Titel: Never mind losing the pound... still got the penny!

The influence of trait greed on risky decision behavior in a mixed and gain only BART

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Abstract

Two different reasons to show risky behavior have been identified: Risk proneness and the lack of loss aversion. So far, the number of empirical studies investigating the influence of trait greed, anxiety, and age on risky decision behavior, differentiating between risk sensitivity and loss aversion, is very limited and inconsistent findings exist. The present study investigated this issue using variants of the Balloon Analogue Risk Task (BART) in an online study. Risky decision-making behavior was then assessed by administering two versions of the BART, a gain only and a mixed gambling BART. A total of 54 male and 51 female subjects participated in the study.

It could be shown that individuals with a high expression of the personality trait greed show an increased risky decision behavior due to an increased risk sensitivity and not due to a reduced loss aversion. This is partly in contrast with previous findings in other tasks assessing risk sensitivity and loss aversion. These differences may be due to the changes of perception during the gain only task.

No significant effect was found between the personality trait anxiety or age and risky decision-making behavior. This could be since no pathologically anxious subjects were used for the sample, or respectively due to an unbalanced distribution of age.

Keywords: Balloon Analogue Risk Task (BART); trait greed; gain only vs. mixed BART; risk sensitivity vs. loss aversion

Introduction

Every day we are exposed to risky decisions. Do I cross the street on red traffic light to save some time, or wait for green traffic light for a safe crossing? Decision situations under risk vary widely and multiple decision factors may come into play that influence the decision. However, when it comes to decision under risk, two decision variables that are often confused with each other: Loss aversion and risk sensitivity. Loss aversion refers to the tendency to weigh losses more heavily than gains when weighing choices (Kahneman & Tversky, 1979; Phelps et al., 2014). Thus, the term describes an avoidance of choices that may result in losses, even if they are accompanied by equal or larger gains. Risk aversion, on the other hand, can be defined as a general aversion to the uncertainty or variance of the outcome, regardless of whether the outcome is a potential gain or loss (De Martino et al., 2010). When risk is associated with potential loss, individuals with high loss aversion may appear to be risk averse, even if they are not generally risk averse when it comes to decisions with minimal or no potential for loss. This interaction problem between the two variables highlights why a clear differentiation between loss aversion and risk aversion is crucial in decision behavior (Xu et al., 2020).

Recent studies have shown that sensitivity to risk and loss can be measured and studied orthogonally in gambling tasks (Phelps et al., 2014). According to Li et al. (2019), in gain only and loss only gambling tasks, where either only gains or losses are possible, individuals' risk tolerance is assumed to be determined by their risk sensitivity. In contrast, in mixed gambling tasks, where both gains and losses are possible, risk taking is influenced by risk sensitivity and by loss aversion.

This can be assumed within the theoretical framework of prospect theory, in which risk sensitivity and the loss aversion coefficient together determine the degree of risk taking in a value-based gambling task (Kahneman & Tversky, 1979; Tversky & Kahneman, 1992).

In our work we try to show this distinction also with the well-known instrument for assessing risk propensity or risk behavior, the Balloon Analogue Risk Task (BART).

The Balloon Analogue Risk Task is a computer-based measure of risk behavior developed by Lejuez et al. (2002). The BART models real-world risk behavior through the conceptual framework of weighing potential gains and losses. In the task, the experimental participant is presented with a balloon and offered the opportunity to earn money by inflating the balloon by clicking a button. Each click causes the balloon to gradually inflate, and money is added to a counter. This happens until a certain threshold is reached, at which point the balloon becomes over-inflated and explodes. So, each pumping means a greater risk, but also a greater potential gain. If the participant decides to cash out before the balloon pops, the money earned for this run will be collected in his total balance. However, if the balloon explodes, the earnings for that attempt are lost. Participants are not informed about the breakpoints (probability of bursting when the balloon is inflated) of the balloons. The primary score used to measure BART performance is the adjusted average number of unexploded balloons pumped. Thus, higher scores indicate a greater willingness to take risks on the part of the subject.

