FACTORS AFFECTING THE RELATIONSHIP BETWEEN ALEXITHYMIA AND MORAL DECISION-MAKING AMONG UNIVERSITY STUDENTS IN MALAYSIA

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A RESEARCH PROJECT

SUBMITTED IN

PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR

THE BACHELOR OF SOCIAL SCIENCE (HONOURS) PSYCHOLOGY

FACULTY OF ARTS AND SOCIAL SCIENCE

UNIVERSITI TUNKU ABDUL RAHMAN

MAY 2025

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Acknowledgement

This study would not have been possible without the support and encouragement of the people around us. We want to take this opportunity to express our heartfelt gratitude to those who have contributed their time, knowledge, and guidance throughout this journey.

First and foremost, we would like to extend our deepest appreciation to our final-year project supervisor, Dr. Au Zher Wen, for his invaluable insights, patience, and unwavering support. His guidance has been instrumental in helping us navigate the challenges of this research, and we are truly grateful for his dedication.

We would like to express our heartfelt gratitude to our family and friends for their unwavering support throughout this journey. Their constant encouragement—through kind words, motivation, and simply being present during challenging times—has truly kept us going. A special thanks to Cheong Jing Yan, Ng Shu Wei, Winnie Tse Li Wei, To Hui Xin and Rong for always believing in us and offering their support in countless ways. Your emotional and mental support has meant the world to us, and we are deeply grateful.

Lastly, we extend our appreciation to our previous lecturers for equipping us with the necessary research skills that have been crucial in completing this study. The knowledge and guidance we received in our earlier years have played a significant role in shaping our academic journey.

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DECLARATION

We declare that the material contained in this paper is the end result of our own work and that due acknowledgement has been given in the bibliography and references to ALL sources be they printed, electronic or personal.

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APPROVAL FORM

This research paper attached hereto, entitled “Factors Affecting the Relationship between Alexithymia and Moral Decision-Making among University Students in Malaysia” prepared and submitted by Ng Yi Hui, Tan Yan Er, and Yeoh Kai Suan in partial fulfilment of the requirements for the Bachelor of Social Science (Hons) Psychology is hereby accepted.

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Abstract

How do individuals living with alexithymia behave when they encounter an ethical dilemma? Will they choose a utilitarian or a deontological course of action? Past research found that alexithymia, a personality trait characterised by difficulty in identifying, understanding, and expressing emotions, was correlated with moral decision-making. Therefore, the present study investigated the relationship between alexithymia and moral decision-making among university students in Malaysia, and also the mediating roles of empathy and reasoning style (analytical versus intuitive) on the correlation. Additionally, the ethics position (idealism versus relativism), which is about the cognitions around moral judgements, was also examined along with moral decision-making in this study. A cross-sectional quantitative study was conducted with 90 university students in Malaysia aged 18 years old and above, using an online survey method. The instruments Toronto Alexithymia Scale (TAS-20), Interpersonal Reactivity Index (IRI), extended Cognitive Reflection Test (CRT), short Ethics Position Questionnaire (EPQ-5), and Gawronski's Moral Dilemmas were applied to measure the variables. The mediating effects were analyzed by using the PROCESS macro mediation analysis. The findings reported that empathy fully mediates the relationship between alexithymia and idealism, instead of moral decision-making, and this relationship is positive. The present study offers new insights about alexithymia and moral decision-making, and this can be utilized as a reference for related future research.

Keywords: alexithymia, moral decision-making, empathy, reasoning style, ethics position, university students

Subclass: HT251-265 Mental and moral life

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List of Abbreviations

ASD	Autism Spectrum Disorder
CD	Cook's Distance
CL	Centered Leverage
CRT	Cognitive Reflection Test
DPT	Dual-process Theory
DSM-5	Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition
EPQ	Ethics Position Questionnaire
EPT	Ethics Position Theory
IRI	Interpersonal Reactivity Index
K-S	Kolmogorov-Smirnov
MD	Mahalanobis Distance
Q-Q	Quantile-Quantile
SERC	Scientific and Ethical Review Committee
SPSS	Statistical Package for Social Sciences
TAS	Toronto Alexithymia Scale
UTAR	Universiti Tunku Abdul Rahman
a	Cronbach's Alpha
H	Hypothesis
M	Mean
n	Number of respondents
p	Significance level
r	Correlation coefficient
R^2	Coefficient of determination
SD	Standard deviation

