

General Psychology

The influence of incentive motivation and risk tolerance on risky decisions

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Risky decisions lead to cognitive-emotional stress because they depend on personal advantages and disadvantages. Assuming that incentive motivation, which is presumably determined by self-interest, and risk tolerance influence risky decisions, we expect that individuals would react differently. The Reinforcement-Sensitivity-Theory (RST) including the Behavioral-Approach-System (BAS) and the Behavioral-Inhibition-System (BIS) seemed to be the most suitable personality theory for this research. Three online surveys with 173, 232 and 299 participants (PN) were conducted in order to identify direct effects from the independent constructs as well as indirect effects by mediators such as current self-control power and self-assessment in view of managing risks. The hypothesis was tested by Structural Equation Modeling (SEM) based on data from the last two studies, and it was confirmed in both studies. More specific, the latent factors incentive motivation (or BAS) and risk tolerance (or BIS), including their predictors, indicated direct influences on risky decisions. Besides, impulsivity as a personality sub-factor should no longer belong to the BAS, but instead to the BIS as BIS (-). Furthermore, incentive motivation and risk tolerance showed reliable interactive effects only as latent factors. Mediator variables between self-interest and risky decision making showed indirect effects, too, e.g. loss of self-control power or disregarding the self-concept. Finally, the RST gets new impulses from this research model by the new latent factor risk-assessment in the SEM, which is responsible for coordinating and controlling the activities from the BIS and the BAS.

1. INTRODUCTION

Many people experience feelings of hope and fear when making risky decisions because risky decision making is connected with uncertainty. In most cases, decision making has been probably linked with self-interest on the one hand and feelings of risk on the other because risky decisions could bring about advantages or disadvantages. Assuming that decision making could be simultaneously influenced by personality factors such as hope and fear, the purpose of this study is to research the influence of such constructs and feelings on risky decisions made by taking incentive motivation, determined probably by self-interest, and risk propensity into account, in order to identify individual differences.

Psychological research into risky behavior and making decisions has dealt with either intuitive judgment or decision making (see Tversky & Kahneman, 1973) or looked for personality constructs which influence this process (see e.g. Bromiley & Curley, 1992).

1.1 RESEARCH IN PSYCHOLOGY ABOUT RISKY DECISION MAKING

Results of intuitive judgment and decision making have shown that heuristics and biases constitute the psychological mechanisms that moderate this process. For instances, in Prospect Theory (Kahneman & Tversky, 1979), the anchor heuristic linked with profit-loss orientation described how individuals prefer being averse to risks if they expected profit, and risk seeking if they expected loss.

Many areas of research which focus on risk and decision

making elaborate on the risk-return model by reconciling the reward and the risk factors to reach a trade-off (Yates & Stone, 1992). Different concepts have been created for the purpose of looking into this issue. For example, Lopes (1987) indicated that hope and fear (as personality factors) and the aspiration level (as a contribution toward the probability of gaining or winning something) result in risky or non-risky preferences. Research around *Domain-Specific-Risk-Taking* or *DOSPERT* (Weber et al., 2002) showed that behavioral decisions in different areas of life (or domains) differed from each other (e.g. Weber et al., 2002; Weller & Tikir, 2011). In addition, it appears to be important to not only consider risk perceptions and risk assessments, but benefits, too, like forced choice.

Investigation of risks also means looking at correlations between individual disposition as sensation seeking (Zuckerman, 2007) toward taking risks and risky behaviour, such as extremely dangerous sports or hobbies. Other studies on risk used test batteries to look for multiple relationships between "classical" personality dimensions and risky behavior. Their results were mixed. On the one hand, Lauriola and Levin (2001) did not confirm any significant coherence between Big5 variables (Costa & McCrae, 1992) and risky choices in games when they monitored age and sex. On the other hand, Weller and Tikir (2011) found that only *emotionality* and *conscientiousness* from HEXACO (Lee & Ashton, 2004) showed effects on *DOSPERT* scales as imagined risky behavior. Both studies pointed out that *extraversion* did not have any connection to risky behavior at all.

1.2 THE REINFORCEMENT-SENSITIVITY-THEORY (RST)

Against this, psychologists who have researched personality and motive disposition with regard to approach / avoidance behavior and its cortical localization and structure have achieved promising results. For instance, the *Reinforcement-Sensitivity-Theory* or RST (Gray, 1971, 1987; Gray & McNaughton, 2000) contains the *Behavioral-Inhibition-System* or BIS (Gray, 1975, pp. 248–250, 1976) which is a reaction to anxiety and conflicts, but also the *Behavioral-Approach-System* or BAS (Pickering & Gray, 1999) which is sensitive to rewards. According to the RST, these motivation systems influence personality development, and they have been defined as *anxiety* and *impulsivity* (Gray, 1970) on the basis of Eysenck's personality model (Eysenck, 1970) which takes the personality factors of neuroticism and extraversion-introversion into consideration.

Yet, measurements of the RST personality factors of anxiety and impulsivity have unfortunately often been inconsistent (Aluja et al., 2013; Knyazev et al., 2008; Pickering & Smillie, 2008; Smillie et al., 2006). Recently, Krupic, Corr, Rucevic, Krizanic and Gracanin (2016) were not able to construct models containing with several RST scales from different instruments with acceptable goodness of fit. Furthermore, the BIS have shown different correlations with impulsivity or psychoticism (Heym & Lawrence, 2010; Poythress et al., 2008) and a negative correlation with sensation seeking (Ball & Zuckerman, 1990).

Risky behavior or risky decisions depend on, besides avoiding loss, rewards, benefits, incentives or - in general - advantages to provide the motivation to carry them out. Therefore, feelings or thoughts in risky situations are determined by advantage or disadvantage orientation. Eventually, the RST could be a suitable personality theory for new research projects, but its psychometric scales, e.g. the BIS and BAS scales (Carver & White, 1994), have not yet brought about consistent evidence (Torrubia et al., 2008, p. 190).