This paradigm is particularly interesting because it offers intuitive sequential risk-taking with direct feedback, where participants can learn directly from their experiences. Moreover, the BART can be systematically manipulated to provide a broader understanding of risk taking (Wallsten et al., 2005). Thus, the BART can be modified into different variants of gambling tasks. Accordingly, an application of a gain & loss only gambling task (either only gains or losses are possible) as well as a mixed gambling task (option on gains as well as losses) is possible. In our study, a modified BART was used to differentiate between loss aversion and risk sensitivity of the subjects. Additionally, we were interested in the interrelation of specific personality traits with risk sensitivity and loss aversion.

The first trait we were interested in was greed. Greed can be defined as a desire to get more at any cost, including the pursuit of coveted goods and a willingness to accept acting even at the expense of others (Balot, 2020; Mussel & Hewig, 2016). Seuntjens, Zeelenberg, van de Ven, et al. (2015) emphasized that greedy personalities expect to be happier with more money, but once they possess more, they readjust their desire and expectations and want even more. Hence, they are in a

hedonistic treadmill. According to Seuntjens et al. (2016), greed can entail both positive effects, such as higher income, and negative effects, such as a higher likelihood of saving less money, or having financial debt. However, greed is often thought to have a selfish nature, which is an extreme and immoral form of self-interest at the expense of others (Balot, 2020). Mussel et al. (2015) point out that greed is associated with antisocial, unethical, and deviant behaviors. Furthermore, greedy individuals may conceivably take excessive risks to increase profits, accepting the possibility of enormous losses to their department, company, or even society.

There are only few empirical findings on the influence of the personality trait greed on risky decision behavior, which are also inconsistent. According to Mussel et al. (2015), trait greed predicts individual risk taking, which was shown using the Balloon Analogue Risk Task (BART), as well as in three risk games (Mussel & Hewig, 2016). Furthermore, it was found that individuals with a low trait greed value showed a stronger neural response to losses compared to gains, individuals with high trait greed values decreased this effect. It has been suggested that reduced feedback-related negativity may indicate difficulties in learning from experience, especially from mistakes, punishments, or negative events. This could contribute to risky decisions in the future. However, Seuntjens, Zeelenberg, van de Ven, et al. (2015) found no association between trait greed and individual risk taking. Li et al. (2019), using a mixed, gain only and loss only gambling task, concluded that the stable personality trait greed was significantly correlated with risky decisions in mixed gambling tasks, but not in gain only or loss only gambling tasks. Furthermore, the individual trait greed value was found to be specifically tied to the loss aversion coefficient, but not to risk attitude. This not only allowed them to confirm the correlation between the personality trait greed and risk taking in general, but also to conclude that the correlation is selectively mediated by individual loss aversion and not by risk attitude, which may explain some of the divergent findings of previous research.

Another promising trait that may influence the behavior during BART is trait anxiety. The word meaning of anxiety is "emotional state accompanied by anxiety, oppression, excitement (in the

face of danger); vague feeling of being threatened" (Duden editorial, n.d.). Differential psychological anxiety research refers to the description and, to some extent, the explanation of individual differences in the tendency to anxiety. Looking more closely at trait anxiety, this refers to the stable tendency to notice, experience, and report negative emotions such as fears, worries, and anxieties across many situations (Gidron, 2013). According to Gidron (2013), this is part of the personality dimension of neuroticism versus emotional stability. Trait anxiety is also manifested by repeatedly worrying about and reporting body symptoms. Further, the personality trait is characterized by perceiving environmental stimuli (e.g., events or statements from others) as threatening.

Concerning decisions under risk, there have been findings that pathologically anxious personalities exhibit reduced risk behaviors compared to healthy experimental participants (Giorgetta et al., 2012; Mueller et al., 2010). Charpentier et al. (2017) examined the differences in risk behaviors between pathologically anxious and healthy individuals using a mixed and gain only gambling tasks. They concluded that the pathologically anxious showed significantly higher risk aversion (measured in the gain only gambling task), but loss aversion (measured in the mixed gambling task) was equivalent compared to the healthy individuals.