Chapter 1

Introduction

Background of Study

Moral decision-making is being able to select the best option from a variety of choices within a set of rules and standards that govern how we act in a society (Rilling & Sanfey, 2011). When faced with moral dilemmas, different people react differently; some may choose a utilitarian approach, while others may choose a deontological one. According to the principles of utilitarianism, the welfare of the greatest number of people should be prioritised (Tseng & Wang, 2021). It asserts that any course of action that maximizes well-being at the group/societal level is ethically permissible (Mantchala et al., 2024). Conversely, deontological ethics is focused on obligations and rights regardless of outcomes (Udoudom, 2021). The best-known instance to explain these two terms is the trolley dilemma, in which participants are asked if it is appropriate to move a trolley that is speeding down on a track toward five people onto another track with only one person (Thomson, 1985). Another variation is the "Footbridge dilemma," where participants were asked to determine if it is acceptable to push someone off the footbridge, causing them to collide with the trolley and die, in exchange for saving five people from the uncontrollable trolley (Thomson, 1985). Pushing a big person off the bridge could be considered morally justifiable from a utilitarian standpoint as doing so would ultimately maximise the outcomes. On the other hand, from a deontological perspective, shoving the individual off the bridge would be immoral since it goes against moral principles such as to not purposely kill an innocent person (Gawronski & Brannon, 2020).

Research has shown that patients who have severe frontal brain damage, frontotemporal memory loss, or abnormalities in the ventromedial prefrontal cortex (vmPFC) make substantially more utilitarian decisions when faced with moral dilemmas (Antoniou et

al., 2023; Karlberg, 2024; Lloyd et al., 2021; Martins et al., 2012). A deficiency in affective processing is a common feature shared by all of those illnesses. Nonclinical individuals with affective impairments, such as those with high levels of alexithymia also demonstrate similar outcomes. They tend to reach more utilitarian decisions than deontological ones due to emotional processing deficiency (Chen et al., 2023; Zhang et al., 2020).

Alexithymia is derived from Greek and is translated as “emotion without speech” or “lack of words for emotions” (Sifneos, 1973). According to Bagby et al. (1994) and Taylor et al. (1997), alexithymia refers to a multidimensional construct which comprises difficulties identifying one’s emotions, distinguishing emotions from emotion-related physical sensations, and verbal description or communication of feelings, as well as the possession of literal, purely functional, and externally oriented cognitive styles. Based on the 20-item Toronto Alexithymia Scale (TAS-20) created by Bagby et al. (1994), alexithymia can be measured in three dimensions, which are difficulty in identifying and differentiating feelings, difficulties in describing emotions, and externally oriented thinking. Despite being one of the primary groups of Diagnostic Criteria of Psychosomatic Research, alexithymia is not a disorder and has never been involved in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, Text Revision (DSM-5-TR) (Fava et al., 1995; Fava et al., 2016). Instead, it is defined as a stable personality trait and a “sub-clinical phenomenon” (Bagby et al., 1994; Rinaldi et al., 2017; Silani et al., 2008; Zhang et al., 2020).

Alexithymia is fairly common. Parker et al. (2008) revealed that approximately 10% of the general population have alexithymia. The severity increases in clinical samples, with a prevalence of 30% to 50% (McGillivray et al., 2016). Several studies discovered risk factors that may contribute to alexithymia. Jørgensen et al. (2007) mentioned that genetic factors predict about 30% to 33% of the variance in alexithymia, whilst environmental factors have a greater effect on alexithymia. One of the significant origins is the history of childhood abuse,

including emotional, physical, and sexual acts of violence. Besides that, studies also found that diagnoses with psychiatric disorders such as depression, chronic conditions, and inadequacy of physical activities are associated with the development of alexithymic personality (Aljaffer et al., 2022; Hamdan et al., 2024).

Furthermore, as mentioned by Ditzer et al. (2023), childhood maltreatment like emotional abuse, emotional neglect, and physical neglect are closely linked to alexithymia. It is because such a childhood environment discourages or inhibits emotions, lacks exploration and guidance regarding emotions, as well as models avoidant approaches to emotion regulation. Children will feel unsafe to express their feelings and adapt to this situation by developing a coping mechanism which suppresses and detaches themselves from emotions, eventually leading to impairments in identifying, interpreting, and verbalising feelings, which is alexithymia.

