

**The effect of intuition and decision-making in depressive symptomatology**

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### **Abstract**

Depressive symptomatology may lead individuals to make less adaptive decisions due to impairments in problem-solving. Information processing style also plays a role in the decision-making process. The majority of literature states that individuals with depressive symptomatology show a less pronounced tendency to intuition (intuitive information processing style) that would lead to more adaptive outcomes. The aim of this study is to examine the influence of an intuitive information processing style on decision-making and the relationship of depressive symptomatology with poorer decision-making. The sample consisted of 97 participants who had fluent knowledge of the Dutch language with ages ranging from 16 to 66. The participants were randomly assigned to one of the 4 experiment conditions in this study. Iowa Gambling Task (IGT), Becks' Depression Inventory II (BDI-II), and Preference for Intuition or Deliberation (PID) were the used measures in this research. The data analysis showed that the severity of depressive symptomatology did not influence decision-making performance. Preference for intuitive information processing style had no effect on decision-making outcomes. Nevertheless, participants started making more adaptive decisions towards the end of the IGT. The results of this study were inconsistent with the majority of literature examining the relationship between depressive symptomatology, intuition, and decision-making. Further research is needed to get a better understanding of the interaction and possible influence of these constructs.

*Keywords:* depressive symptomatology intuition, intuitive information processing style, decision-making.

### **The effect of intuition and decision-making in depressive symptomatology**

People with depressive symptoms tend to make poor decisions in various contexts, such as social, economic, career or other situations where decision-making is involved. Research shows that depressive symptomatology impairs individuals' abilities to make more flexible, hence, more adaptive, decisions that would provide more beneficial outcomes (Cella, Dymond, & Cooper, 2010; Okwumabua, Wong, & Duryea, 2003). Problem-solving impairments in depressive symptomatology are caused by cognitive deficits (Rock, Roiser, Riedel, & Backwell, 2014), such as executive functioning, memory, attention (Rock et al., 2014) psychomotor speed, concentration, and learning (Pan et al., 2019). Working memory plays an important role in the decision-making process (Bagneux, Thomassin, Gonthier, & Roulin, 2013). Higher working memory capacity is related to learning towards more adaptive behavior; whereas lower working memory capacity indicates possible difficulties in learning or remembering outcomes of decisions made in the past. The complex real-life problem-solving abilities are partially mediated by learning, memory, and reasoning (Yen, Rebok, Gallo, Jones, & Tennstedt, 2011).

People with depressive symptoms are characterized by typically slower and impaired, also known as less adaptive, decision-making (Cella et al., 2010; Hammar & Ardal, 2009; Moniz, de Jesus, Goncalves, Pacheco, & Viseu, 2016). The less adaptive decision-making strategies experience difficulties in searching for information; use fewer resources in decision-making; have difficulties to make a beneficial choice using prior knowledge of a similar situation; and show slowed decision-making compared to healthy controls (Lawlor et al., 2019; Leykin, Roberts, & Derubeis, 2011). Other studies explain decision-making impairment not only as a result caused by executive dysfunctions, but also as an impairment in emotional decision-making such as altered sensitivity towards reward and punishment. Individuals with depressive symptomatology are more sensitive to high reward and continue

using the same decision-making strategies even if they are less adaptive in a long run (Must et al., 2006).

Damasio (1996) developed The Somatic Marker Hypothesis which suggests that decision-making is a complex process. The adaptive decisions in uncertain decision-making situations are made not only based on rational thinking, but also on rapid emotion-based physiological signals (somatic markers). These signals could be illustrated as a *gut-feeling*, that guides our decisions towards more advantageous outcomes. Imagine a situation when a person chose a lit path instead of an unlit one when walking alone at night in a dangerous neighborhood. According to this theory, people who are experiencing affective disorders, such as depression, show an impaired ability to make adaptive decisions due to the defect in their emotional mechanism that deprives them of emotional signals, which are the somatic markers (Bechara & Damasio, 2005; Bechara, Damasio, Tranel, & Damasio, 2005). This deprivation of emotional signals forces individuals to rely on deliberation and over-analysis of all possible choices, their immediate and future outcomes, and leads towards problematic decision-making (Damasio, 1996; de Siqueira et al., 2018). Therefore, it is expected that people with more severe depressive symptomatology will make less adaptive decisions.