1.3 INCENTIVE MOTIVATION INFLUENCED BY SELF-INTEREST AS AN ALTERNATIVE INVESTIGATION MODEL

According to Gray (1975, pp. 176–187), incentive motivation is connected to the instrumental response of carrying out acts in expectation of their reinforcement. Bolles (1972) assumed that the behavior or the instrumental response itself could be reinforcement due to the incentive of satisfying desired needs. Given that getting rewards or incentives is a natural desire and probably influenced by self-interest than the motivation to carry them out would be incentive motivation which is similar to the BAS. Incentive motivation was originally created as an emotionally-driven secondary reinforcement to learn new behavior (Hull, 1943, 1951) or as expectancy to satisfy desired needs (Tolman, 1955). The assumption that incentive motivation and its self-reinforced behavior are influenced by self-interest – which means in short “*to do something in order to get something*” (Wienkamp, 2017) - and presumably greed could provide new insights into how to investigate economic or social matters.

Previous research in early years showed that self-interest provides the strongest motivator or desire for people, and ranges from selfishness to altruism (Lersch, 1938, pp. 146–151). In addition, Miller (1999) claimed that self-interest is a “natural” part of our culture and social norms. Self-interested behavior would therefore manifest when people distrusted others for fear that they might be exploited, or when they acted in their own best interests after weighing up the efforts against the benefits of an action.

Weigel, Hessing, and Elffers (1999) proposed a new concept of egoism based on social and forensic findings. According to them, self-interest could be a source of advantage maximization where the well-being of an individual is concerned, by exploiting other people or even the general public, if necessary. They have developed an egoism scale, which was tested by De Vries, De Vries, De Hoogh, and Feij (2009) and by Webley, Cole, and Eidjar (2001) with regard to tax-evasion tendencies. Webley et al. (2001) reported that egoistic behavior was mostly observed in private, rather than in public.

Greed is a specific kind of egoism. This could be due to the existence of *insatiability* (Krekels & Pandelaere, 2015), being unsatisfied with the status quo (Seuntjens et al., 2015), and the self-reinforced process of rewards and desire. Greed is known as “*pleonexia*” in Greek (Nikelly, 1992, 2006), meaning boundless desire and acquisition. Recently, Krekels and Pandelaere (2015) and – independently of them, Seuntjens et al. (2015) - have developed the *Dispositional Greed Scale* to investigate this construct.

1.4 NEW RESEARCH QUESTIONS AND HYPOTHESIS

Against the background of the RST, it would be useful to investigate whether BAS denoted as an incentive motivation system could be influenced by self-interest, especially with regard to advantage orientation, and greed. Yet, psychological research has investigated the structure of the BIS and the BAS by means of factor analysis and found additional evidence for new or other sub-dimensions which also exist. For instance, Caseras, Avila and Torrubia (2003) found that the BAS-construct had three different sub-dimensions: (a) *impulsiveness/thrill-seeking* (b) *reward interested* and (c) *gregariousness*. In a similar vein, Corr and Cooper (2016) extracted four sub-factors for the BAS and they found out that *impulsivity* was not comparable with the other BAS sub-factors: reward interest, goal-drive persistence and reward reactivity. If we suppose that “reward interested” could be the same as self-interested, it would be evident that this facet of the BAS (or incentive motivation) is influenced by self-interest and greed, either completely or in part.

RST research has indicated that the BIS is “in charge” when it comes to risky and conflict situations that are linked to anxiety. This proposal denotes only risk aversion. Contrary to this conception of the RST, other scholars (Andresen, 2000) have suggested that risk propensity be interpreted as a bipolar dimension, e.g. with risk aversion on one end and risk seeking on the other. Furthermore, results have shown that when BIS is linked with anxiety, it correlates negatively with impulsivity and sensation seeking (Ball & Zuckerman, 1990; Heym & Lawrence, 2010). It therefore makes sense to suppose that risk propensity or risk tolerance could be a bipolar dimension.

Furthermore, previous researches (Corr, 2002, 2004) have shown that variables of the motivation system BIS and BAS could be an interactive relationship which will be proven by these studies.

There is additional evidence that risky behavior could be influenced by a loss of psychic energy or *ego depletion* (see e.g. Baumeister & Heatherton, 1996). Thus, this study aims to ascertain whether or not a loss of power indirectly influences risky decisions in lieu of risk propensity.

In risky or uncertain situations, it is expected that:

1. Risky decisions will be determined by incentive motivation (scale: egoism; greed, for example) and risk propensity (scale: sensation seeking, as hypothesized);

2. Incentive motivation and risk propensity will show effects of interaction with regard to risky decisions; for instance, more incentive motivation and risk propensity at the same time could result in more risky decisions as well;
3. Ego depletion (scale: currently available power of self-control) will correlate wholly or in part with risky decisions and with risk propensity.

In the view of the RST, it seems to be reasonable to test a new investigation model with new psychological constructs representing BIS and BAS as indicators (see in detail Wienkamp, 2017). For the purpose of researching this context, it is better to select or to develop attitude scales that concern either egoistic or incentive motivated matters, on one side, or risk propensity on the other. All these studies were conducted in Germany.

2. STUDIES

Against the background of this concept, it will be assumed that effect of incentive motivation and risk propensity on behavioral preferences in different risky situations (i.e. scenarios) would be existed. In the 1st study which was conducted as a pre study it had to prove direct effects of the Egoism scale by Weigel et al. (1999) and the Dispositional Greed Scale by Krekels and Pandelaere (2015), which represented incentive motivation, and the Sensation Seeking Scale (SSS) converted in the 1993 version into German language by Gniech, Oetting and Brohl (1993), which stood for risk tolerance, on the outcome variable risky scenarios. Both will be analyzed as indirect effects from the mediator “The currently power of self-control” by Bertrams, Unger, and Dickhäuser (2011) in a German-language short version.