Due to the deficits in emotional cognitive and affective processing, alexithymia always brings about behavioural, physiological, and neurological impacts (Loas et al., 2001). People with alexithymia are frequently aware of experiencing an emotion but fail to recognise it concretely, even to deliver their feelings to others (Patil & Silani, 2014b). Moreover, alexithymia is related to poor social cognition skills. Alexithymics are unable to determine others' facial expressions, empathise with others, and motivate themselves to have altruistic behaviours. Therefore, it is challenging for them to build and maintain interpersonal relationships and social attachments, resulting in social isolation (Di Lorenzo et al., 2019; FeldmanHall et al., 2012; Ridings & Lutz-Zois, 2014; Wang et al., 2022). Also, Di Lorenzo et al. (2019) stated that alexithymics are prone to use impulsive or compulsive methods to regulate their emotions and less likely to have positive feelings such as happiness, joy, and affection. Accumulating various troubles, research indicated alexithymia has a strong positive

correlation with serious psychopathological symptoms such as depression and anxiety and is negatively correlated with life satisfaction (Chen et al., 2023; Hamaideh, 2017).

Empathy, which is a dimension of emotional intelligence (Di Lorenzo et al., 2019), is the ability to understand and respond to the feelings of others through multiple mechanisms (Weisz & Cikara, 2021). It means putting yourself in the shoes of others and experiencing the world through other's perspectives (Bloom, 2016; Di Lorenzo et al., 2019). According to Meyers et al. (2019), empathy is made up of two components, which are cognitive and affective. The cognitive aspect focuses on thoughts (Meyers et al., 2019). It includes both perspective taking (PT), which is the capacity to adopt a psychological standpoint of others as well as fantasy (FS), which is the capacity to imagine oneself in the emotions and behaviours of fictional characters in literature and film (Decety & Cowell, 2014; Singer & Lamm, 2009). On the other hand, the affective aspect involves experiencing other people's emotions (Meyers et al., 2019). It refers to the desire to care for another's well-being. It consists of two major components: empathic concern (EC), which is the propensity to feel sympathy and concern for miserable others, and personal distress (PD), which is the tendency to feel anxious in reaction to the misery of others (Decety & Cowell, 2014; Singer & Lamm, 2009).

Empathy is frequently linked to successful relationship results (Weisz & Cikara, 2021). It is supported by Kardos et al. (2017), who discovered that individuals with greater empathic concern scores have more intimate friendships and wider social networks. Interpersonal connections benefit from empathy because it enables one to understand the intentions of others and pay attention to their emotional states, which in turn helps to gain trust in the relationships (Kardos et al., 2017; Shamay-Tsoory & Aharon-Peretz, 2007). In addition to improving interpersonal relationships, empathy benefits society and individuals. Prosocial conduct, social connection, and overall well-being are all associated with positive empathy (Morelli et al., 2015). It lessens prejudice, revenge, disruptive actions, and illegal

conduct in settings of service (Bove, 2019). In addition, low cognitive empathy was associated with more depressive symptoms (Bennik et al., 2019).

Reasoning style is the systematic approach an individual uses to analyse information and solve problems, shaping judgements and decisions. It is usually classified into two types: analytical reasoning and intuitive reasoning. Analytical thinking is the rational and intentional evaluation of facts and evidence before concluding (Evans & Stanovich, 2013). This kind of reasoning requires individuals to carefully evaluate the issue, explore choices, and employ critical thinking to determine the most rational answer. For example, in a moral dilemma, an analytical thinker would weigh the benefits and drawbacks of each possible action, assess potential consequences, and choose a course of action that fits the moral principles. In contrast, intuitive thinking is based on gut feelings, instincts, or instant impressions rather than extended thought (Haidt, 2001). Intuitive thinkers frequently make snap decisions based on emotional signals or subconscious patterns, which can be useful in situations demanding quick replies but may be imprecise in complex scenarios.

Analytical and intuitive reasoning can influence how people make moral and ethical decisions. According to the dual-process approach, moral judgements are either processed emotionally (quickly, without thought, and unconsciously) or logically. The dual process hypothesis of moral judgement holds that emotions and intellectual processes play an important role in forming moral decisions (Greene et al., 2001; Greene et al., 2004).