According to the cognitive-experiential self-theory explaining how people usually make everyday decisions, there are two information processing styles: rational and experiential (Epstein, 1994). The rational thinking style is described as a deliberative information processing style, that is conscious, relatively slow, planned, based on analytical reasoning and evaluation of pros and cons; whereas experiential (intuitive) information processing is understood as experiential, affect based, very spontaneous, and operating unconsciously (Kahneman, 2011; Pachur & Spaar, 2015; Pacini & Epstein, 1999). Epstein (2010) offered to expand the definition of intuition, stating that due to unconscious information processing, intuition gives a person a sense of knowing what is right in a certain

situation. In order to make adaptive and fast decisions in real-life situations, where possible outcomes of decisions are unknown, people have to follow their intuition often called “gut-feeling” which is supposed to guide people towards more adaptive decisions (Pachur & Spaar, 2015). These two information processing styles are considered as independent from one another. The preference to a rational decision-making style is linked to a tendency to over-analyze the situation which is common among depressive people (Barrouillet, 2011; Witteman, van de Bercken, Claes, & Godoy, 2009) whereas an intuitive decision-making style is linked to fast decisions that are made based on emotional stimuli.

It is also known that the affect trait/state has an impact on decision-making patterns (de Vries, Holland, & Witteman, 2008b). Remmers and colleagues (2015) stated that people with affective disorders, such as major depressive disorder (MDD), especially in acute phases, present impaired intuition and tend to make their decisions based on rational thinking compared to samples without MDD. Moreover, depressive people tend to feel less satisfaction about their decisions because of selective attention toward negative aspects of their choice or possible outcomes (Leykin et al., 2011). This recyclic negative thinking (concentration on negative pieces of information) is called depressive rumination. It causes over-thinking about given situations and impairs cognitive capacity and problem-solving skills (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008; Papageorgiou & Wells, 2003). According to Watkins (2004), rumination maintains negative affect in depression and impairs the intuitive information processing style which is described as necessary to make more adaptive decisions. We acknowledge that the findings from clinical samples cannot be equated to the general population with depressive symptomatology. We might observe some common ground such as depressive symptomatology being a part of depression, on the other hand the latter does not necessarily present to all individuals having depressive symptomatology. To sum up, we do not deny the disadvantages of such risk of equation

between the two and we acknowledge the need for skepticism but overall the research done in the depression field can have some added value/utility in depressive symptomatology analyses.

The preference to one of the information processing styles also depends on the type of cognition that is used: “hot” or “cold”. Using “hot” cognitions helps people to take into account emotional information and provided feedback. On the other hand, information processing using “cold” cognitions is emotion independent. People with depressive symptoms tend to show a more pronounced impairment because of using “cold” cognitions. If the task that an individual is performing has positive and negative feedback, it may become the highly emotional stimuli; that individuals who are experiencing depressive symptoms have difficulties to process (Roiser & Sahakian, 2013).

Mood also plays a role in the decision-making process and preference for one of the information processing styles. People who experience more negative moods compared to others who experience more positive ones are thought to be inclined to over-analyze their choices and make sub-optimal, less adaptive decisions due to a deliberative information processing style (de Vries, Holland, & Witteman, 2008a). Research carried out on a non-clinical sample illustrated that people in a more positive mood rely stronger on the affective information (somatic markers), whereas people in a more negative state, probably tend to adopt a more careful, deliberative, information processing style (de Vries et al., 2008b). Recent research conducted by Remmers and colleagues (2016) shows inconsistent results with prior research - depressed people can outperform healthy controls depending on the type of task. For example, according to Pachur and Spaar (2015) these inconsistencies in research could be explained by the possibility that individuals are capable of changing information processing style according to the situation. There is a lack of literature that explains how

depressive symptomatology affects preference for one of the information processing styles in non-clinical samples.

