

Introduction: The concept of interoception refers to the sensation of physiological states inside the body. Bechara et al. (1999) suggested that the correct reception of somatic markers, which are bodily signals, influences human decision-making. Werner et al. (2009) used Iowa Gambling Task (IGT) to examine the relationship between interoception and decision-making. They found that those with an accurate interoception made more rational decisions. However, the relationship between the two has not been consistently understood, which could be attributed to the relationship between interoception and its associated anxiety and emotional control. Several studies have found that a positive correlation between interoception and anxiety (Pollatos et al., 2009), whereas others found a negative correlation (Fukushima et al., 2013). Regarding anxiety and decision-making in IGT, high anxiety has been shown to inhibit proper decision-making. It is associated with increased sweating, a somatic marker when choosing from an advantageous deck (Miu et al., 2008). It is assumed that those with a more accurate interoception can regulate their emotions more effectively. This is because that awareness of bodily sensations is related to the relationship between awareness of one's emotional state and emotional regulation (Füstös et al., 2013). However, empirical research on the relationship between the two is limited. Therefore, the present study aimed to examine the relationship between interoception and decision-making, including the perspectives of anxiety tendency and emotional control. Method: University students were surveyed using (a) trait anxiety: a new version of the STAI (Hitano et al., 2021), and (b) emotion control: the suppression items of the ERQ-J (Yoshizu et al., 2013). Eighteen female participants were included in this analysis. In addition, the heartbeat counting task (Schandry, 1981) was conducted to measure the accuracy of interoception. Then the participants performed an IGT on a personal computer using Inquisit software. A polygraph device (Polymate II, AP216, TEAC) was used to measure the pulse wave during the heartbeat counting task and the skin conductance level (SCL) during the IGT. Results: A t-test of the change in performance on the IGT, a measure of rational decision-making, between the high and low interoception groups showed that the high group showed a greater change in performance than the low group with a significant trend ($t(16) = 2.08, p = .054, d = 0.980$). In addition, a t-test of the change in performance on the IGT between the high and low groups for trait anxiety and suppression revealed no significant differences (trait anxiety: $t(16) = 0.96, p = .353, d = 0.454$; suppression: $t(13) = -1.76, p = .102, d = -0.801$). Discussion: The high interoception group made more rational decisions than the low group. Although the trait anxiety groups did not differ in the degree of rational decision-making, the high group showed an increase in sweat gland activity just before selection from the advantageous deck in the middle of the trial until the very end. This result differs from that of Bechara et al. (1997), suggesting that high anxiety affects

the relationship between sweat gland activity just before selection from the advantageous deck and rational decision-making. Moreover, emotional control with suppression is not believed to influence rational decision-making.

The impact of interoception on decision-making in gambling tasks

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Introduction

interoception is referred as the sensation of physiological states inside the body. the relationship between interoception and decision-making was examined using Iowa Gambling Task (IGT).

an accurate interoception
Werner et al. (2009)



a inaccurate interoception
Dunn et al.(2010)
unreasonable decision making

interoception and its associated **anxiety** (Pollatos et al., 2009)

interoception and its associated **emotion control** (Füstös et al., 2013)

This study aimed to examine the relationship between interoception and decision-making, including the perspectives of anxiety tendency and suppression.

Method

Participants: eighteen participants(18women, mean age of 21.5 ± 1.4 years)

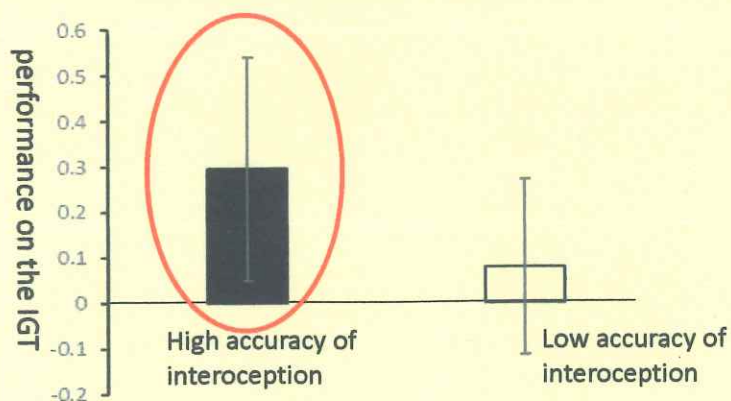
Measures: (a)trait anxiety: a new version of the STAI (Hitano et al., 2021); (b)emotion control: the suppression items of the ERQ-J (Yoshizu et al., 2013); (c)the accuracy of interoception: the heartbeat counting task (Schandry, 1981); (d)decision making: Iowa Gambling Task (IGT)

A polygraph device (Polymate II, AP216, TEAC) was used to measure the pulse wave and the skin conductance Response (SCR) . Before data collection, the nature of the study was described to the participants, and their informed consent was obtained.