The authors suggest that the increased risk aversion stems from biased risk assessment and anxious personalities overestimate the risk of negative events (Butler & Mathews, 1983). This, according to Charpentier et al. (2017), would result from an overestimation of the likelihood of bad gambling outcomes (whether that outcome is a smaller win, a loss, or nothing at all, and therefore independent of loss aversion), resulting in a withdrawal from risky decisions.

Xu et al. (2020), on the other hand, came to contrary results in their study. Here, risk aversion and loss aversion were simultaneously investigated during decision making in individuals with high and low trait anxiety in a variable gain only/ loss only gambling task using functional magnetic resonance imaging. It was found that individuals with a high trait anxiety personality had increased loss aversion while engaging in decision-making behavior under risk. Despite fewer "gamble" decisions in anxious individuals, no group difference was found in subjective risk aversion. This

suggests that the negative decision bias in trait anxiety is due to an overweighting of loss rather than risk. This dominant role of loss aversion in maladaptive risk assessment was further supported by disorganization of emotion-related and cognitive-control-related neural networks.

Another interesting factor concerning decisions under risk and uncertainty is age. Weller et al. (2011) investigated risky decision-making behavior in gain only and loss only gambling tasks of subjects aged five to 85 years. They concluded that risky behavior in the gain only gambling task decreases over the life span.

In the loss only design, on the other hand, risk behavior remained relatively constant, a result they attributed to the ubiquity of loss aversion. In contrast, a study by Gaechter et al. (2007), which looked at loss aversion in risky and risk-free decision tasks, concluded that in both choices, loss aversion increases with age. However, the research results are again based on different study designs. For example, Weller et al. (2011) subjects underwent "the Cups task," which contained gain and loss only runs, to examine risky decision behavior. In contrast, Gaechter et al. (2007) used a "lottery choice task" to measure loss aversion for the risky decision task. Furthermore, they exclusively used customers of a German car manufacturer as test subjects. This allows only limited ecological validity, since car customers are not very representative of the overall population.

Based on the theoretical background and the state of research, the following three questions and hypotheses arise for this paper: Does trait greed predict increased risky decision-making behavior due to reduced loss aversion in the BART? Our first hypothesis states that the higher the score on the subject's trait greed scale, the higher the value of the difference in the average number of inflations of balloons between the mixed gambling BART and the gain only gambling BART (mixed - gain only BART). The second question is whether trait anxiety predict reduced risky decision-making behavior in BART due to increased loss aversion? We would hypothesize, that the higher the score on the subject's trait anxiety scale, the higher the value of the difference in the average number of inflations of balloons between the gain only gambling BART and the mixed gambling BART (gain only – mixed BART). The last question and hypothesis were whether age predict reduced risky decision

behavior due to increased risk aversion as well as loss aversion in BART? We expected that the older the subject's age, the lower the average number of inflations of unexploded and absolute balloons, both in the mixed gambling BART and in the gain only gambling BART.

Material and methods

Ethical statement

The study was carried out in accordance with the recommendations of “Ethical guidelines, of the psychological association of the country of the institution with written informed consent from all subjects. All subjects gave written informed consent in accordance with the Declaration of Helsinki before they participated in the experiment. The protocol was approved by the local ethics committee.

Preregistration

The preregistration (blinded) of the study is given here:

https://osf.io/fv29z/?view_only=5490a21747164c938c17ff7e54529289.

Participants

The calculation of the minimum sample size was performed using the computer program G*Power (Version 3.1.9.7) (Faul et al., 2009; Faul et al., 2007) with an estimated effect size of $r=.292$ (Huo et al., 2020), power = .8 and alpha = .05 led to a required number of 87 subjects.