To sum up, we observe the lack of research and inconsistent results in terms of the role of intuition in the decision-making process with regards to depressive symptomatology. The aim of this study is to examine the influence of an intuitive information processing style on decision-making and the relationship of depressive symptomatology with poorer decision-making. According to the literature review provided above, it is hypothesized that that people with more depressive symptoms will show poorer decision making (H1); people who have preference for intuitive information processing style will use more adaptive decision-making strategies and perform better (H2); people with more depressive symptoms will not rely on their intuition in decision-making process (H3).

## Method

### Participants

The sample of this cross-sectional study is non-clinical, and consists of 97 participants, including 63 women and 34 men. The age of participants was ranging from 19 to 66 years old ( $M = 26.13$ ,  $SD = 8.87$ ). The average age of women was 26.32 ( $SD = 8.97$ ), men 26.29 years old ( $SD = 8.81$ ).

Participants were recruited at Utrecht University and within the community via Social Networking Sites (SNS). Prior to starting the experiment, participants received information about the study and signed the consent form. The participants were at least 18 years old and spoke fluent Dutch.

### Design, procedure, measures, and materials

The study utilized an experimental design. All participants performed the Iowa Gambling Task (IGT) (Bechara, Damasio, & Damasio, 2000) and filled out the questionnaires on the laptops (with mice and headphones) provided by Utrecht University. The length of an experiment was approximately 30 minutes.

This research is a part of the ongoing study “What influences outcomes on the Iowa Gambling Task? A closer look at task differences and symptoms of mental illness”. The ethical approval for this assessment using the Iowa Gambling Task was obtained from The Faculty Ethics Review Board (FERB) of Faculty of Social and Behavioural Sciences at Utrecht University.

All participants were randomly assigned to one of the four conditions (25 participants per condition) of the study using an online randomization tool from [www.random.org](http://www.random.org). In each condition participants were asked to perform the task (with or without audiovisual feedback depending on condition) on the laptop and fill out the questionnaires. The conditions were as follows: 1) IGT without audiovisual feedback at the end of the test



battery, 2) IGT with audiovisual feedback at the beginning of the test battery, 3) IGT without audiovisual feedback at the beginning of the test battery, 4) IGT with audiovisual feedback at the end of the test battery.

### **Instruments**

**Iowa Gambling Task (IGT) (Bechara et al., 2000).** The IGT is used to assess real-life decision-making under risk of uncertainty (Bechara et al., 2000). The design of the IGT does not allow participants to assume outcomes of each of the possible choices (decks) right away. Each participant has to make 100 choices by picking a card from one of the 4 decks (A, B, C or D) in order to win more money. Decks A and B provide relatively high gains but also very big losses, whereas decks C and D result in smaller gains but also relatively small losses. During the task, participants have to learn by themselves which decks are more advantageous (C and D) and would provide better outcomes in the long term. The participants' learning effect over time is measured using formula:  $[(C+D) - (A+B)]$ , and the higher result indicates the more advantageous decision making and increased learning curve.

The Dutch version of the IGT and questionnaires were used in this study. IGT is a widely used in research and considered a valid measure to assess real-life decision-making (Bechara et al., 2005). According to Schmitz and colleagues (2020), the IGT shows moderate retest reliability.

**Beck's Depression Inventory-II (BDI-II) (Beck, Steer, Ball, & Ranieri, 1996).** The BDI-II is one of the most widely used measures to assess levels of depression with regard to psychological and physical symptoms. It contains 21 statements (e.g., "Sadness", "Guilty Feelings", "Loss of Interest") evaluated on a 4-point Likert type scale from 0 (symptom absent) to 3 (severe symptoms). The scoring is achieved by summarizing ratings for all 21 items. The greater sum of scores indicates greater symptom severity. In this research the total BDI score was considered as a continuous variable rather than a categorical one.