While analytical thinking may support utilitarian decisions by emphasizing overall outcomes, intuitive reasoning often aligns with deontological perspectives, which are motivated by firmly held moral intuitions or beliefs (Greene et al., 2001; Li et al., 2018). According to research, people can switch between various thinking styles depending on the situation and their cognitive resources (Pennycook et al., 2015). For example, in high-pressure situations or under cognitive stress, people may turn to intuitive reasoning,

depending on emotional intuition to resolve difficulties. In contrast, in low-stress circumstances with plenty of time for thought, analytical reasoning emerges, allowing for extensive evaluations of moral issues.

Problem Statements

Individuals who have alexithymia have deficits in their emotional and cognitive processing abilities (van der Velde et al., 2013). According to Cecchetto et al. (2017), there are numerous neurological and psychiatric disorders are linked to alexithymia, such as autism spectrum disorder (Mantchala et al., 2024), depression (Hemming et al., 2019), and burnout risk (Franco et al., 2020). Berardis et al. (2008) added that statistical investigations clearly demonstrate the significance of alexithymia in anxiety disorders such as post-traumatic stress disorder (PTSD), obsessive-compulsive disorder (OCD), and panic disorder. Furthermore, Franz et al. (2004) also stated that persistently ignoring emotions in social situations can be maladaptive and lead to disagreements and disturbances in crucial relationships. Given the numerous detrimental effects, alexithymia has on a person's psychological health, social functioning, and overall life quality, it is crucial to investigate how alexithymia may affect people's moral decision-making since it affects how people perceive and process emotions. Gaining insight into this relationship may help us better understand how alexithymia influences people's decisions and lives.

The majority of the studies suggest that alexithymia and moral decision-making are significantly associated. They discovered that people with high levels of alexithymia are more possible to choose a utilitarian decision (Chen et al., 2023; Patil & Silani, 2014b; Zhang et al., 2020; Zhu, 2023). However, the findings of many studies are inconsistent. Several studies found that alexithymia was not a strong predictor of moral decisions (Cecchetto et al.,

2017; Mantchala et al., 2024), leaving readers confused. Thus, the purpose of this study is to reexamine the relationship between alexithymia and decision-making.

In addition, research on the mediating factors in the relationship between alexithymia and moral decision-making remains limited. Numerous studies have indicated that empathy is one of the mediators (Patil & Silani, 2014b; Zhang et al., 2020); nevertheless, there are still other mediators that may be involved. According to the dual process theory of moral judgment, both emotional and reasoning processes are important in making moral decisions (Greene et al., 2001; Greene et al., 2004). Prior research has stressed the importance of emotional processing, particularly empathy, in comprehending alexithymia and moral decision-making (Mao & Zhou, 2023; Patil & Silani, 2014b; Takamatsu & Takai, 2017; Zhang et al., 2020). However, they have largely overlooked the potential contribution of rational and analytical thinking, leaving a gap in the exploration of how cognitive processes might influence these areas. In order to fill the research gap, our study will investigate the association between alexithymia, empathy, reasoning style, and moral decision-making.

Past studies about alexithymia and moral decision-making have been conducted in Italy (Cecchetto et al., 2017), China (Chen et al., 2023; Zhang et al., 2020), as well as in Europe, America, and Africa (Mantchala et al., 2024). However, there is a shortage of research and knowledge about the correlation between alexithymia and moral decision-making in Malaysia. Studies discovered that moral judgements and behaviours may be influenced by cultural differences between countries or societies (Bentahila et al., 2021; Graham et al., 2015; Seo et al., 2020). This highlights the importance of investigating how alexithymia affects moral decision-making in the Malaysian context. Therefore, the present study aims to fill the research gap by further exploring the relationship between alexithymia and moral decision-making, as well as the mediating roles of empathy and reasoning style, among university students in Malaysia.

Research Objectives

1. To determine the mediating role of emotional traits (empathy) and/or reasoning style in the relationship between alexithymia and moral decision-making among university students in Malaysia.

Research Questions

1. Is there a relationship between alexithymia and moral decision-making among university students in Malaysia?
2. Does empathy mediate the relationship between alexithymia and moral decision-making?
3. Does reasoning style (analytical and intuitive style) mediate the relationship between alexithymia and moral decision-making?

Research Hypotheses

H_1 : There is a significant relationship between alexithymia and moral decision-making among university students in Malaysia.

H_2 : Empathy mediates the relationship between alexithymia and moral decision-making.