Data collection took place from June 9 to June 28, 2021, and the study completion time was approximately 30 minutes. To participate in the experiment, subjects were required to be at least 18 years old, have a good command of German, and have no mental illness. Subjects were recruited via Facebook, WhatsApp groups, email distribution lists, and SONA (an online study enrollment platform that is widely accessible).

Seven subjects were excluded from the sample because they either did not complete the study to the end or were identified as statistical outliers (see preregistration: mean values or participation time: $z > 3.29$ Tabachnick & Fidell, 2014).

The final sample included 105 subjects and the mean age was 35.75 years ($SD = 11.86$). A total of 54 males and 51 females participated. The participants did not get a monetary compensation for participation, yet psychology students were able to get course credits. However, it was advertised that the participant with the highest total credit was paid 50€ as a prize.

Procedure

All subjects participated in the study voluntarily. The subjects were informed about the processing of the data, gave their consent and received an explanation about the aim of the study at the end of the experiment. The study was conducted online using SoSci Survey (Leiner, 2021). A link with a serial number was sent to the test persons via email address so that the winner with the highest fictitious total credit could be determined after completion of the study. Since the study contained audio effects (when pressing the buttons "pump", "collect", and when the balloon burst), participants were told at the beginning how to activate them in their individual internet browser. The study was composed of two parts (see Figure 1):

Figure 1:

Overview of the examination procedure.

In the first part, demographic data (age, gender, monthly income and highest education) trait greed ("the GREED scale", Mussel & Hewig, 2016) and trait anxiety („State-Trait-anxiety inventory“, STAI, trait part Laux et al., 1981; Spielberger & Gorsuch, 1970; Spielberger, 1989). was used. As an additional control trait anger („State-Trait Anger Expression Inventory“, STAXI trait part, Schwenkmezger & Hodapp, 1991) was assessed.

In the second part, after an explanation of the experimental task, the subjects went through two variants of the BART (Lejuez et al., 2002). Here, the test participants were presented with a green balloon in which a sum of money in euros was displayed.

It was possible to increase this sum of money by inflating the balloon by clicking on the "pump" button. Each click caused the balloon to gradually inflate and the amount of money displayed in the balloon increased, but each pumping not only meant a larger potential prize but also a greater risk of the balloon bursting. However, participants were not informed about the breakpoints of the balloons. If the participant decided to cash out before the balloon burst by clicking the "collect" button, the money earned in that round was collected in their total balance. A bursting of the balloon in turn entailed different events in the two different variants of BART, which are presented in a more differentiated way below.

In the mixed gambling BART variant, a balloon with a value of 1000€ was presented in each run. A (successful) inflate option doubled this value (to e.g., 2000€ after a single inflate). If subjects clicked on "collect", they were credited with the value currently displayed in the balloon to their fictitious total balance. With each inflation, the risk of the balloon bursting increased in 7% increments from 15% to 71% (15%, 22%, 29% ... 71%) and then from 71% with an increase from 29% to 100% from level nine to ten. If the balloon burst, the full value displayed in the balloon was subtracted from the total credit (a negative total credit was also possible as a result). The test subjects went through 40 runs of the "mixed gambling" variant, with an additional five test runs beforehand.

The gain only gambling BART variant, differed from the mixed gambling BART in that when the balloon burst, the value currently displayed in the balloon was not deducted from the total credit, but a quarter of this value (e.g., 250€, if the balloon burst during the first inflation) was credited to the total credit. Here, too, the subjects completed 40 runs of the "gain only gambling" variant, also with 5 test runs in advance. This gain only task was an enhanced gain only variant, as the normal BART is already a gain only task. Yet, we wanted to maximize the effects of the differences and therefore implemented a gain in case of non-successful pumping.

At the end of the experimental series, a supplementary question was asked whether the subjects could hear sound effects during the experiment.