The BDI-II shows high validity and reliability across different cultures. Factor analysis showed that general depression dimension is composed of two constructs: somatic-vegetative and cognitive-affective (Wang & Gorenstein, 2013) subscales. Regarding reliability, the internal consistency was found to be around 0.9. After re-test the reliability ranged from 0.73 to 0.96 (Wang & Gorenstein, 2013). Therefore, BDI-II is a valid and reliable test to use. In this study, the Cronbach's  $\alpha = .908$ , which means that the test is reliable and could be used in research.

**Preference for Intuition or Deliberation (PID) (Betsch, 2004).** This questionnaire measures individuals' habitual, almost natural, preference for deliberation (PID-D) or intuition (PID-I). The questionnaire consists of 18 statements. All of them are evaluated with a Likert-type scale, ranging from 1= I don't agree at all to 5 = completely agree. In this questionnaire, deliberation is a decision mode that is based on reasons and beliefs (e.g., "I think before I act"), and intuition is perceived as a basic decision-making mode that follows our experienced feelings and moods (e.g., "My feelings are very important when I make decision").

According to Witteman and colleagues (2009), the two-factor model was found while investigating the validity of the instrument. The intuition factor's loadings were ranging from 0.43 to 0.83, deliberation factor loadings were ranging from 0.46 to 0.82. The reliability of

this PID-D scale was Cronbach's  $\alpha = 0.85$ , and PID-I Cronbach's  $\alpha = 0.87$ . In this study, PID-D Cronbach's  $\alpha = .747$ , PID-I Cronbach's  $\alpha = .769$ , thus, both subscales are reliable and appropriate to use in research setting.

### **Data Analysis**

The statistical analyses were carried out using IBM SPSS 26.00. Demographic information was assessed by using descriptive statistics. To test whether a possible effect of audiovisual feedback and placement effect of IGT has any impact on the outcomes, and to test the hypotheses of this study, the Repeated Measure ANOVA analyses were conducted.

## Results

### Preliminary Analyses

The descriptive analyses of the sample properties can be found in Table 1. To test for the assumption of normality, a Shapiro-Wilk test was completed for the depression and IGT variables. The outcomes indicated that the total BDI-II and majority of IGT scores per block were not normally distributed ( $p < 0.05$ ). Furthermore, no outliers were found. The Repeated measures ANOVA is considered to be a robust statistical technique where different violations of assumptions are present more often than not (Blanca, Alarcón, Arnau, Bono & Bendayan, 2017; Wilcox, 2012).

Table 1

*Demographic characteristics of the sample (N = 97)*

Demographic variables	
Gender, <i>N</i> (valid %)	
Female	63 (64.9)
Male	34 (35.1)
Age in years, <i>M</i> ( <i>SD</i> ), range	26.31, (8.87), 19 - 66
Years in education <i>M</i> ( <i>SD</i> ), range	15.12, (4.57), 3 - 27
Educational level, <i>N</i> (valid %)	
Primary school	1 (1)
Highschool VMBO	1 (1)
Highschool HAVO	12 (12.4)
Highschool VWO	18 (18.6)
MBO	11 (11.3)
HBO	15 (15.5)
WO	39 (40.2)

Current Occupation, *N* (valid %)

Full-time employee	14 (14.4)
Part-time employee	14 (14.4)
MBO student	2 (2.1)
HBO student	14 (14.4)
WO student	49 (50.5)
Other	4 (4.1)

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**Placement of the task and audiovisual feedback**

To estimate whether audiovisual feedback influences learning over time, a Repeated measures ANOVA was conducted. The assumption of sphericity was violated ( $p = .002$ ) and therefore the Huynh-Feldt (1976) correction was used. No statistically significant differences were found between the groups that received audiovisual feedback and those that did not,  $F(3.674, 349.062) = 1.50$   $p = .21$ ,  $\eta_p^2 = .016$ .