Because of risky scenarios was a new one and developed by the author it should be introduced: It contains 20 imagined scenarios in different spheres of life (e.g. finances and insurance; health and sports) with a chief focus on incentive situations, risky situations or both. Preference polling was carried out by offering four standardized alternatives of behavior, which were ranked from best to worst. For each scenario, the ranking of the standardized alternatives was always weighted accordingly, with a multiplier from 1 (*risky*) to 4 (*risk averse*), resulting in a range from 20 (*risk averse*) to 30 (*risk seeking*). One example of a risk scenario was:

“You have had an executive position in a company for many years. You have been offered a very lucrative position in another company with the prospect of a pay increase and a career jump. However, your sector has not been doing very well, which could mean that this company is having economic difficulties. How would you react?”

- a. I would accept the position
- b. I would think about it a bit and wait
- c. I would ask others for advice
- d. I would reject the offer and say, “no”.

For instance, if PN ranks these alternatives in the same manner of a > b > c > d, which will reach the maximum score of 30, namely:

$$(1 \times 1) + (2 \times 2) + (3 \times 3) + (4 \times 4) = 1 + 4 + 9 + 16 = 30.$$

Results from the Multiple Linear Regression Analysis (MLRA) showed direct effects of sensation seeking and egoism on risky decisions, but not greed. In spite of the expectation that the currently power of self-control showed indirect effects between sensation seeking on the one hand and risky decisions on the other, the results were not efficient, a new model with the predictor egoism provided

better results regarding the stronger correlations between these variables, which moderated the relationship between egoism and the mediator, resulting in a good fit for the model (for more details, see Wienkamp, 2017).

On the basis of Study 1, the purpose of this next study was, in the first instance, to examine and prove the relationships between the variables again as the new path model. Secondly, for enlargement purposes, the research model could select additional variables as predictors, outcome variables as risky decisions, and an additional mediator (self-assessment in connection with risk) in order to moderate the connections between them and to embark on a Structural Equation Modeling (SEM) containing the latent factors: BIS and BAS.

2.1 METHOD

2.1.1 SAMPLE

This study was also carried out via an online survey (UNI-PARK, questback GmbH, 2015) and led to 359 contacts. 232 PN (64.6 %) completed the questionnaire. Most of them (223 PN) were recruited from the “respondi AG” organization and received an incentive of €2.50. The study was represented by 106 women (45.7 %) and 126 men (54.3 %) with an average age of 45.7 years old (*SD*: 16.4) and a median of 46 with a range of between 18 and 87 years. Most of the PN have had a job.

2.1.2 INSTRUMENTS

Previous instruments: All instruments from the previous study were selected again.

Machiavellianism scale: The Machiavellianism construct and scale by Christie and Geis (1970), was the predecessor of a German version (Hennig & Six, 1977) with 18 items (and two additional items) and a scale interval from 1 (*do not agree at all*) to 6 (*completely agree*). According to Christie and Geis (1970), Machiavellists were “cool” individuals without any scruples and empathy, and masters of manipulating and exploiting others, primarily in situations without any rules for their own gain. The items for the Machiavellianism scale are very similar to those for an egoism scale, for instance: “It is not so important how to win, but rather to win” (Item No. 2).

Risk taking scale: Measurement of risk taking was rendered by an instrument from the Hamburger-Persönlichkeits-Fragebogen (HPF, from Andresen, published by Gniech, 2002, p. 153), later the Hamburger-Persönlichkeits-Inventar (HPI) from Andresen (2002), with 12 items and a scale from 1 (*completely wrong*) to 4 (*completely right*). The short version of this scale (in German: “Risikobereitschaftsskala”) covers all risk-oriented issues, especially with regard to behavior in harmful situations and in competition with others. One example of an item is: “I like to manage difficult and risky tasks” (Item No. 4).

Incentive motivation scale: An instrument for measuring incentive motivation with the facets of advantage orientation and endowment motivation (similar to greed) had to be created as it did not exist. People with strong incentive motivation tend to provide instrumental responses (Gray, 1975) in order to obtain an advantage for them or to avoid any disadvantages. In summary, the power of incentive motivation can be attributed to self-interest or egoism. Furthermore, this is absolutely natural and the exhibited behavior will either be offensive (e.g. “making profit”) or defensive (e.g. “avoiding loss”) in form. In constructing the instrument, it was recommended that the participants be given preferences, as a forced choice. The best way of doing

this is therefore to compare and select alternative options contained within a block:

Example of a block:

No.	Item	I prefer	I do not prefer
1	make profits (o)	Scoring = 2	Scoring = 1
2	Invest (o)	Scoring = 2	Scoring = 1
3	wait for a better offer (d)	Scoring = 1	Scoring = 2
4	take small, careful steps (d)	Scoring = 1	Scoring = 2

Note. (o) = offensive. (d) = defensive.

PN were asked to select two options which they prefer or not prefer resulting in a range of four to eight points per block. A high score indicates offensive incentive motivation, while a low score denotes a defensive position. The total score of all items containing in 15 blocks could reach 60 to 120 points.

Risk tolerance scale: This scale was constructed by generally following the methodology of the incentive motivation scale. Risk tolerance defines an individual risk threshold and is indicated by either a high score and risky behavior or a low score and risk-averse behavior. In contrast to other instruments that measure risky behavior or decisions, this risk tolerance scale takes account of risk facets that are often neglected, e.g. taking responsibility vs. passing responsibility on to others (Andresen, 2000, 2002).