Data Analysis

To test the research question and hypotheses, linear regressions with the traits as predictors and the difference in the average number of unexploded balloon inflations between the mixed gambling BART and the gain only BART, as well as the difference in the average number of absolute balloon inflations as criteria. To avoid suppression effects, as intercorrelation of the traits were expected, the regressions were done separately for each trait and criterion. The significance level was set at $\alpha = .05$. The traits greed and anxiety and the age of the subjects were z-standardized. According to Lejuez et al. (2002), the primary score used to measure BART is the adjusted average number of inflations on unexploded balloons. Because participants still receive a quarter of the currently displayed value in the balloon as gain when it pops in the gain only BART variant, it was reasonable to assume increased balloon inflation and, consequently, more frequent balloon pops. For this reason, not only was the adjusted average number of inflations for unexploded balloons measured here, but also the unadjusted average number of inflations for the absolute balloons (including the exploded balloons) was additionally measured. According to Lejuez et al. (2002), however, it was expected that both measurements would yield almost identical results.

On exploratory level, trait greed was used as a predictor for the inflation behavior in four separate regression models for the mixed and the gain only task, for either all balloons or only the ones that did not explode.

All statistical analyses were done using open-source statistical software Jamovi (The jamovi project, 2021 – Version 1.8.4).

Results

Descriptive

The descriptive and the bivariate correlation of the measured variables can be seen in supplemental Tables S1 and S2.

Confirmatory analyses

To test whether trait greed predicts increased risky decision-making behavior due to reduced loss aversion, two linear regressions were conducted. Here, trait greed as a predictor and the *difference in the mean number of times balloons were blown up unexploded (between the mixed gambling and the gain only BART)* as a criterion proved to be significant ($\beta = -.19$, $t(103) = 1.997$, $p = .048$). It was possible to explain 3.73% of the variance of the criterion with the predictor *trait greed* (Figure 2 A).

Figure 2:

Trait greed and the difference between mixed and gain only pumping behavior

Note: Y-axis intercept= difference in average number of inflations of unexploded balloons (mixed - gain only BART) as criterion; X-axis intercept= trait greed as predictor.

The second linear regression performed with trait greed as the predictor and the difference in the average number of inflations of absolute exploded balloons (between the mixed gambling and the gain gambling BART) as the criterion proved to be significant ($\beta = -.21$, $t(103) = 2.201$, $p = .03$). It was possible to explain 4.49% of the variance of the criterion with the predictor trait greed (see Figure 2B). Hence, the first hypothesis could not be accepted, as the expected effect was not given, although a significant effect was found in the opposite direction.

To test whether trait anxiety predicts reduced risky decision-making behavior due to increased loss aversion, two linear regression analyses were again performed. Here, *trait anxiety* as a predictor and the *difference in the mean number of times balloons were blown up unexploded (between the gain only gambling BART and the mixed gambling BART)* as a criterion proved to be non-significant ($\beta = .06$, $t(103) = -.63$, $p = .532$) (see Figure 3A).

Figure 3:

Trait anxiety and the difference between mixed and gain only pumping behavior.

Note: Y-axis intercept= difference in average number of inflations on unexploded balloons (mixed - gain only BART) as criterion; X-axis intercept= trait anxiety as predictor.

The second linear regression performed with trait anxiety as the predictor and the difference in the mean number of times absolute balloons were blown up (between the gain only gambling

BART and the mixed gambling BART) as the criterion also showed no significance ($\beta = .05$, $t(103) = -.51$, $p = .615$) (Figure 3B). Thus, the second hypothesis could not be accepted.

To address the question of whether age predicts reduced risky decision-making behavior due to increased risk aversion as well as loss aversion, two linear regressions were performed. Here, *age* as a predictor and *average inflation on unexploded balloons* as a criterion proved not to be significant ($\beta = .05$, $t(103) = -.42$, $p = .675$) (see Figure 4A).

Figure 4:

Age and the mean of mixed and gain only pumping behavior.

Note: Y-axis intercept= average inflation on unexploded balloons as criterion; X-axis intercept= age as predictor.