The second Repeated measure ANOVA was conducted to test whether the position of IGT in the test battery had a possible effect on IGT performance over time. Mauchly's test showed that the assumption of sphericity was violated ( $p = .001$ ). After applying Huynh-Feldt (1976) correction ( $\epsilon = .91$ ), no statistically significant differences were present between people who performed the task at the beginning and the end of the test battery,  $F(3.640, 345.778) = .96$ ,  $p = .42$ ,  $\eta_p^2 = .010$ . This showed that participants did not perform differently when the IGT was placed first in the test battery in comparison to when it was placed last.

**Depressive symptomatology and decision-making**

A repeated measures ANOVA was conducted to examine whether the severity of depressive symptomatology elicits worse IGT performance over time. The assumption of sphericity was violated,  $\chi^2(9) = 23.65$ ,  $p = .002$  and therefore the Huynh-Feldt (1976)

correction was used ( $\epsilon = .92$ ). There was a statistically significant effect of the blocks obtained,  $F(3.666, 345.258) = 4.44, p < 0.05, \eta_p^2 = 0.045$ , thus, with small effect size, showing that participants started making more advantageous decisions over time. There was no statistically significant main effect of severity of depressive symptomatology showing that in general this severity did not influence overall IGT performance,  $F(1, 95) = .002, p > .05, \eta_p^2 = .001$ . Additionally, there was no statistically significant effect found of depressive symptomatology on IGT performance over time,  $F(3.666, 348.258) = 0.41, p = 0.79, \eta_p^2 = .004$ . Therefore, the severity of experienced depressive symptomatology did not have a negative impact on IGT performance.

### **Intuition and decision-making**

To examine if the higher preference for intuition elicits better IGT performance over time, One-way repeated-measures ANOVA was conducted. Results of Mauchly's test indicated that the assumption of sphericity was violated  $\chi^2(9) = 26.46, p = .002$ . After applying Huynh-Feldt (1976) correction ( $\epsilon = .92$ ), no statistically significant interaction effect was found of level of intuition on IGT performance over 5 blocks,  $F(3.664, 348.078) = .84, p = .49, \eta_p^2 = .009$ . Additionally, a statistically significant effect was found of blocks  $F(3.664, 348.078) = 0.84, p < .05$ , showing that participants started making more advantageous decisions over time. There was no statistically significant effect of level of preference for intuition showing that in general this severity did not influence overall IGT performance,  $F(1, 95) = .01, p > .05, \eta_p^2 = .0$ . Therefore, a higher preference for intuition does not elicit better IGT performance over time.

### **Interaction of depressive symptomatology and intuition on decision-making**

To test if the higher preference for intuition and less depressive symptomatology influence IGT performance *together*, a repeated measures ANOVA was conducted. Results of Mauchly's test indicated that the assumption of sphericity was violated  $\chi^2(9) = 26.55, p =$

.002. After applying Huynh-Feldt (1976) correction ( $\epsilon = .917$ ) there was found a significant effect of the block,  $F(3.667, 348.345) = 4.26, p < .05, \eta_p^2 = .043$ . As expected from the previously conducted analyses, no significant effect of intuition and depression were found on the overall IGT performance,  $F(1, 95) = .012, p > .05, \eta_p^2 = .0$ . Results did not show a significant interaction effect between reliance on intuition and depressive symptomatology on IGT performance over time,  $F(3.667, 348.345) = .43, p = .77, \eta_p^2 = .004$ . The interaction between the preference of intuition and depressive symptomatology did not influence IGT performance over time.

## Discussion

In this study, we investigated the effect of depressive symptomatology and reliance on intuition in decision-making. According to our findings, neither the severity of depressive symptomatology nor intuition influenced the decision-making task performance. Based on our findings we speculate that people do not start making more advantageous decisions because of a higher preference for an intuitive information-processing style. Additionally, there was no relationship found between intuition and depressive symptomatology. Hence, the severity of depressive symptomatology and preference for intuitive information processing taken *together* did not influence the decision-making outcomes. Finally, the results showed that all participants became better at the decision-making task over time as they made more adaptive decisions.

### Depressive symptomatology and decision-making

The results of this study have shown that the severity of depressive symptomatology does not negatively influence decision-making abilities. The overall learning effect has been noticed despite the severity of depressive symptomatology. This result is inconsistent with previous findings where it was found that depressive symptomatology has a negative impact on decision-making (Cella et al., 2010; de Siqueira et al., 2018; Hammar & Ardal, 2009; Moniz et al., 2016). On the contrary, people suffering from depressive symptomatology to various extents perform in a similar manner compared to control groups (Andrews & Thomson, 2009; Remmers et al., 2016; Rinaldi, Lefebvre, Joachim, & Rossingol, 2019) or even outperform them (Smoski et al., 2008). The present findings could be explained by the results of the other studies stating that depressive symptomatology does not necessarily elicit poorer decisions (Maddox, Glorcik, Worthy, & Beevers, 2012), nor depressive symptomatology impairs individual's abilities to generate more adaptive decisions based on previous outcomes of their choices (Leykin et al., 2011).



The given instructions and understanding of the main concept of the IGT and personal experience may have an impact on the outcomes of our research. Beevers and colleagues (2013) state that individuals with low depressive symptomatology show better performance when they are instructed to maximize their gains during the decision-making task. Note, the maximization of gains is the main instructional point given for the participants in the IGT. Okdie and colleagues (2016) suggest that mindset manipulation of how the IGT task is construed could lead to inconsistent results. The increased psychological distance could explain why some individuals do not change their behavior, whereas a construal (planning based) mindset may have more beneficial outcomes on IGT performance. According to Buelow (2020) it remains unclear whether decision making in depressive symptomatology is guided by the over-focus on negative information or the experienced difficulties in processing positive information.

Some studies suggest that individuals learn how to make more adaptive decisions during IGT over time. On average, it takes more than 100 trials of a task to see the major differences in the task outcomes; the direction of the overall learning curve inclines towards a higher number of adaptive decisions when compared to healthy controls and clinical samples (Dunn et al., 2006; Overman & Pierce, 2013; Wetzels, Vandekerckhove, Tuerlinckx, & Wagenmakers, 2010). Presumably, the lack of impact of depressive symptomatology could be explained by the characteristics of our sample - most of the participants scored low on BDI-II, therefore, not the full range of possible severity of depressive symptomatology was investigated. This low variability of depressive symptomatology in the research sample may have had an impact on the study outcomes. Considering that results of various studies are inconsistent, it could be assumed that there could be more underlying processes. For example, having positive or negative feelings of coherence in terms of individual's choices

(Remmers & Michalak, 2016), that could have an impact on decision-making in presence of depressive symptomatology and higher preference for intuitive information-processing style.

### **Intuition and decision-making**

There was no positive relationship found between an intuitive information-processing style and decision-making in this study. This finding is inconsistent with other studies stating that intuition activates somatic markers that will guide decision making towards more beneficial decisions as is measured with the IGT (Remmers et al., 2015). According to some researchers (Phillips, Fletcher, Marks, & Hine, 2016; Dane, Rockmann, & Pratt, 2012; Pachur & Spar, 2015) more intuition guided decision-making is noticeable in tasks where individuals have a high level of expertise in that particular task or have done similar tasks before. Furthermore, other studies suggest that intuitive decision-makers perform similarly compared to deliberative decision-makers or there is no difference at all and decision-making is guided by similar cognitive processes (Steingroever, Pachur, Šmíra, & Lee, 2018) The self-reported preference for one of the thinking styles does not necessarily reflect an individual's behavior during the decision-making task (Steingroever et al., 2018) It was also found that outcomes of the decision-making task in the light of one of the thinking styles depends on the nature of the task that should explicitly activate the individuals' preferred information processing style (Phillips et al., 2016). Hereby, we speculate that there is a possible lack of association between the IGT and its ability to activate intuitive decision-making style.

### **Intuition, depressive symptomatology, and decision-making**

According to our study, the lower preference for intuition and stronger depressive symptomatology had no impact on decision-making. Research by Remmers and colleagues (2016) highlights that even if depressed individuals express the trend to have impaired intuition, the outcomes of decision-making tasks do not differ from a control group and they

show learning towards more beneficial outcomes. The task type may have an impact on the interaction between depressive symptomatology and impaired intuition (Remmers et al., 2016). Additionally, the role of intuition can be understood as emotion-based learning which is a more complex process and consists of more cognitive information processing properties that are possibly associated with intuitive reasoning in decision-making tasks (Turnbull, Evans, Bunce, Carzolio, & O'Connor, 2005). The severity of depressive symptomatology plays a role in impaired intuition due to the experienced negative affect (Remmers et al., 2016). The majority of our sample indicated nearly no depressive symptomatology or very mild symptoms. For this reason, the absence of the significant relationship between intuition and depressive symptomatology could be explained by the low levels of negative mood. We argue that it remains unclear whether impaired intuition exists in depressive symptomatology or not.

### **Learning effect**

In this study, we have found that all participants independent of their level of depressive symptomatology or predisposition for intuitive decision-making style became better at the IGT over time. A recent study conducted by Deisenhammer and colleagues (2018) supports our findings, and states that individuals are capable of learning how to make more advantageous choices over time in the IGT. Moreover, some research shows that younger adults tend to perform better on IGT. Level of education and better cognitive abilities may have a positive effect on learning in IGT (Beitz, Salthouse, & Davis, 2014; Suhr & Hammers, 2010). On the other hand, other research shows controversial results and poorer performance as higher education levels may discourage individuals to use emotion-based learning (Evans, Kernish & Turnbull, 2004). It remains unclear if education has a positive effect on IGT performance.

According to Suhr and Hammers (2010), young people who have higher estimated intellect perform better on IGT compared to those who have lower estimated intellect. Additionally, it is suggested that at the beginning of the task participants are making less advantageous choices due to ambiguity (possible outcomes of each selection of the card are not known). Also, within the time frame (especially at the end of the task) individual's decisions are made depending on the known probabilities of gains and losses, also known as decisions made under risk (Brand, Recknor, Grabenhorst, & Bechara, 2007). Therefore, we could hypothesize that our study sample of young adults who had a higher education may have had an impact on our research outcomes. Future studies should sample people with various levels of education, age, and intellectual capacities to provide a more accurate interpretation of IGT performance in a non-clinical sample.

### **Limitations and Future Directions**

This study has several limitations. Firstly, the sample of the study was relatively small and homogeneous as most of the sample was sharing the same demographic characteristics, such as age, education, occupation, as well as similar low scores on the BDI-II. To draw more definite conclusions, a larger and more diverse sample is needed as well as more heterogeneously distributed results of depressive symptomatology. Secondly, intuition is a very complex construct that is difficult to activate and complicated to assess, especially with self-report questionnaires (Glöckner & Witteman, 2010). According to Glöckner and Witteman (2010), considering self-report questionnaires and physiological measures while examining intuition may provide more reliable and accurate results because the influence of affect may be considered.

In the future, more studies could be conducted with non-clinical samples and include the possible effect of various symptoms of psychopathology. Moreover, some studies use modified versions of the IGT (Lawrence, Jol, O'Daly, Zelaya, & Phillips, 2008) or compare

outcomes of different versions of the IGT (Buelow & Barnhart, 2017), thus, in order to have consistent results, the samples should be examined under the same conditions (e.g., using the same type of IGT task) (Overman & Pierce, 2013). The literature examining intuition and depressive symptomatology effect on various-decision making tasks is limited, therefore, future studies could possibly investigate the interaction of these constructs in real-life decision making.

To conclude, there is not a lot of research done explaining the effect of depressive symptomatology and intuition on decision-making outcomes. The results of the present research were not in line with existing literature as we have not found significant relationships between the aforementioned concepts. The IGT is considered a very complex task in which outcomes depend on a variety of underlying mechanisms and potential influences. Further research is needed in order to get a better understanding of the possible influence of depression and intuition on various decision-making tasks in the non-clinical sample.

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