Result

Discussion

Figure 1. difference in means of performance on the IGT in each group



- the high group showed a greater change in performance than the low group with a significant trend.

- the high and low groups for trait anxiety and suppression revealed no significant differences.

- high interoception group made more rational decisions than the low group.**

- high anxiety affects the relationship between sweat gland activity just before selection from the advantageous deck and rational decision-making.

- Moreover, emotional control with suppression is not believed to influence rational decision-making.

※There is no COI relationship with any company that should be disclosed in connection with the presentation of the abstract.

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発表概要報告書

問題：内受容感覚とは、身体内部の生理状態の感覚を指す概念である。Bechara et al. (1999) は、体が発する信号であるソマティック・マーカーを正しく受け止めることが人間の意思決定に影響することを示唆している。内受容感覚とIGTにおける意思決定の関係について、内受容感覚が正確な者は、合理的な意思決定を行ったことが示された (Werner et al., 2009)。しかしながら、内受容感覚の正確性と意思決定の関係は整合的に理解されていない。この知見の不一致は、内受容感覚とそれに関連する不安や感情制御との関係によって生じていると考えられる。内受容感覚と不安との関連については、不安傾向が高い者ほど内受容感覚の正確である (Pollatos et al., 2009) という知見が多い一方で、両者の関連は一貫していない。また、不安とIGTでの意思決定については、不安の高さは適切な意思決定を阻害し、有利な山からの選択時のソマティック・マーカーである発汗の増加と関連することが示されている (Miu et al., 2008)。内受容感覚と感情制御との関連については、自身の感情状態への気づきと感情制御との関係に対して身体感覚への気づきが関連している (Füstös et al., 2013) ことから、内受容感覚が正確な者ほど、感情制御ができると推測されるが、両者の関連について十分な実証的研究はなされていない。そこで、本研究では、内受容感覚と意思決定の関係において、不安傾向や感情制御の観点を含めて検討することを目的とする。方法：大学生を対象に、(a)特性不安：新版STAI (肥田野他, 2021)、(b)感情制御：ERQ-J (吉津他, 2013) の抑制項目を用いて調査を行い、女性18名を分析対象とした。また、内受容感覚知覚の正確性の測定のために、自身の心拍を一定時間数える心拍カウント課題 (Schandry, 1981) を、意思決定の測定のためにIGTをパソコン上でInquisitにより実施した。なお、ポリグラフ装置 (Polymate II, AP216, TEAC) を使用し、心拍カウント課題実施中には脈波を、IGT実施中には皮膚コンダクタンス水準 (Skin Conductance Level : SCL) を測定した。結果：不合理な意思決定の指標であるIGTの成績変化について、内受容感覚の高群と低群でt検定を行った結果、内受容感覚高群は低群と比較して、成績変化の大きさが有意傾向で大きかった ($t(16) = 2.08, p = .054$)。また、IGTの成績変化について、特性不安および抑制の高群と低群でt検定を行った結果、有意な差は見られなかった (特性不安： $t(16) = 0.96, p > .05$; 抑制： $t(13) = -1.76, p > .05$)。考察：内受容感覚高群は、低群に比べてより合理的な意思決定を行うと考えられる。特性不安各群では合理的な意思決定の程度に差はなかったが、特性不安高群は、試行の中盤から終盤にかけて有利な山からの選択直前において汗腺活動の増加を示した。これは、先行研究 (Bechara et al., 1997) の結果と異なり、不安の高さが有利な山からの選択直前の汗腺活動と合理的な意思決定との関係に影響を与えている可能性が示唆された。また、抑制での感情制御は合理的な意思決定に影響を及ぼさないと考えられる。

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