The second linear regression performed with *age* as predictor and *average inflation on absolute balloons* as criterion also did not show significance ($\beta = -.05$, $t(103) = -.52$, $p = .602$) (see Figure 5B). Thus, the third hypothesis could also not be accepted.

Exploratory studies

Further linear regressions were performed to investigate the extent to which trait greed can predict risky decision behavior. Trait greed was always used as a predictor, but different criteria were used (see Table 1 and Figure 5). Only in the gain only tasks there was a significant prediction of the behavior by greed.

Table 1:

Trait greed as predictor in four separate regressions with the inflation behavior on unexploded balloons (gain only & mixed BART) (A & B) and all balloons (gain only & mixed BART) (C & D) as criterion.

Criterion	β	SE	t	p
(A) gain only unexploded	.231*	.114	2.409	.018
(B) mixed unexploded	.135	.102	1.379	.171
(C) gain only total	.302**	.07	3.216	.002
(D) mixed total	.169	.0717	1.740	.085

Note: * $p < .05$, ** $p < .01$

Figure 5:

Trait greed and the inflation behavior on unexploded balloons (gain only & mixed BART) (A & B) and all balloons (gain only & mixed BART) (C & D) as criterion.

Discussion

The aim of the present study was to investigate the influence of trait greed, trait anxiety, and age on risky decision behavior, differentiating between loss aversion and risk sensitivity. We hypothesized a positive relation of trait greed to loss aversion, however it was shown that there was a significant difference between trait greed and risky decision behavior in the mixed and gain only gambling BART. Surprisingly, a negatively directional relationship emerged, suggesting that this significant effect is not due to decreased loss aversion as seen in the research findings of Li et al. (2019), but to a higher risk proneness. This significant effect was evident in both linear regressions, each using two different criteria (difference in the average number of times unexploded and absolute balloons were inflated). In their study, Li et al. (2019) concluded that trait greed was significantly correlated with risky decisions in mixed gambling tasks but not in gain only tasks. Furthermore, they concluded that the individual trait greed value was specifically tied to the loss aversion coefficient, but not to risk sensitivity. Yet, they used a different task, a gambling task and not the BART.

The present results instead confirm the findings of Mussel et al. (2015), who found that trait greed can predict individual risk-taking. They also used a gain only BART (according to Li et al., 2019), but here only the value "0" was recorded when the balloon burst. Yet, it seems very important which kind of task is used, as trait greed seem to have different influence, depending on the specific properties of the measurement paradigm, i.e., economic game. However, the results contrast with the physiological findings of Mussel et al. (2015) as they suggest that high trait greed would lead to a lower loss aversion, which was indicated by FRN. Nevertheless, the influence of the experimental variation, especially of our "exaggerated" gain only task seem to change the perception of the burst rather drastically, and therefore the total lack of loss leads to a full development of the relation of greed and pumping behavior. This burst in gain only may instead be seen as a dampened win, although one loses an amount of money. This shed additional light on the danger of having to choose between two winning options for greedy persons, as they may not see a problem if they still win something. However, it is questionable whether the evaluation processes line up with the behavioral

responses one-to-one. Hence, this experiment should be repeated with EEG to compare the differences in FRN response to confirm possible differences in the findings or disentangle the electro-cortical response of feedback processing from the behavioral response. Additionally, other measurements of loss aversion should be added to confirm the finding in BART.

Concerning trait anxiety there were no significant effects found in our study. One possible explanation for a lack of effect would be an insufficient degree of anxiety in the sample. In the work of Giorgetta et al. (2012) and Mueller et al. (2010), pathologically anxious personalities were specifically compared to healthy subjects to conclude that the pathologically anxious exhibited reduced risk behaviors. In the contrasting findings of Charpentier et al. (2017) and Xu et al. (2020), in which reduced risky decision-making behavior resulted first from reduced risk sensitivity and second from reduced loss aversion, pathologically anxious personalities were also compared with healthy experimental participants. This suggests that to achieve a significant effect, a random sample with test participants who only exhibit increased trait anxiety is not sufficient and that pathologically anxious test subjects would have to be specifically sampled. However, this null finding allows to question the generalizability of the results previous mentioned results and whether the findings are maybe only given for pathological anxiety and not for the personality aspect of anxiety. However, the absence of the effect could also be due to sample homogeneity.