H_3 : Reasoning style (analytical/intuitive style) mediates the relationship between alexithymia and moral decision-making.

Conceptual Definitions of Terms

Moral Decision-Making

Moral decision-making refers to the process of making choices that align with ethical and societal standards or maximize well-being at the group/societal level (Rilling & Sanfey, 2011; Mantchala et al., 2024). The inclination is between deontological and utilitarian with

the main difference being that deontology focuses on duties and responsibilities, while utilitarianism focuses on outcomes. With ethics position measures the cognitive aspects of moral decision-making, while moral decisions measure the behavioural aspects. It involves complex cognitive and emotional processes, including assessing right and wrong and considering outcomes and intentions.

Alexithymia

Alexithymia, first introduced by Sifneos (1973), is a psychological construct describing individuals with difficulties in identifying, expressing, and understanding emotions. These individuals may struggle to distinguish emotional states from physical sensations, leading to impaired interpersonal communication and decision-making. For instance, someone with high alexithymia may find it challenging to articulate feelings of guilt or remorse during moral dilemmas, potentially impacting their moral judgments.

Empathy

Empathy is the ability to recognize and understand another person's emotions, comprising two dimensions: cognitive empathy, the ability to intellectually understand others' perspectives, and affective empathy, the ability to share and respond to others' emotional states (Meyers et al., 2019). For instance, healthcare providers often rely on both forms of empathy to make patient-centred decisions.

Reasoning Style

Reasoning style describes an individual's approach to process information and solve problems. Epstein et al. (1996) introduced the concept of two parallel systems: intuitive

reasoning, which is rapid and emotion-driven, and analytical reasoning, which is deliberate and logical.

Operational Definitions of Terms

Moral Decision-Making

The cognitions around moral decision-making will be measured using the short Ethics Position Questionnaire (EPQ-5), which assesses individual levels of relativism and idealism in moral reasoning (Forsyth, 1980; O'Boyle & Forsyth, 2021). The EPQ-5 consists of five Likert-type questions about idealism and five about relativism. Participants answer whether they agree or disagree with each item (ranging from 1 = "strongly disagree" to 5 = "strongly agree").

Besides that, Gawronski's Moral Dilemmas (six problems, each with four variations) developed by Gawronski et al. (2017) will be used to assess the behavioural aspect of moral decision-making. Three components of moral decision-making will be measured: sensitivities to consequence and to norm, as well as inclinations to act or not act.

Alexithymia

Alexithymia will be assessed using the Toronto Alexithymia Scale (TAS-20), a 20-item self-report questionnaire, which was designed to measure difficulties in identifying and describing emotions, as well as externally oriented thinking (Bagby et al., 1994). Based on TAS-20, alexithymia can be measured in three dimensions, which are difficulty in identifying and differentiating feelings, difficulties in describing emotions, and externally oriented thinking. The items are assessed on a 5-point Likert scale, ranging from 1 = "strongly disagree" and 5 = "strongly agree". Five of the 20 elements are reverse items. The sum scores range from 20 to 100, and higher scores suggest more alexithymia.

Empathy

Empathy will be assessed by utilizing the Interpersonal Reactivity Index (IRI). The 28 items were rated on a 5-point Likert scale, ranging from 1 = “Does not describe me well” to 5 = “Describes me very well”. The measure is divided into four subscales, each of which contains seven separate items. The four subscales are perspective-taking, fantasy, empathic concern, as well as personal distress. For instance, higher scores in perspective-taking indicate better cognitive empathy (Davis, 1983).

Reasoning Style

Reasoning style will be operationalized using the extended Cognitive Reflection Test (CRT). We took questions from a study by Baron et al. (2015). The CRT is an objective measure designed to test certain cognitive abilities. It tests people's ability to reject intuitive and spontaneous ("System 1") wrong answers and choose thoughtful and analytical ("System 2") correct answers. There are two types of questionnaires: one involving mathematical calculations, and the other involving only verbal logical reasoning to avoid confounding with mathematical abilities.

Significance of the Study

Theoretical Contributions

This study addresses a significant research gap by investigating the mediating roles of empathy, ethical positions, and reasoning style in the relationship between alexithymia and moral decision-making. According to the dual-process theory, moral judgments are processed in two ways: emotional, which is fast, not thought through, and unconscious, or rational. This dual process theory of moral judgment (Greene et al., 2001; Greene et al., 2004) highlights

the significance of both emotional and thinking processes in making moral judgments. Therefore, an important rationale is missing in the current studies. Specifically, studies only looked at whether emotional processing (empathy) is implicated in alexithymia and moral judgement but failed to consider = thinking style/ability.