Selecting of project proposals: Sokolowska (2006) developed a scale which provided offers from two potential suppliers with nine different options. These options have alternative calculations for profit or loss by applying certain probabilities and slightly different expectation values in parts. Preference for a less risky supplier A scores one point, while the riskier supplier B scores two points, rendering a scale with a range from 9 to 18 points. Only the case story was modified for this study. Here is an example of option no. 1 of this outcome variable:

"project proposal of A: -100 x 0.5 to 100 x 0.5 vs.
project proposal of B: -200 x 0.5 to 200 x 0.5"

Which would you prefer? "

Risk preferences: Risk preferences refer to risky choices with slightly different expectation values for scenarios involving financial dispositions or gambling. The author created them by collecting ideas from other instruments as well as from new ones. This scale is also used as an outcome variable and it contains eight items in total with scale intervals from four to seven. Each item begins with a riskless option and then lists further options, which progressively become riskier. A high score therefore indicates a high risk preference. Here is an example for item no. 6:

"If you were at a gambling casino and had already lost €500 from the €1000 you had at the beginning, what would you do?"

1. To finish the game and cut the loss
2. Stake 100 € for the next game
3. Stake 200 € for the next game
4. Stake 300 € for the next game
5. Stake 400 € for the next game
6. Stake 500 € for the next game

Self-assessments in connection with risks: With regard to the investigation model, it makes sense to look for and create an additional mediator concerning self-assessment in connecting with risk. Therefore, it was essential to look into the (partly irrational) cognitions and emotions which

resulted from making decisions in light of uncertainty. For example, whether if speculators are convinced that future trends will be the same as past trends. Each of the nine items had to be adjusted on a scale with six grades. For instance,

"Do you agree with this statement 0 %, 20 %, 40 %, 60 %, 80 %, 100 %?"

2.2 PROCEDURE

The procedure was about the same as for study 1 via web-online questionnaire and anonymous.

2.3 RESULTS

Data screening and descriptive statistics: From 232 PN, only 223 PN completed the survey within a suitable time frame again. Data screening for all variables resulted in the quality of data being judged as acceptable, e.g., skewness and kurtosis remained under 1.0 except in the case of risk preferences (skewness 1.174, kurtosis 2.120). Table 1 shows M , SD , r_{tt} and all the correlations between the variables. There were no significant differences between men and women in terms of the variables ($p < .05$), with the exception of outcome variables for risky scenarios and risk preferences, such as the new predictors for the Machiavellianism scale and the risk-taking scale.

Multiple Linear Regression Analysis (MLRA): Table 2 shows all the beta-coefficients and their significant levels as direct effects of the predictors on the outcome variable of risky decisions, as a result of a MLRA. After analyzing the influence of age and sex on the outcome variable of risky decisions which could explain 10, 8 % of the variance (R^2) - and adjusted $R^2 = 10, 0$ %. Block 2 with the egoism, greed, sensation seeking and incentive motivation predictors explains about 35 % (adj. $R^2 = 33, 0$ %) and, finally, block 3 with the additional Machiavellianism, risk-taking and risk-tolerance predictors could explain about 36 % (adj. $R^2 = 33, 7$ %) of the variance.

New evidence was produced for the research question as to whether there could be an interactive effect between the self-interest and risk propensity predictors on risky decision making. But the results were mixed. Interactive effects were revealed only for some predictors, e.g. the Machiavellianism scale together with sensation seeking, and incentive motivation with all the risk predictors on the basis of risk preferences as the outcome variable. In addition, egoism and sensation seeking showed an interactive relationship as supposed by the research hypothesis (for more details, see Wienkamp, 2017).

Path Analysis Models (PA): Repetition of the PA from study 1 resulted in a non-significant research model and was able to explain a lot more variance with 38 % (in study 1 = 27 %). Based on the evidence that self-interest exploits the power of self-control, it may be worthwhile considering the creation of a more complex PA by modeling the new variables in this study. As it transpires, a new PA, which could explain 66, 2 % of the variance, would be the best solution with $\chi^2(6, 223) = 3.190$, $CMIN/df = .532$, $p = .785$, $NFI = .990$, $GFI = .996$, $RMSEA = .000$, $SRMR = .0199$, which includes incentive motivation and greed as additional predictors, and self-assessment as an added mediator. In this PA, sensation seeking is connected with the new self-assessment mediator. This means that self-assessment will improve if sensation seeking decreases.

Structural Equation Modeling (SEM): On the background of this new PA and, of course, the evidences of the MLRA with its statistical effects from the predictor variables on

Table 1: Descriptive statistics of all variables, reliability, as well as Pearson product-moment correlations between these variables

Variable	<i>M</i>	<i>SD</i>	<i>r_{tt}</i>	(1)	(2)	(3)	(4)	(5)
Egoism (1)	30.448	7.480	.838	-				
Greed (2)	20.601	6.157	.783	.383**	-			
Machiavellian (3)	61.466	15.090	.911	.692**	.494**	--		
Incentive motivation (4)	25.502	11.876	.790	.192**	.365**	.304**	--	
Sens. seeking (5)	40.117	11.796	.925	.316**	.489**	.391**	.305**	--
Risk taking (6)	27.238	7.067	.896	.291**	.438**	.426**	.354**	.633**
Risk tolerance (7)	27.839	10.915	.706	.159*	.242**	.114	.446**	.368**
Self-control power (8)	47.623	9.136	.829	-.326**	-.178**	-.268**	-.099	-.215**
Self-assess. (9)	35.987	5.909	.655	-.102	-.094	-.132*	.014	-.188**
Risky decisions (10)	103.798	26.466	.717	.388**	.381**	.376**	.403**	.423**
Project proposals (11)	12.345	2.843	.832	.120	.195**	.143*	.232**	.213**
Risk preferences (12)	14.897	5.351	.733	.137*	.329**	.201**	.418**	.429**
Variable	-	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Risk taking (6)	-	-						
Risk tolerance (7)	-	.411**	-					
Self-control power (8)	-	.010	.057	-				
Self-assess. (9)	-	.042	.217**	.454**	-			
R. decisions (10)	-	.260**	.246**	-.320**	-.176**	-		
P. proposals (11)	-	.072	.148*	-.116	-.058	.228**	-	
R. preferences (12)	-	.345**	.337**	-.086	-.035	.394**	.165*	-