Concerning age there was also no significant effect given in our sample. In the study by Weller et al. (2011), subjects aged five - 85 years were used. In our study, participants under the age of 18 were excluded. Additionally, the age group between 25 and 35 is disproportionately often represented. In contrast, in the study by Weller et al. (2011), no effect was found for the age group from 18 - 22 years old, which represented the largest proportion of subjects. Perhaps this is also the reason that our sample was not able to produce an effect.

Limitations

One important limitation is BART itself. Although the aim of the study was to investigate the relation of greed in specific variations in this task, it is questionable, whether the sequential nature of

the task leads to a real “gain-only” experience in this condition, if the balloon bursts at higher level, as part of the won money is still lost. Given this uncertainty and that correlations in both conditions (mixed and gain only) were in the positive direction ($.13 < r < .30$), but only the difference score that should address the loss aversion is negative, it is hard to tell whether loss aversion is higher or lower in individuals with high (compared to low) levels of trait greed. In the same regard, it would also be interesting to determine whether risk sensitivity is differentially expressed between the loss-only and gain-only gambling task compared to the BART variations.

The present study was collected exclusively online. Neither the environment nor the execution of the experiment could be controlled by the experimenter. Hence, the internal validity might be limited. In addition, self-assessment questionnaires are subject to possible response biases such as social desirability, acquisition tendencies, or the tendency toward the middle (Bogner & Landrock, 2015).

Furthermore, the subjects were informed that the participant with the highest fictitious total credit earned would receive a prize of 50€. This was done following Mussel et al. (2015), who provided 100€ for this purpose. This procedure could have encouraged the subjects to show increased risk behavior and to inflate the balloons more often than would have been the case without the possibility of winning. Nevertheless, the possible gain was retained for motivational incentives for the subjects and to provide a better comparability with previous studies (e.g., Mussel et al. (2015)).

Future research should also consider alternative personality models to examine personality traits related to risky decision behavior such as the HEXACO model of personality structure (Lee & Ashton, 2004) or the Role Construct Repertoire Test (Kelly, 2020). Additionally, one could control for trait impulsiveness, as was done in the study of Li et al. (2019).

Since the beginning of 2020, Corona pandemic containment measures such as lockdowns, quarantine regulations, and social distancing have shaped everyday life. The pandemic with its measures is associated with increases in state-trait anxiety, generalized anxiety, stress, and

depression, among others. The study reported here was conducted during the time of the Corona pandemic, this may have had a particular impact on the study of trait anxiety on risky decision-making behavior (Every-Palmer et al., 2020; Nikčević et al., 2021; Wong et al., 2020), which may have undermined or distorted effects that were previously found.

Conclusion and research outlook

The present study is the first to investigate the influence of the personality traits greed, anxiety, and the demographic variable age on risky decision behavior using variants of the BART, differentiating between risk sensitivity and loss aversion. It was shown that individuals with a high expression of the personality trait greed show increased risky decision behavior due to increased risk sensitivity and not due to decreased loss aversion. No significant effect was found between the personality trait anxiousness or age and risky decision behavior. These findings question the generalizability of previous findings. Concerning trait greed, the task seems to be important, while for age and anxiety, the specific manifestation may be vital. While difference in trait anxiety may not be sufficient and the effects may only be found for pathological samples, the influence of age may only occur in specific timeframes of one's life.

Yet, the finding concerning trait greed may have practical implications. The context of the task may alter the perception of the loss. Hence, a lack of loss aversion is not necessarily the driving factor to explain risky behavior given by greedy persons, but a higher reaction to reward in specific cases. Accordingly, depending on the tasks, greed might be a preferable or negligent personality concerning economic decisions and its implications for business may be reconsidered, especially if two options with different gains are available.