By focusing on these understudied factors, the study enriches the moral psychology literature, offering new insights into the emotional and cognitive mechanisms underlying ethical decision-making.

Practical Contributions

The practical implications of this study extend to various domains. First of all: education and professional training. Findings from this study could inspire the development of educational frameworks that emphasize emotional awareness and ethical reasoning, particularly in fields like healthcare, law, or business. For example, introducing case-based learning that integrates emotional awareness training could improve decision-making outcomes.

Next, clinical interventions. By identifying the relationship between alexithymia and moral decision-making, therapists could design interventions targeting emotional awareness and regulation to improve interpersonal relationships and ethical behaviour among clients with alexithymia.

Furthermore, the findings contribute to policy and workplace practices. The insights of the study into reasoning styles could guide policies in high-stakes environments. For instance, promoting critical thinking and deliberative processes could potentially enhance unbiased decision-making in professions such as the judiciary or public administration.

Lastly, public awareness and societal campaigns. The study underscores the importance of fostering understanding and compassion in diverse communities. Public

workshops or campaigns that encourage perspective-taking and empathy could help address societal issues like bullying and discrimination.

Chapter 2

Literature Review

Introduction

This chapter explores the potential link between alexithymia, moral decision-making, and two potential mediators (empathy and reasoning style).

Alexithymia and Moral Decision-Making: The Role of Empathy

Previous studies have indicated that alexithymia is significantly correlated with moral judgment (Chen et al., 2023; Patil & Silani, 2014b; Zhu, 2023). Zhang et al. (2020) surveyed university students and found that people with high alexithymia tend to make more utilitarian decisions than deontological ones. According to Brewer et al. (2015), moral judgements can be influenced by an individual's emotional reaction to a hypothetical scenario. The finding is similar to another study, which stated that those with high alexithymia have limitations in emotional processing, which leads them to make more utilitarian decisions (Zhang et al., 2020). Chen et al. (2023) also stated that utilitarian decisions are typically made by those with high alexithymia because they are less sensitive to moral norms. These studies suggest that diminished affective reaction to moral rule violations explains the connection between alexithymia and moral decision-making.

Empathy has been used in several studies to explain the connection between moral decision-making and alexithymia (Patil & Silani, 2014; Takamatsu & Takai, 2017; Zhang et al., 2020). Alexithymia and empathy were revealed to be negatively and significantly correlated (Aslan et al., 2020). According to Patil and Silani (2014), empathy deficiencies are an acknowledged feature of trait alexithymia. Williams and Wood (2009) also indicated that a reduction in empathy for others is linked to alexithymia in closed-head traumatic brain injury. Individuals with alexithymia struggle to comprehend their own emotions as well as those of

others, and they also struggle with communication and interpersonal connections. These cases are due to the impairments in their empathy skills (Aaron et al., 2015; Besharat, 2010; Grynberg et al., 2010). It can be explained that in those with trait alexithymia, the region of the brain that controls affective empathy is less active, causing them to have trouble expressing their feelings, particularly empathy (Zhu, 2023).

Several studies have specifically indicated that alexithymia negatively affected empathetic concern, which in turn increased the propensity for utilitarian moral choices. According to Patil et al. (2016), alexithymia characteristics were linked to a more utilitarian bias because they showed less empathy for those who suffer. Zhang et al. (2020) also stated that low empathic concern in those with strong alexithymia reduces their propensity for deontological reasoning and supports traditional relative judgments. They are more likely to reach utilitarian ethical choices in the context of trolley issues due to a lack of emotional processing (Mao & Zhou, 2023; Zhang et al., 2020). Alexithymia affected ethical judgments through empathy in such a way that it reduced sympathy for the victim, which weakened effective avoidance of the harm that happened to the victim, and participants concentrated more on the character's innocent intentions when evaluating their behaviour (Patil & Silani, 2014a). Takamatsu and Takai (2017) also surveyed around 300 Japanese university students in order to evaluate the alexithymia, empathetic concern, and propensity to make utilitarian moral judgments in the trolley dilemma. The findings demonstrated that alexithymia features reduced empathetic concern. