The question of whether lawyers reason about facts better when the context of the task involves legal norms or proceedings is therefore an interesting empirical research problem. A preliminary clue has been provided by Chris Guthrie, Jeffrey Rachlinski, and Andrew Wistrich, who in one of their experiments presented a group of federal magistrate judges with the following case (related to the Green/Blue cab problem):

> «The plaintiff was passing by a warehouse owned by the defendant when he was struck by a barrel, resulting in severe injuries. At the time, the barrel was in the final stages of being hoisted from the ground and loaded into the warehouse. The defendant's employees are not sure how the barrel broke loose and fell, but they agree that either the barrel was negligently secured or the rope was faulty. Government safety inspectors conducted an investigation of the warehouse and determined that in this warehouse: (1) when barrels are negligently secured, there is a 90% chance that they will break loose; (2) when barrels are safely secured, they break loose only 1% of the time; (3) workers negligently secure barrels only 1 in 1,000 times» (GUTHRIE et al. 2000, 808).

Participants of the experiment were asked how likely it was that the barrel that injured the plaintiff broke off as a result of the negligence of one of the workers. They answered by choosing one of four options (probability ranges): 0-25%, 26-50%, 51-75%, or 76-100%.

The correct (see above, nt.4) solution is (only) about 8.3%. However, accidents like this intuitively seem to be the result of someone's carelessness. Therefore, the 90% chance (the probability of an accident given negligence) may be easily misinterpreted as the probability of negligence given an accident (the prosecutor's fallacy), which may be seen as the probability that the accident was caused by negligence. In this experiment, the majority (about 60%) of the participants chose the wrong options and most of them went with 76-100%. On the other hand, the judges fared more than twice as well as physicians solving an analogous problem in a medical context (CASSCELLS et al. 1978)[7].

4. *Conscious evaluation of evidence*

The relative success of the participants in the above-described study may mean that some of them used System 2 instead of intuition (GUTHRIE et al. 2007). Intuitive thinking is the domain of System 1—the default and dominant (especially in cognitively difficult conditions) mode of operation of the human mind. Many errors in reasoning, evaluation, and decision-making may therefore be attributed to its automatic, fast, and unconscious processes. The rationality of free (and thus dependent on the individual mind) evaluation of evidence depends to a large extent on whether these errors can be avoided by the evaluator.

[7] One should however remember that the results of separate experiments can only be compared with extreme caution.

Therefore, it can be argued that conscious thinking is a necessary condition for the rationality of free evaluation of evidence. "Conscious" should be understood twofold here. Firstly, evaluation should be informed, i.e. conducted by a person who is aware of the existence of psychological pitfalls of evaluation (has basic knowledge of relevant theories and research) and does not underestimate them. Secondly, evaluation should be attentive (cognitively controlled), i.e. made with the use of System 2, which, if necessary, corrects its counterpart's mistakes.

The road to informed evaluation is simply through education. Unfortunately, even knowledge of eyewitness psychology is not common among judges (BJØRNDAL et al. 2021). Meanwhile, the psychology of thinking is a vast and dynamically developing field. The same applies to epistemology, which could be instrumental in the legal pursuit of rationality and truth.

Attentive assessment should therefore be facilitated all the more. One can try to use legal mechanisms for this purpose, but their effectiveness may be quite limited. It would seem, for example, that the introduction, where there is none, of the obligation to justify factual findings in writing, could encourage more careful reasoning. However, as mentioned above, such justifications may be as well derived from intuitive conclusions (LIU & LI 2019). On the other hand, the effects of experimental methods of attention, working memory, or cognitive control training on the overall functioning of the mind are not always straightforward (POSNER et al. 2015). Even *reasonable* external conditions (lack of distractors, pressures, etc.) may often be difficult to provide. Therefore, individual self-control, mindfulness, and epistemic ethos remain indispensable.

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