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Supplemental materials

Table S1

Table 1:

Descriptive of the measured variables:

	gender	mean	median	SD	minimum	maximum
gain only not exploded	women	2.427	2.292	1.119	0.361	4.5
	men	2.985	3.028	1.202	0.5	6.333
mixed not exploded	women	1.804	1.846	0.887	0.103	3.615
	men	2.446	2.39	1.085	0.175	5.25
(mixed - gain only) not exploded	women	-0.624	-0.604	0.578	-1.95	0.494
	men	-0.539	-0.428	0.799	-2.433	0.986
mean (gain only & mixed) not exploded	women	2.115	2.209	0.968	0.365	3.808
	men	2.715	2.668	1.073	0.625	5.792
gain only total	women	2.19	2.275	0.796	0.425	3.475
	men	2.535	2.55	0.658	0.875	3.625
mixed total	women	1.734	1.85	0.734	0.125	2.975
	men	2.169	2.263	0.684	0.175	3.375
(mixed - gain only) total	women	-0.455	-0.425	0.449	-1.375	0.45
	men	-0.366	-0.275	0.497	-1.85	0.5
mean (gain only & mixed) total	women	1.962	2.15	0.732	0.413	3.05
	men	2.352	2.462	0.624	0.938	3.375
trait greed	women	32.882	33	10.18	12	62
	men	37.667	35.5	12.651	12	69
trait anxiety	women	49.784	50	6.071	37	63
	men	45.833	46	5.266	34	60
age	women	35.392	32	12.238	19	62
	men	36.093	33	11.708	21	71

Table S2

Table S2:

Correlation of the measured variables of the study.

		gain only not exploded	mixed not exploded	(mixed - gain only) not exploded	mean (gain only & mixed) not exploded	gain only total	mixed total	(mixed - gain only) total	mean (gain only & mixed) total	trait greed	trait anxiety	age
gain only not exploded	Pearson's r	—										
	p-value	—										
mixed not exploded	Pearson's r	0.812	—									
	p-value	< .001	—									
(mixed - gain only) not exploded	Pearson's r	-0.494	0.106	—								
	p-value	< .001	0.284	—								
mean (gain only & mixed) not exploded	Pearson's r	0.958	0.945	-0.225	—							
	p-value	< .001	< .001	0.021	—							
gain only total	Pearson's r	0.936	0.759	-0.464	0.896	—						
	p-value	< .001	< .001	< .001	< .001	—						
mixed total	Pearson's r	0.8	0.955	0.06	0.916	0.796	—					
	p-value	< .001	< .001	0.546	< .001	< .001	—					
(mixed - gain only) total	Pearson's r	-0.226	0.293	0.822	0.016	-0.333	0.306	—				
	p-value	0.02	0.002	< .001	0.867	< .001	0.002	—				
mean (gain only & mixed) total	Pearson's r	0.916	0.904	-0.215	0.956	0.948	0.947	-0.016	—			

Trait greed in mixed & gain only BART

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	p-value	< .001	< .001	0.028	< .001	< .001	< .001	0.869	—			
trait greed	Pearson's r	0.231	0.135	-0.193	0.195	0.302	0.169	-0.212	0.249	—		
	p-value	0.018	0.171	0.048	0.046	0.002	0.085	0.03	0.01	—		
trait anxiety	Pearson's r	-0.153	-0.134	0.062	-0.151	-0.126	-0.096	0.05	-0.117	-0.124	—	
	p-value	0.119	0.174	0.532	0.123	0.199	0.332	0.615	0.234	0.206	—	
age	Pearson's r	-0.066	-0.009	0.099	-0.041	-0.084	-0.013	0.111	-0.052	-0.319	-0.007	—
	p-value	0.502	0.928	0.313	0.675	0.394	0.893	0.258	0.602	< .001	0.947	—