

# **Perceptions of risk and risky decision-making – what matters?**

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## **Abstract**

The existing theories from psychology and economics don't take into account each influencing factor with regard to the perception of risk and the decision making-processes in risky situations; thus, they need to be expanded, or rather, combined.

Comparing the definitions used and factors considered within the prospect theory and the unified risk attribution theory which are both building upon knowledge gained in behavioral economics challenging the rational choice theory I am trying to complete them by factors like personality, cultural background, emotions, stereotypical self-perception and biological sex as well as regulation and injunctive norms. Then, I focus on the currently known findings from neuroscience on the influence of gender on risk-aversion by critically examining the validity of its methodology and findings.

Looking at possible consequences of the influences mentioned above for regulation policy and personnel selection, I will show how to create more risk-aware environments.

This could lead to a restriction of the growth of the financial market at the time being decoupled from the growth of the real economy.

**Keywords:** financial market, growth, neuroeconomics, prospect theory, contextual and personal factors, uncertainty, risk-perception, decision-making

## **Perception of risk and risky decision-making – what matters?**

The ratio of the amount of money compared to the increase in the quantity of goods produced is called the depth of the financial market. This depth has been increasing globally since 1980:

Back then, the financial stock (comprising equities, private and government debt and bank deposits) was just as big as the real economy (measured as GDP), whereas in 2010 it was three times higher (McKinsey Global Institute, 2010).

Pineault (2016) proposes the image of a treadmill: The current monetary production economy is driven by the accumulation of fixed capital causing overproduction and overconsumption to keep it running. So even if the growth of the real economy, or its proxy GDP, has not been as fast as the growth of money both contribute to a higher material throughput (Pauliuk & Hertwich, 2015) within a world of limited biogeochemical resources.

Hence, the importance of looking at the growth-engines (Pineault, 2016) within the financial market and the widening of financialization meant to “to restore growth and profitability to the economy of the overextended hegemon of global capitalism (Streeck, Wolfgang, 2014, p. 51).

The rising amount of money had to find its way into products, derivatives and bonds which were promising the highest returns. Deregulation was just one aspect in this process, which made it easier to take on higher risks. In the following I want to look closer at actors within the financial market, and their perception of risk and their willingness to take such from the theoretical perspective of neuroeconomics.

Ailon explains how this growing financialization is shaping financial markets analogously to a gambling towards a sociological gambling. There are three parallel processes at work - first, a reflexive social distancing by actors within the financial market that draw a clear distinction between themselves and the social processes that lead to the formation of prices; second, a social

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forgetting of those dynamics thanks to seemingly objective numbers and graphs depicting developments of prices; third, the social dissociation from those people measuring risk and deciding on whether to take it or not from those who are affected by their decisions<sup>2</sup>. Even if chance in the financial area is partly dealing with math, social chance is underlying, thus finance resembles again a gambling game.

After a clarification of what psychology and economics are talking about when referring to “risk“, I will show the wide range of factors which need to be taken into consideration when describing and explaining results regarding risk perception and decision making. That leads to the question, whether the often-assumed gender-differences of being risk-averse or risk-seeking are methodically soundly arrived upon and if they are reliable.

Finally, consequences for politics in the field of reporting, regulation, and of education are discussed with the aim of highlighting factors that could contribute to an economy staying within the planetary boundaries (Rockström u. a., 2009).

## **Risk and financial markets**

In the neurosciences “[r]isk is often defined roughly as the estimated variance in potential outcomes, typically normalized by the magnitude of those outcomes.” [...]

The term uncertainty means different things in different settings, but it can be thought of as the psychological state of having limited information, as often occurs in the making of real-world decisions.

Research in neuroeconomics has investigated two main sorts of uncertainty: uncertainty about what outcome will occur, and uncertainty about when an outcome will occur. The former typically leads to what

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<sup>2</sup> Ailon mentions “Leerverkäufe” whose characteristic is that traders can buy and sell assets without or before owning them. Another illustration could be that many banks are acting on a global scale; thus, decisions taken on one end of the globe can have influences on the opposite side, which is unimaginable far away.

is often called risk aversion (with the related concept of ambiguity aversion); the latter leads to delay discounting. (Purves et al., 2008)

Drawing on the distinction between probability and uncertainty given by Keynes (Keynes, 1921, p. 7f.; as well as Minsky, 1996, p. 359; Rotheim, 1988) the relational aspect is emphasized: A certain probability arises in references to a specific amount and kind of knowledge that one person disposes of on how rational it is to believe in the occurrence of an outcome. In social systems such as the financial market, however, there is uncertainty prevailing, since one cannot know how changing probabilities or the upcoming of new factors influence one another and the hitherto known probability. That links back into the psychological understanding of risk as a certain probability assigned to a specific outcome and to the neuroscientific idea of uncertainty about the relation between premises and consequences.

It is not only when new evidence about the market becomes publicly available that economic agents change the way they perceive those salient relations, but people also just differ in their perception of those relations. That's why I want to present the models of risk-perception developed so far, and discuss if and what factors they are missing for explaining such differences.

## **2.2 Existing models**

### **2.2.1 Rational choice and bounded rationality**

Herbert Simon (1979) argues against the assumption of rational decision making or utility maximization, since its predictions are easily falsified when they get empirically tested. He was one of the first to favor a form of bounded rationality, which means that people facing decision-situations do not compare marginal costs and revenues of two or more options whose future implications and their evaluation are already known. This does not fit together with “gut feelings” or taking emotions as evaluative information, with limited cognitive resources and with the above described uncertainty which no one can escape or avoid.

People rather try to come to a decision that is satisfactory, not necessarily optimal and they orient towards sub-goals, which are more concrete and thus easier to identify then. Thus, what counts as a high risk to someone could be to someone else hardly risky at all. If economic agents possess only bounded rationality, it is easier to explain empirical findings. For example, that aggregated bounded rational behavior need not lead to rational market behavior; rather, unexpected crashes can occur, when nobody accurately accounts for the risks of structural mortgage obligations due to their limited understanding of their complex mechanism.

### **2.2.3 Prospect theory**

Another principle of rational-choice theory, the description invariance (that means that people are expected to consistently decide according to their preferences when facing identical problems which are differently depicted or presented) is questioned by the findings of Kahnemann and Tversky regarding the framing or presentation of decision-making situations.

They show in their latest version (1992) of prospect theory<sup>3</sup> how to integrate empirical findings challenging the assumptions of expected utility theory in line with a rational choice regarding human decision-making when facing risky and uncertain (i.e. when the probabilities of outcomes are not known) prospects. They state, “human choices are orderly, although not always rational in the traditional sense of this word” (p. 317).

There are framing effects in the first phase of a decision, when representations of the task are formed. That means, that depending on the presentation of a choice (referring to gains or losses and not the final assets, be it money or materials) there are different preferences to be noted.

Secondly, people exhibit nonlinear preferences, i.e., a change of the probability of an outcome next to the extreme ends of the distribution weighs more than such a change in the mid-part.

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<sup>3</sup>This theory is meant to describe how people form expectations regarding future events having unknown probabilities, thus it is dealing with the perceived prospects.

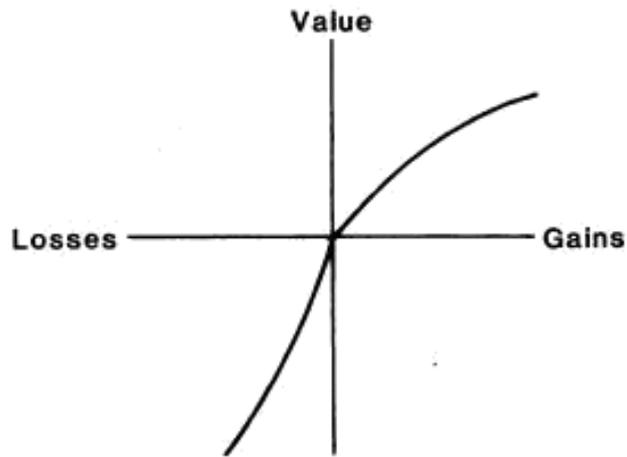
This refers to Allais' finding "that the difference between probabilities of .99 and 1.00 has more impact on preferences than the difference between 0.10 and 0.11" (p. 298).

Then, there is the so-called source-dependence, which means that the origin of an uncertain event plays a role in shaping people's preferences. Heath and Tversky (1991) found that people prefer uncertain choices within areas they know well over risky ones with less ambiguity. Thus, the weighting functions of uncertain prospects need to be further investigated (cf. 317).

Moreover, there is risk-seeking and not risk-avoiding to be observed, when there is a tiny probability of gaining a large prize and "when people must choose between a sure loss and a substantial probability of a larger loss" (p. 298). Finally, there is loss-aversion, which means that decision-makers try to avoid losses to which they contribute more significance.

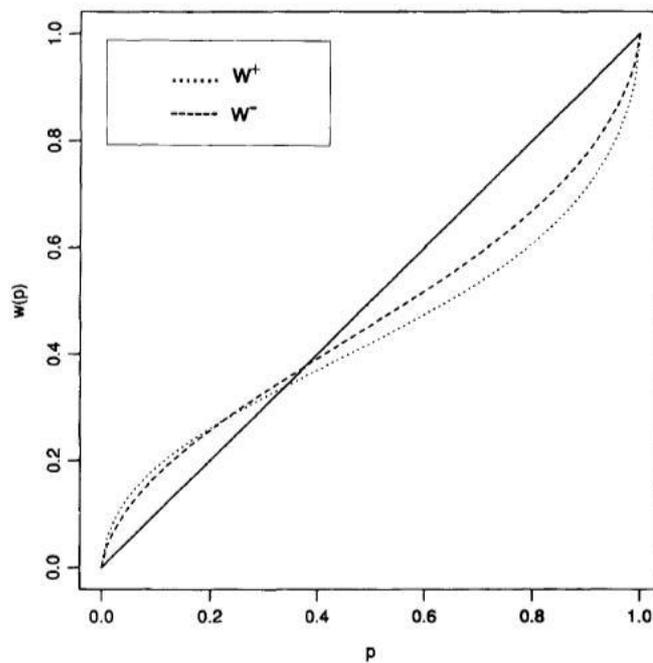
In the second phase, the valuation phase, each expectation is given a value "multiplied by a decision weight" for a certain probability (p. 299), leading to a cumulative functional depicting it. The decision weight can also be described as the marginal improvement due to the expected outcome.

In one of their earlier articles (Tversky & Kahneman, 1981) they combine the ratio of losses and of gains in one graph, which is meant to aggregate over individual decisions and provide a general impression of risky choices. It is a S-shaped function, which illustrates the above-mentioned nonlinearity of preferences and the risk-aversion. Its shape below the reference point of zero is convex and above it is concave symbolizing the higher value attributed to changes at the lower and higher end. And it can be seen that "the response to losses is more extreme than the response to gains" (p. 454).



**Fig. 1. A hypothetical value function.**

Based on their findings they discern gains and losses and high and low probabilities, thus speaking of a “fourfold pattern of risk attitudes” (p. 306) as shown in the graph below.



*Figure 3. Weighting functions for gains ( $w^+$ ) and for losses ( $w^-$ ) based on median estimates of  $\gamma$  and  $\delta$  in equation (12).*

The diagonal represents the indifference-curve of rational choice or expected utility theory, the more curved line symbolizes weighting function for gains (or the indifference curve for gains) and the slightly less curvaceous line stands for the weighting function of losses (or the indifference curve for losses).

If gains are attributed a low probability, then people show risk-seeking behavior; if they are associated with high probabilities then they are turning risk-averse. For losses, almost the inverse pattern can be found: If losses have a low probability then decision-makers show risk-aversion; if they have a moderate to high probability then they have risk-seeking preferences.

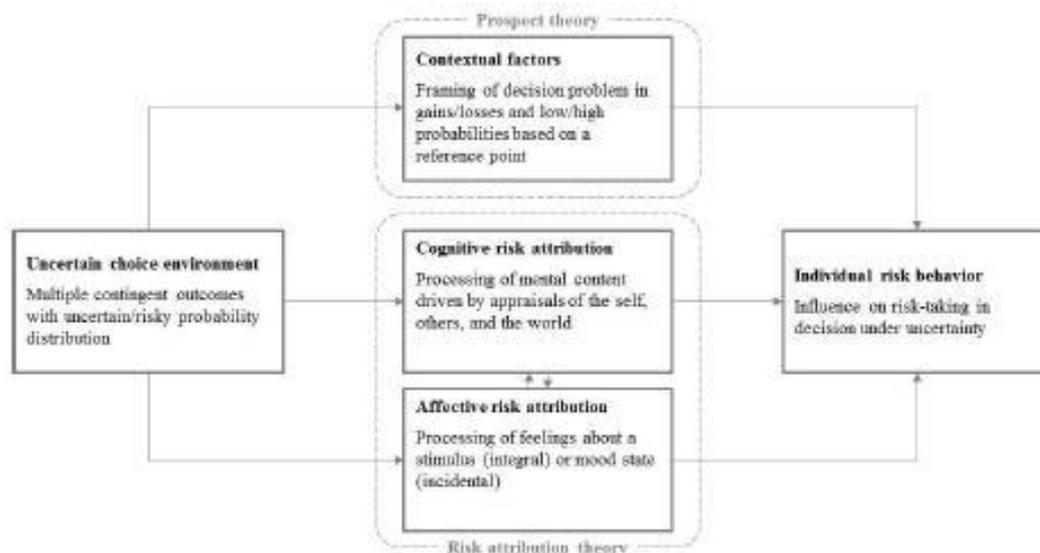
This can be explained by the fact, that decision-makers tend to overestimate low probabilities and underestimate the occurrence of high probabilities. Hence, their insensitivity to changes in probability in the mid-range.

There are preliminary findings by Sitkin and Weingart that show that framing effects, besides other influencing variables, exercise their effect on risky decision-making not only directly, but also through the perception of risk and through the individual risk-propensity. Thus, the risk-perception as well as a person's willingness to take risks or rather avoid them are mediating the influence of the problem framing and of the past positive or negative consequences one has made with taking risks. The authors propose that there are many more variables (like age, gender, organizational culture, rewards or self-efficacy) influencing risky decision-making whose mediated role (through risk perception and -propensity) should be further examined.

The model, which I am going to present next, is already taking into account the effect of emotions; still, there remain more variables likely to influence people's decision making behavior.

#### **2.2.4 Unified risk attribution model**

Hönl, Meissner and Wulf (2017) venture to elaborate the prospect theory of Kahnemann and Tversky on risky decision making, i.e. the question “how are choices made when outcomes are uncertain” (p. 4) by adding dispositional factors to the contextual ones postulated by prospect theory. Based on various empirical research showing that the results predicted by prospect theory change, when mood and feelings are taken into account (cf. p. 5), they claim that they are able to explain those anomalies.