Note. Data from study 2. * = $p < .05$. ** = $p < .01$.

the outcome variables, it seems to be possible to build up a SEM (for explanation see text figure 1 and Wienkamp, 2017), as a logical next step, to test a complex research model by including psychological constructs as *latent factors*, similar to a personality theory. In this way, it should be used BAS (for reward sensitivity or incentive motivation) and BIS (for sensitivity toward conflicts or disadvantages) as latent factors from the RST. Furthermore, a new latent factor for risk-assessment could be responsible for managing behavior in risky or conflict situations, i.e. for incompatible impulses that result from BAS and BIS (for results of the final research model see study 3 and Fig. 1).

2.4 DISCUSSION

As expected, the correlations and results of the MLRA provided support for the hypothesis that risky decision making is moderated by the variables of predictors of incentive motivation, like self-interest, and risk propensity. The MLRA analyzed all available interactive relationships after introducing more variables as predictors, in addition to outcome variables, which represented risky behavior or risky decisions. Only some of the relationships were positive and statistically significant, and thus, it has not been possible to verify the research hypothesis in general at this time.

The PA in this study with additional variables provided very good model indices. Thus for the first time, it would be possible to outline an SEM which is based on both the PA and new and serious connections to latent factors like BAS and BIS from the RST, on one hand, and a new disposition called risk-assessment for the management of risky behavior,

on the other.

3. FINAL STUDY (STUDY 3)

The purpose of this new study was only to validate the results from the second study.

3.1 SAMPLE, INSTRUMENTS AND PROCESS

In a similar vein to the previous studies, this study was solely conducted by “respondi AG” and based on an online survey, once again. There were 446 contacts and 299 PN (67.0 %) who completed the questionnaire, receiving an incentive of €3 for doing so. 145 men (48.5 %) and 154 (51.5 %) women were recruited for this study. They were, on average, 48.1 years old (*SD*: 15.2); the median was 49 with a range of between 18 and 83 years. Most of them have a job.

All the instruments from the preceding study were applied to this study again with hardly any modifications. The procedure was the same as in the previous study.

3.2 RESULTS

Data screening and descriptive statistics: By applying the same standards as study 2, only 12 PN were eliminated due to process time or for other reasons. The final sample therefore consisted of 287 PN and table 3 displays the results of the descriptive statistics. Different from the previous study, sensation seeking was different between men and women. Overall, there was a decrease in some of the correlations when compared to those in study 2, particularly with regard

Table 2: Beta coefficient, test of significant and semi partial correlation (part)

Variable	Beta β	Sign. p	Part Sr_i^2
Block 1			
Age	-.301	.000	-.298
Sex	-.184	.005	-.182
Block 2			
Age	-.165	.012	-.139
Sex	-.098	.084	-.095
Egoism	.248	.000	.224
Greed	.080	.237	.065
Sensation seeking	.142	.054	.106
Incentive motivation	.255	.000	.233
Block 3			
Age	-.162	.015	-.135
Sex	-.118	.041	-.112
Egoism	.220	.005	.156
Greed	.086	.216	.068
Sensation seeking	.223	.009	.145
Incentive motivation	.267	.000	.223
Machiavellian	.064	.460	.040
Risk taking	-.170	.029	-.120
Risk tolerance	.012	.862	.009

Note. Outcome variable was risky decisions by risky scenarios.

Data from study 2.

to the correlation between project proposals and the other variables. In contrast, both mediators reinforced their connections to the self-interest variables (except in the case of incentive motivation), but their coherences with the risk variables have been slightly mitigated.

Multiple Linear Regression Analysis (MLRA): The MLRA was conducted by using the same concept as in the preceding investigation. The results (see table 4) showed that firstly, the demographic variables of age and sex lost their strong influence on the outcome variable of risky decisions with $R^2 = 4, 7\%$ and adjusted $R^2 = 4, 0\%$ (block 1). Secondly, egoism, sensation seeking and incentive motivation remained statistically significant as predictors (block 2); the model explained more variance with $R^2 = 27, 7\%$ (adj. $R^2 = 26, 2\%$). Thirdly, this model (block 3) could explain slightly more variances $R^2 = 29, 5\%$ (adj. $R^2 = 27, 3\%$) and egoism and sensation seeking ceased to function as an essential predictor for risky behavior. Fourthly, risk tolerance has become a new significant predictor for the making of risky decisions. Finally, only incentive motivation indicated influence on risky decisions in both studies ($p < .001$). An analysis of interactive effects revealed barely significant statistical relationships.

Path Analysis Models (PA): The last complex PA from the 2nd study could be proved with $\chi^2(6, 287) = 23.951$, $CMIN/df = 3.992$, $p = .001$ and a goodness of fit with $NFI = .934$, $GFI = .947$, $RMSEA = .102$ and $SRMR = .0595$ which did not show evidence. 52, 9 % of the variability in this model could be explained and the incentive-motivation predictor again displayed the strongest influence on risky decisions ($\beta = .316$, $p < .001$).

Structural equation modeling (SEM): In the first place, the SEM from the previous study could not be administered here due to negative covariance between the residual variances. In conclusion, slight modifications have been carried out, while the structure of the causal model remains unchanged. Thus, the only connections that have been newly created are between greed and the “currently available power of self-control” mediator, and between egoism and the self-assessment mediator. The SEM (see Fig. 1) could be tested afterwards based on both the data of this study and data of the previous study. According to this *backward strategy*, the SEM rendered good results for data in both studies. The parameters based on data of study 3 were: $\chi^2(6, 287) = 99.223$, $CMIN/df = 2.420$, $p < .001$ and a goodness of fit with $NFI = .902$, $GFI = .947$, $RMSEA = .070$ and $SRMR = .0525$; and based on data of study 2: $\chi^2(6, 223) = 93.980$, $CMIN/df = 2.292$, $p < .001$ and a goodness of fit with $NFI = .892$, $GFI = .936$, $RMSEA = .076$ and $SRMR = .0544$.

Similar to the previous study, the latent factor BIS (-) and BAS showed a correlation of $r = .74$, $p < .001$ and an influence of the new latent factor risk-assessment with $\beta = .431$, $p = .035$ for BAS and $\beta = .514$, $p = .012$ for BIS (-).

3.3 DISCUSSION

In contrast to the previous studies, the proportion of women was larger than men. Some of the differences in the variables between men and women as well as some of the correlations between the variables may therefore have been altered by this. Furthermore, against the background of the MLRA, some predictors, which fall into either the complex of self-interest or risk-propensity categories, interchanged

Table 3: Descriptive statistics of all variables, reliability, as well as Pearson product-moment correlations between these variables

Variable	<i>M</i>	<i>SD</i>	<i>r_{tt}</i>	(1)	(2)	(3)	(4)	(5)
Egoism (1)	30.983	7.053	.807	-				
Greed (2)	19.826	6.302	.829	.300**	--			
Machiavellian (3)	62.268	16.226	.920	.681**	.460**	--		
Incentive motivation (4)	24.209	11.944	.797	.169**	.421**	.222**	--	
Sensation seeking (5)	39.474	12.279	.933	.294**	.337**	.385**	.346**	--
Risk taking (6)	27.941	7.937	.926	.254**	.211**	.316**	.273**	.688**
Risk tolerance (7)	27.209	11.144	.718	.112	.109	.010	.430**	.382**
Self-control power (8)	47.289	9.395	.855	-.342**	-.219**	-.231**	-.085	-.158**
Self-assessments (9)	35.143	5.299	.546	-.229**	-.152**	-.173**	.023	-.058
Risky decisions (10)	106.366	26.340	.712	.270**	.326**	.327**	.438**	.358**
Project proposals (11)	12.669	2.881	.831	.094	.137*	.104	.049	.069
R. preferences (12)	14.638	4.832	.667	.112	.271**	.194**	.345**	.367**
Variable	-	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Risk taking (6)	-	-						
Risk tolerance (7)	-	.305**	--					
Self-control power (8)	-	-.009	.050	-				
Self-assess. (9)	-	.078	.194**	.485**	--			
R. decisions (10)	-	.298**	.301**	-.180**	-.066	--		
P. proposals (11)	-	-.037	.058	-.029	-.096	.105	--	
R. preferences (12)	-	.244**	.264**	-.040	-.107	.359**	.127*	-

Note. Data from study 3. * = $p < .05$. ** = $p < .01$.

their level of statistically significant influences on the outcome variable. Hence (with the exception of incentive motivation), specific variables of self-interest or risk propensity cannot be selected as reliable predictors.

Through the modeling of the PA and the SEM, evidence could be produced that the relationship between the self-interest variables and the mediators would have been closer and more negative. This has resulted in the assertion that self-interest exploits the power of self-control and disregards self-confidence too. In light of this, it was vital that the SEM with its risk-assessment and the BIS and BAS system factors be proved via the backward strategy, on the basis of data from both studies 3 and 2.

4. GENERAL DISCUSSION

A new research concept introducing incentive motivation, which is determined by self-interest, and risk propensity as essential, psychological dispositions influencing risky decisions was developed on the basis of the RST (Gray, 1971, 1987; Gray & McNaughton, 2000). However, it was better to avoid BIS or BAS instruments given that BIS and BAS constructs are more complex than BIS or BAS scales, and their measurements have been inconsistent and not comparable up to now (Torrubia et al., 2008). Following on from this, I used other instruments in my studies, e.g. the egoism scale (Weigel et al., 1999) for self-interest; and for risk propensity, I used a German version of the sensation seeking scale from Gniech et al. (1993). Finally, risky decisions as an outcome variable were mostly constructed by risk scenarios

which outlined economic or “everyday” issues, while mediators were selected because they could indirectly influence risky decisions.

Results in all the studies indicated support for the hypothesis that egoistic influences and risk taking have psychological effects on risky decisions, although some of the variables did not always show statistically significant effects in every study between the blocks within the MLRA. In contrast to this, the new incentive-motivation predictor showed constantly significant effects on the outcome variable of risky decision making in both studies, presumably by means of the new advantage-orientation and endowment-motivation facets. Even so, all the computations of direct effects and indirect effects of mediators on decisions made and the PA finally yielded a SEM as a (tentative) research model. This showed and quantified, first of all, latent factors - confirming an antagonistic relationship between BIS and BAS as well as their influence on the new latent factor of risk-assessment. If so, then BIS and BAS would be interchangeable, as either can be activated or inhibited. In this case, it could be concluded that egoistic impulses correlate positively with risky ambitions and constitute the precondition for risky decisions in this manner. Incidentally, it was only possible to determine reliable interactive effects between the variables in this context, namely between the latent factors of BIS and BAS.

Because sample effects were given, the last two studies produced some different results, which might be caused by a greater proportion of women in study 3. This more or less yielded variability for the predictors and lower effects on

Table 4: Beta coefficient, test of significant and semi partial correlation (part)

Variable	Beta β	Sign. p	Part Sr_i^2
Block 1			
Age	-.150	.010	-.150
Sex	-.158	.007	-.158
Block 2			
Age	-.049	.399	-.043
Sex	-.091	.084	-.088
Egoism	.149	.007	.138
Greed	.082	.172	.070
Sensation seeking	.137	.034	.108
Incentive motivation	.319	.000	.276
Block 3			
Age	-.065	.279	-.055
Sex	-.081	.132	-.076
Egoism	.061	.386	.044
Greed	.063	.319	.050
Sensation seeking	.045	.593	.027
Incentive motivation	.275	.000	.220
Machiavellianism	.150	.057	.097
Risk taking	.041	.574	.028
Risk tolerance	.125	.040	.104

Note. Outcome variable was risky decisions by risk scenarios.
Data from study 3.

the outcome variables take into account.