Their model, as shown above, leads to modifications in the value function and the weighting function as known from prospect theory (see the paragraph above).

So, a form of loss-aversion, “the so-called disposition effect in the stock market which describes the tendency of investors to retain losing stocks too long and sell winning stocks too quickly” (p.

8) might be modified. Thus, if a person has a high illusion of control linked to higher risk-taking, they might opt for retaining collateralized mortgage obligations hoping for a gain to be realized.

As the authors put it: “As gains seem more attractive and losses appear less discouraging, the value function (when visualized on a plot) becomes steeper for gains and flatter for losses, respectively. Hence, the effect of loss aversion is attenuated.” (p. 11).

The writers of this article posit five hypotheses concerning the influence of cognitive and affective factors on risky decision-making. The cognitive aspect is operationalized as core self-evaluation (“individual cognitive disposition”, p. 12), that “comprises four dimensions—namely, self-esteem, locus of control, generalized self-efficacy, and emotional stability—” (p. 13) and the affective one with four different parts, which are “information, a spotlight, common currency, and a motivator” (p. 13).

1. The higher the self-esteem and the internal locus of control the higher are probability estimates/decision weights for gains, because people show more optimism, more willingness to take risks and they think that it is up to them to influence events and “the course of action” (p. 15) as they wish. Vice versa, the lower the self-esteem and the more external the locus of control is the more people tend to judge losses to be more probable.

2. The higher the general self-efficacy (the conviction that one possesses all the abilities required to achieve one’s own goals) the higher the perceived values/subjective utilities of gains as this person shows more “appreciation of favorable events and acceptance of occasional setbacks” (p. 16). People with low levels of general self-efficacy attribute more importance to losses, which they want to avoid primarily.

3. Because of the mood-congruence effect (people are more optimistic when they are in a good mood (and vice versa), that is, they expect things to happen that are fitting to their current emotional state), a positive affect (understood as a source of information and as a common currency allowing to reduce complex decisions to simpler ones concerning ones’ gut feeling) induces people to higher give higher probability estimates/decision weights to gains. Once again, depressed or discouraged people will overestimate the likelihood of negative events or losses.

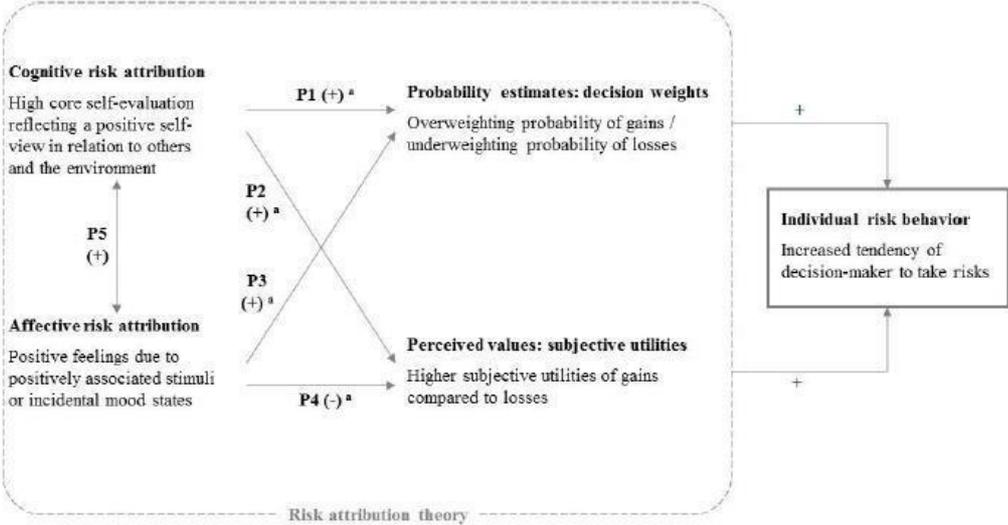
4. Motivated by a positive affect people attribute higher perceived values/subjective utilities to losses in comparison to similar gains, since they anticipate the ensuing emotions and their effect on their current emotional state. Being in a pleasurable mood one negative event has a higher

impact on you as it poses a greater risk of a deterioration in sentiment. Vice versa, being in a negative affective state one gain can contribute immensely to an improvement in sentiment, which leads to higher perceived values/subjective utilities for gains.

5. Affect as a spotlight influencing, initiating or hindering cognitive processes interacts with emotional stability (there are mixed results of the form of the interaction so far). That is, “certain affective states give rise to cognitive appraisals” (p. 20) and at the same time a low manifestation of emotional stability influences affective states, like anxiety and a negative mood.

The model, as shown below, should now further be investigated in empirical examinations.