Evidence from previous research activities assumed that indirect effects on making risky decisions would exist, e.g. between risk taking and ego depletion (Baumeister & Heatherton, 1996). The influences were investigated only in the pre study to show none effects of currently available psychic energy on risky decisions connected with sensation seeking. In addition, it could be asserted that the self-assessment mediator, when linked with risks, moderates the relationship between any of the predictors and risky behavior or decisions. However, the relationship between the variables of self-interest and mediators has increasingly become stronger and closer against the background of all the studies conducted here. The conclusion is therefore that egoism needs power and psychic energy, and disregards the self-concept.

In the past, some scholars (Webley et al., 2001; Weigel et al., 1999) found that egoism could be concealed in the form of tactical behavior, e.g. in cases of tax evasion. This was similar to my findings because egoists have to make decisions as to whether they will commit acts in risky situations. They are, in a manner of speaking, in conflict with them, and might suffer a lot of stress. De Vries et al. (2009) supported this assertion because egoism has a stronger correlation with introversion than it does with extraversion.

The new construct and incentive-motivation scale concurs well with incentive-motivation concepts of early years (Bolles, 1972; Gray, 1975, pp. 176–187), especially with regard to the aspect of advantage orientation and endowment motivation (or greed), which was defined by Bolles (1972) as *self-reinforced behavior* in the form of the $R - S^*$ con-

nection. This means that the behavior (R) should be advantageous and goal-oriented in order to obtain rewards (S^*). Greed comes via the self-reinforced process, and stands for excess without limits! However, the disposition of greed could not be in line with Prospect Theory (Kahneman & Tversky, 1979), which postulated that people would become more risk-averse if they have made profits. In contrast to this, if people were greedy, they would demand more and more. This may be a reason for the weaker correlations between greed and risky decisions, because people are either inclined to remain greedy or to change their mind and take risk into consideration more.

With reference to the research model, it is essential that the RST motivation systems, BIS and BAS, be identified and approved by using the egoism and risk scales. However, it is necessary to consider and discuss the structure of the RST extracted by SEM, too. Thus, the new system factor of risk-assessment could support the BIS in order to conduct risk and conflict management. However, the task of the BIS would not be the same as beforehand. Departing from the RST, results that are linked with the research project and some references from other scholars (Franken & Muris, 2005; Heym & Lawrence, 2010; Penolazzi et al., 2012; Zuckerman, 2007, p. 19) indicate that the personal construct, impulsivity should not be part of the BAS but rather a facet of the BIS, representing BIS (-) as a solution within a bi-dimensional system. Incidentally, Andresen (2000) found out by means of factor analysis that the personality theory needs an additional construct beside the Big5 (Costa & McCrae, 1992), which emerges as a bi-dimensional system with risk taking on one end, and agreeableness on the other. This

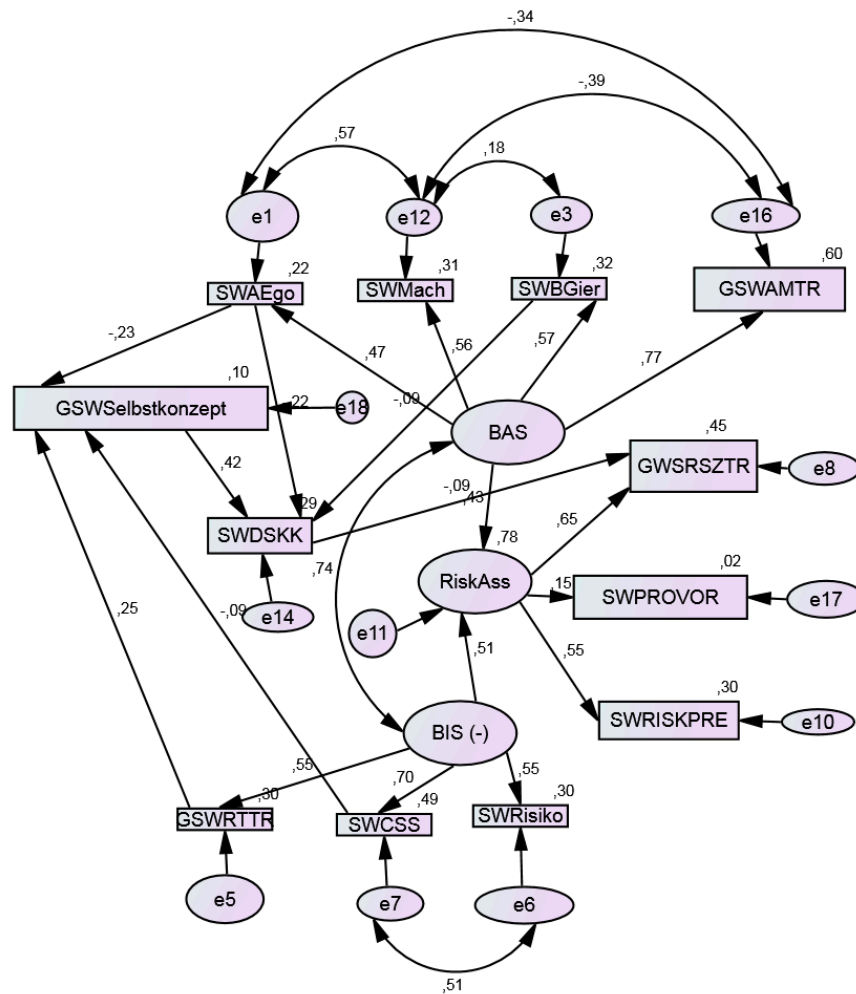


Figure 1.