**Causal Model of Risk Attribution Theory**



a. The symbols „+“ and „-“ relate to higher/lower levels or more positive/negative for cognitive or affective risk attribution, respectively and should thus be understood in line with our respective propositions

**2.3 Incomplete models**

### 2.3.1 missing contextual and personality factors

People are less risk-averse when they are less neurotic, less agreeable and have higher levels of ambition; in contrast, such personality traits have no influence on their ambiguity aversion (Borghans, Heckman, Golsteyn, & Meijers, 2009).

Risk perception and affect/Self-Monitoring/MoodDecisionMaking/Positive Affect/Information Integration/Risk propensity scale/Sensation Seeking/Autoritarismus/Kognitive Geschlossenheit/Confirmation Bias/Typologie Framing/DecisionRisk/Culture Loss Aversion/Affect Decision Accounting/Affect Risky Choice/Ambiguity Time

personality (tolerance of ambiguity, self-efficacy, locus of control, risk-seeking, value attributed to money), cultural background, emotions, stereotypical self-perception (gender-role orientation and gendered nature of the financial market) and sex or rather biological factors (testosterone), as well as regulation (need for cognitive closure, personal liability, self-monitoring) and injunctive norms

After showing which personal factors shape risk-perception and risk-taking one can broaden the view and see how the context of such decisions matters equally.

Thakor (1996) describes the structure and design of financial systems looking at financial intermediaries like banks and states that the financial crisis of 2008 and 2009 showed that “the design of the financial system could impinge on real activity and economic development” (p. 919). Most of those factors, like the “banks’ role in liquidity creation and the impact of bank runs” (p. 924) pointing to the setting of the equity ratio, are more of structural factors, which do not influence individual decision making and risk-perception straightforwardly. They are rather part of the regulation system with rules, law regulations and requirements.

Still, another factor, the “screening activities and credit rationing of banks” (p. 926) has more of direct effects on agents within the financial market. If the interest rate for bank loans is set too high (to put it precisely: so high, that the market is cleared), then all the safe borrowers might have chosen to leave the credit market, because they know that they will be able to receive funds on the more individualized financial market where. So, a higher short-term gain due to a higher interest rate might lead to greater losses in the future because of unpaid loans.

At the first glance this may seem counterintuitive, since one could assume that the lower the interest rate the more people who are not creditworthy choose to take out a loan. Thakor is looking at the effects from the other side, that is, focusing on those borrowers who are reliable ones and who decide against borrowing within the banking system if the interest rate is high.

It is not clear, whether a financial system with less bank loans and more investment provided by independent financial agents is more investment-friendly and less stable. As financial agents are competing with each other and thus are more willing to concede credits in abundance, they can be seen as being more investment-friendly. At the same time, such a financial architecture seems to be less stable, because it is easier to break implicit, long-term contracts between employers and employees, suppliers and creditors: “Jaggia and Thakor (1994) demonstrate that formal bankruptcy provides one mechanism for invalidating implicit long-term wage commitments. Shleifer and Summers (1988) point to the possibility of takeovers of publicly traded firms as another mechanism” (p. 928).

Altogether, a theory developed by Allen and Gale is cited, that describes the differences between bank-dominated systems, like the German financial system, and market-dominated systems like that of the US. The former one leads to a better risk-sharing in time due to more long-term commitments, whereas the latter one distributes risk more widely, because there are more instruments for handling risks (cf. p. 942). – Looking at this statement twenty years later, after the financial crisis from 2007 through 2010 it can be stated that precisely this wider distributed risk

contributed to a higher instability and a more widespread domino effect after the first credits burst. These increased linkages were even due to some aspects of risk-management, namely the mortgage-securitization.

A recent study by the International Monetary Fund (2017) found that the higher the share of women on bank boards the higher the institution's stability operationalized as the amount of nonperforming loans and of the capital buffer. This finding is robust for controlling for variables such as the professional experience of the board members, overall economic state and countries and holds also for the financial crisis in 2008. Had there been more – or in most cases: any – women on board of the investment, savings and mortgage banks, then the last financial turmoil might have been more moderate. Still, caution is needed in arguing uncritically for the acceptance and inclusion of (more) women into leadership positions in the financial sector. The catchy phrase “Lehman Brothers should not have been Lehman Sisters, but it should have been Lehman

Brothers and Sisters” (Prügl, 2012) keeps women in a position of being the other, the counterpart to men compensating through their patience and prudence for male recklessness and willingness to take risks. This keeps women in a narrowly defined area of possible, acceptable behaviors and attitudes, does not consider queer and transgender persons and finally, might serve as an argument for a devaluation of women as soon as risk-taking becomes again more attractive in a restored economy.

Moreover, it is important to note that up to now the causal mechanisms cannot be explained; that is, why the authors of the IMF-study negate “that a statistically significant positive association between the share of women and stability reflects differences in risk-taking between men and women” (p. 6). To avoid jumping to such putative conclusions really is important – and I am going to explain why in more detail in the following section.

stereotypical self-perception (gender-role orientation and gendered nature of the financial market)

Gender ambiguity/Geschlechterrollenorientierung/Gender context cognitive

## GENDER AS A SOCIAL CATEGORY!

### **2.3.2 critical assessment of gender as an influencing factor**

Krampen/Groson/DecisionMakingWomen/Metaanalysis Gender Differences/Gendered Preference for Protection/Gender Risk Perception

The array of studies on differences between women and men displayed in their perception and willingness to take risks is vast, with explanations ranging from the biological and genetic to value-based ones (Adams & Funk, 2012) and meta-analyses scrutinizing different areas of risk-taking (Byrnes, Miller, & Schafer, 1999). The most influential approach for the time being is the neuroscientific combining biological reductionism with computer-based technology. Making an argument for a critical, i.e. self-reflexive, neuroscience research Choudhury and ... stress that seemingly objective findings about the working of the brain (so-called "brain facts") and their interpretation are influenced or even biased by social and cultural concepts and constraints. Thus, a socio-political context where a binary gender conception serves as one of the most pervasive distinction criterion, besides age, ethnicity and class, seems prone to generate research questions and interpretations reinforcing those assumptions. The research on the confirmation-bias can be seen as supporting such a cautiousness, because people tend to seek evidence confirming their hypotheses, beliefs and assumptions and need to confront much more negative evidence to accept another hypothesis and they might see patterns in their data which are not there but which they have been looking for from the very beginning (cf. Nickerson). Even if Grossman (2011) does not name explicitly the confirmation-bias his research suggests that it is at work when lay people predict others' (both men and women) attitude towards risk-taking in a simple gambling task: Both women and men rely on stereotypical gender-attitudes and assume that women are more risk-averse than men even when they have more individual information from a survey which measures the risk people are willing to take in the area of ethics, finance, health, social

relations, recreational activities. So sticky are those stereotypes and so prevalent the search for confirming evidence that predictors are adapting their judgements according to the gender-stereotypes when they had first received only the individual information.

When researching differences between women and men in their perception of and behavior connected to risky situations there is a variety of moderating and mediating factors to be kept in mind. For example, it is possible that women aspiring for higher positions in management (as is the case within in politics, see Besley, Folke, Persson and Rickne, 2017) need to be higher qualified to be selected than males who seem to be favored just because of their perceived gender in hiring situations (Uhlmann & Cohen, 2005). Then, it would be their more profound competence and informed decision-making that explains the correlation with a higher risk-aversion and no longer their gender.

The idiosyncrasies of low-risk firms might make them more interesting for women due to the support offered to combine family and work through flexible working schedules or fixed salaries. If the surrounding institutions impede women in attaining leadership positions in the economic sector, then they might be more risk-taking than their male counterparts. Adam and Funk (2012) show that this is exactly the case for board members in Sweden where the females are more risk-seeking than the males, even if they still put more weight on values like benevolence, stimulation and universalism. Thus, they are not fitting the gender-stereotype of women being risk-averse, traditional, and cautious. Adam and Funk propose that such deviations could be even more pronounced in countries with institutional settings that make it more difficult for women to enter higher ranking positions. So, it is not necessarily any innate difference between women and men which explains their differing behavior.

Maybe there is a form of overcompensation at work with some women, when they are facing gender-stereotypes<sup>4</sup>. One possible way of reacting to such a stereotype is to do the “vaginal hour” (Allen, 2009), i.e. stay longer than the males to prove one’s willingness, motivation and competence. It does not suffice to act like men, but to excel in traits and behaviors, which are perceived to define them predominantly. Interestingly enough, this seems to be contrary to findings on stereotype threat and the importance a woman bestows upon her gender identity.

In a study by Schmader both women and men only showed stereotype-consistent behavior in a math-test (men performing better than women), when they put much importance on their gendered social identity and when their test-performance was linked to their group’s performance. Since it is not yet decided whether the mechanism at work here is really the perceived threat or rather the activation of an automatic behavior associated with a certain stereotype in theory, it is also possible that women – just as men – identifying with a stereotype of a risky, active, competent banker show connected behavior when this generalization is evoked and when it forms an important part for their professional identity.

Carr and Steele extend the research on stereotype-threat on performance to the domain of decision making and show that women are deciding more risk-averse and loss-averse when they are manipulated to be aware of their gender identity which seems under threat.

The study by Knorr Cetina and Brügger (2000) is a vivid example. They remark the gendered nature of the financial market in their ethnographic study on financial markets, i.e. the trading floor within a Swiss investment bank. They state that „[p]erhaps for the first time in recent history it appears unclear whether, for individuals, other persons are indeed the most fascinating part of their environment — the part we are most responsive to and devote most attention to. [...] But postsocial analysis can also be brought to bear on human relations where these depart

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<sup>4</sup> It is imaginable that the same effects (though to a lesser degree) could be true of men. Is their behavior in risky situations just as profoundly influenced by absorbed stereotypes as women’s behavior? That seems to be a question worth of further consideration and research.

from our core notions of sociality. Potential for such analyses can be found in collective disembodied Systems generated in a symbolic Space, for example forms of human interaction mediated by and constituted through communication technologies. We may call these postsocial forms since they arise in circumstances where interaction, space, and even communication appear to mean something different from our accustomed understanding of the terms." The market is then an epistemic object, the center of attention and research, which is getting defined and coming into existence during and through the process of establishing a postsocial relationship. The compare "the swiftly changing, flickering screen contents with the expression of a face, or rather with that of many faces" which the investment bankers try to interpret adequately.

It seems that this is not so much a cognitive process, but rather a feeling into the market. As a Zurich trader puts it, many of the terms refer to "basically sex and violence and a lot of them seem to have to do with anal penetration": "I got shafted, I got bent over, I got blown up, I got raped, I got stuffed/the guy stuffed me, I got fucked, I got hammered, I got killed". The interviewers note that "one interesting facet of this vocabulary is that it displays the assaults implicit in trading as analogous to bodily assaults".

Unfortunately, in the appendix there is no additional information on the gender of the 81 persons interviewed provided; though it would be very interesting to know if the sample consisted only of male investment bankers or also of female ones. Thus, it is not possible to know, if certain conceptions of masculinity and sexuality are also taken on by female traders.

There are methodological shortcomings of the research on risk and gender. When Schubert, Brown, Gysler and Brachinger (1999) carried forward their study they did not just rely on a pure experimental setting but rather tried to create a context that is like the one of real-life investment decisions. Their findings do not replicate any gender differences.

Cordelia Fine (2010; 2005), a researcher in neurosciences, points out that first of all, this discipline is still in its early beginnings having to deal with methodological flaws: small samples,

inadequate thresholds of significance<sup>5</sup> and that there are hints that the so-called “file-drawer phenomenon” is at work. That means, that most of the studies conducted are searching for differences between the genders and secondly, that only those with spectacular outcomes get published, while the other ones disappear in a drawer of some researcher’s desk (S. 227).

Nelson (2012) statistical significance

Furthermore, it is quite possible that differences in brain structure and function are a form of compensation. De Vries (2005) calls it the “dual function hypothesis”, which means that structural brain differences might lead to different behavior but at the same time enable male and female human beings to show the same behavior, if needed.

Brighetti and Lucarelli demonstrate that the pervasive cultural norm of men being risk-loving and women being risk-averse shapes their respective self-concept: Women and men evaluate their risk-propensity according to those stereotypes even if their behavior facing risk in an adaption of the Iowa Gambling Task shows no difference.

Krampen et al. point to the significance of the social-psychological gender aspect which is called sex-role orientation and refers to what people consider the appropriate behavior for women and men (Krampen, Effertz, Jostock, & Müller, 1990). This variable is a valid explanatory factor, even more so than the morphophenotype sex, i.e. the outer appearance. Further clarification is thus needed, what studies are looking at – the sexual identity, the biological sex or the performativity. This would take into account that gender is a socially constructed category and just as potent as the biological sex. Maybe there are interdependencies between those different aspects of a person’s identity, which would make a more detailed analysis even more important and informative.

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<sup>5</sup> to give just one example: researchers from the university of Santa Barbara in California using the standard methods of functional neuroimaging could detect signals for perspective taking in a dead salmon when not correcting for multiple comparisons. This is the standard procedure in neuroscience research, but it is extremely susceptible of spurious results which just make no sense at all. See Bennett, Miller, & Wolford, 2009.

The authors (Ronay & von Hippel, 2010) of another study focusing on the potential biological processes underlying sex differences conclude by stating that the experience of power leads to risk-taking via the promotion of an optimistic frame of mind and lowering of one's risk perception (p. 8) and that for those high in power motivation, the experience of power acts as a signal that their wish for power is being fulfilled, thus prompting a desire for the status quo. It may well be that the risk aversion displayed by high-testosterone participants in the present studies is similarly facilitated by a desire for stability when their power needs are met (ibid.), so it is necessary to take into account, if the gained power is perceived as stable or unstable.

Connecting their research to the questions around financial market behavior they ask if high-testosterone financial traders would, for instance, take greater financial risks when primed with a low-power threat. To make things even more complex, profound and legally instituted personal liability could exert drive people towards even higher risk-taking, because the decision maker's status is under threat through a potential reduction in income earned. To give just another example, illustrating the vast and often contradictory array of studies focusing on biological explanations or correlations, in a study by Coates and Herbert (2008) a higher level of testosterone predicted riskier behavior yielding higher profits in male traders.

### **2.3.3 Consequences for politics - Regulatory reporting:**

Financial reporting/Regulierung Gerichtsurteil

Regulatory prescriptions provide the broader structure shaping, enabling and limiting an individual's decisions and actions. Thus, they provide an indirect influence, which can be exerted on actors in the financial system.

Traczyk und Zaleskiewicz (2016) argue that a reliable measurement of risk attitudes "under conditions that impair the conscious control of thought (e.g. time pressure or cognitive overload)" (p. 3) needs to be implicit, not explicit. Verbal accounts can be influenced by social

desirability and in demanding situations it might not be possible to decide after a long deliberation process, but rather choose immediately one or the other option.

Lejuez et al.(2016) (2002) correlated the above-mentioned balloon-test with an Implicit Association Test (IAT) by Greenwald and Banaji (1995) for measuring general risk attitudes. There is a significant association, but none with other explicit measures for risk attitudes. Therefore, Traczyk und Zaleskiewicz (2016) propose their IAT for risk covering cognitive as well as affective aspects of attitudes toward risk. They show that it is a reliable measurement with predictive power for assessing the general, impulsive, stimulating risk attitude that influences the risk perception and an ensuing decision.

Still, there remain open questions like “in what areas are implicit measures better predictors of behavior than explicit ones? In other words, to what extent can general implicit attitudes toward risk help us understand risk taking processes in a variety of domains?” (p. 10).

Since there is stigmatized as well as non-stigmatized or even praised risk-related behavior it might be highly informative to look at the most salient norms regarding risk behavior in the financial market. If risk behavior is rather stigmatized than implicit measurements are more appropriate to assess it; if risk behavior is socially accepted among financial market actors, explicit ones can be used as well.

Human behavior is assumed to be driven by relatively stable preferences and restrictions, which can be changed through regulations. In the last section I will come back to that point in discussing how to influence and change people´s behavior.

Within the scope of those restrictions people act rationally in the sense that they try to maximize their utility by choosing options that seem to be the best under circumstances of uncertainty. In such situations, which are the rule, one knows that they do not know everything, hence, that there are unknown courses of actions and consequences. Since human beings are not like mathematical machines calculating their best option, but rather have limited resources and

motivation, they use heuristics, knowledge or norms to search and opt for the best alternative.

This behavior can also be described as a “bounded rationality” (Simon, 1979). Kirchgässner mentions its similarity to the value-expectancy-theory of social-psychological models (Jonas, K., Stroebe, W., & Hewstone, M., 2014, p. 192 f.).

As personal values and societal norms can be conceived as a certain kind of restrictions imposed on acting individuals (Kirchgässner, p. 35), it seems quite probable, that the emergence or transmission of a norm regarding risk perception and the subsequent decision-making can influence and shape investment traders’ behavior.

Injunctive norms describing what to do at a certain place or under specific circumstances (Jonas, 2007, p. 364) are routines on a societal level that help to reduce complexity. So, under circumstances of uncertainty, people can rely on them for orienting themselves and their behavior. It is quite plausible then, that there might be a norm regarding decision making in risky situations (Ha Joon Chan).

For example, Giegold, Philipp and Schick (2016, p. 47 f.), propose to defer bonuses above 500000 euro for a period of ten years in order to buffer potentially upcoming financial plights caused by a decision maker. This would mean that the time frame would be enlarged, so that a form of personal liability reaches into the future. Still, the discounting of future gains varying between people could attenuate this effect.

Graham et al. 2010!

A person’s decision to take a certain risk is influenced by the possible consequences they may have to face. So, establishing a personal liability might also help to reduce excessive, irresponsible risk-taking. Through sanctions which decision-makers cannot be insured against (as is today still usual and possible via group rate-insurances for managers) they would have to pay a fine (cf. Giegold et al., p. 48 – 52). Still, it would be important “that experts are only held to account for circumstances over which they have real control” (p. 13, The rise of defensive engineering: how

personal liability considerations impact decision-making), so that they do not assume a defensive stance, just wanting to reduce their possible liability. Instead, their goal should continue to consist in reducing risks or taking only reasonable risks.

Along the lines of the risk attribution theory described above it can be argued that in processes of personnel selection it might not always be the best strategy to choose the people who are convinced of their own work-related worth and qualities having a high self-esteem, high general self-efficacy and an internal locus of control.

Stiglitz/Litigation and Medicine/Discussion Personal Liability/Liability Discussion

### **Consequences for education, formation, studying:**

Since people in leadership positions can take decisions with far-reaching consequences it seems important to incorporate the confrontation with ethical dilemmata and the participation in ethic programmes in the professional education in the banking and management sector.

Moreover, as Sitkin and Weingart state, the individual risk-propensity is “a cumulative tendency to take or avoid risks” (p. 1589), so that people with a shorter history of risky decisions taken are easier to influence so that they can develop a lower risk-propensity.

When their education is already finished, it is still feasible to introduce personality tests for certain professional groups in order to filter the ones who are less risk-prone.

Clearly, this regulation and consideration of individual factors, comparison with extended certificate/tenure -> deeper insight into personal life, legitimized by the high responsibility and the possible influence on others/surroundings society)

Consequences for politics

implications for regulation (more articles; medicine; law suits & changing injunctive social norm; regulation & no boni, constraints like tax on financial transactions, short-term & more women, longterm & changing concepts of femininity/masculinity, introducing modules of self-reflection into formation, maybe within ethics classes)

Primarily, gender differences and their power should be taught and discussed in a self-reflective manner so that their affective, cognitive and behavioral consequences get known and can thus be reduced.

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