Influences of reward sensitivity (BAS) and conflict- or risk sensitivity (BIS) on risky decisions (RiskAss) by indirect influences of mediators. SEM based on the principle of MLRA determines the relationship between latent factors. It doesn't happen about directly, but by measuring the latent factors on the background of indicators and their residual or error variances. The path coefficients quantify these direct effects from the exogenous on the endogen variable. Results of a causal model are the proportion of the explained to the unexplained variances as both as the remaining error or residual variances too representing by the terms e1 to e18.

SWAEgo = Egoism; SWMach = Machiavellian; SWBGier = Greed; GSWAMTR = Incentive motivation; SWDSKK = Currently available self-control power; GSWSelbstkonzept = Self-assessments; GSWRTTR = Risk tolerance; SWCSS = Sensation seeking; SWRisiko = Risk taking; GWSRSZTR = Risky decisions by risk scenarios; SWPROVOR = Risky project proposals; SWRISKPRE = Risk preferences; BAS = Behavioural Approach System; BIS = Behavioural Inhibition System; RiskAss = Risk assessment. Data from study 3.

solution could be the same for impulsivity or risk seeking and for anxiety or risk avoidance linked with this current study.

After all, evidence from the RST research activities shows that connections could exist between the RST constructs, BAS and BIS, and the variables or facets representing self-interest and risk taking (Aluja et al., 2013; Corr & Cooper, 2016; Knyazev et al., 2008). Factor analysis from Caseras et al., (2003) revealed that the "reward-interested" sub-factor was similar to self-interest and not impulsiveness/thrill-seeking or gregariousness which represents extraversion. This was indirectly approved by other scholars (Lauriola & Levin, 2001; Panno et al., 2013; Weller & Tikir, 2011) who could barely find any serious correlations between their personality attributes and risky decisions.

By means of SEM, more complex research models could

be formed on the basis of multiple relationships and provided by self-reported questionnaires. Unlike this research project, which, for the first time, has resulted in an integrated model with direct and indirect connections, previous research only dealt with specific models for BIS and BAS (Gee-nen et al., 2016; Krupić et al., 2016) or other constructs like HEXACO (Lee & Ashton, 2004) or DOSPERT (Weber et al., 2002) to investigate risky behaviour (Weller & Tikir, 2011). As a result, the study by Weller and Tikir (2011) could only render different models for selected predictors and mediators for each domain (e.g. financial, health).

In contrast to the RST with its original three-motivation system my new research model contains another endogen factor of risk-assessment, which is similar to the risk-assessment construct for preventing potential dangers from animals, e.g. predators (Blanchard & Blanchard, 1988).

After establishing that there is a relationship between risky attitudes and malign risky behavior (Lauriola et al., 2007; Zuckerman, 2007), it could be shown that coherence between these attitudes or constructs and risky decisions also exists. Namely, it should be noted that the results of my studies were not in line with investigations into “classical” personality traits like the Big5 and their influence on risky decisions in games (Lauriola & Levin, 2001), as the results of the latter were not efficient. However, research activities based on the basis of risk-return models, which prefer to investigate selections of options in agreement with personal preferences based on both, risks and benefits, were more useful and comparable with the concept of my studies.

Thus, the hope and fear model by Lopez (1987) postulated that those who are averse to risks prefer a lower aspiration level linked with small profit or loss decisions, as opposed to potential risk seekers. However, in the current studies, different decisions with regard to comparable offers of insurance (as part of the risky scenarios) with presumably have the same risk probability could not be explained or interpreted by the hope and fear model not by the Prospect Theory (Kahneman & Tversky, 1979). For example, Prospect Theory was able to predict that PN prefer to buy, for instance, travel cancelation insurance due to minimal risk. But, in a similar context, PN did not behave in a risk-averse manner, in most cases in my studies, because they did not buy insurance for avoiding the cost of repairs in the near future, even though there was presumably the same risk probability.

Apparently, my studies were able to show, through examples that decision preferences which are based on imagined, ambivalent scenarios (the risk scenarios as an outcome variable) are best explained by individual differences and preferences linked with self-interest and risk propensity.

For future research, it is recommended that the RST research activities take a stronger focus of other similar constructs as predictors, for example egoism, incentive motivation, and risk propensity and, if possible, indirect effects by mediators as well. If so, then scholars have to discuss the structure of the RST and the function between their mo-

tivation systems. In this context, it is advisable to differentiate between exogenous factors (like BIS and BAS) and endogenous factors (like risk-assessment) within a new research model and prove their connections to their indicators or attribute scales, such as BIS and BAS scales. With regard to aspects of more practical activities, the new constructs will be able to investigate several differential diagnostic matters, e.g., mercantile propensities, incentive and risk dispositions, and last but not least, certain special types of personality (e.g. bargain hunters).

Self-developed scales have the advantage of being able to look into issues that have been neglected up to now, e.g. advantage orientation. However, the new instruments will initially cause limitations. Some of the instruments were created by the author, while others had to be translated into German and were used for the first time in this version. Similarly, investigations that were conducted by online surveys offered no possibilities of any control. Thus, it is advisable to set up criteria (e.g. process time) to carefully select participants in order to obtain valid data.

5. CONCLUSION

The conducted studies have supported the assumption that self-interest and risk propensity directly or indirectly influence the process of making risky decisions, including via mediators. In addition, the relationship between the BIS and the BAS, and their effects on the new latent factor of risk-assessment could be revealed and outlined in two studies. This was based on the supposed connections and successive steps for PA and SEM as a tentative research model. For future research, it would be useful to focus more on self-interest and risk impulses as well as the existence of the new system factor of risk assessment, when discussing the structure of the RST.

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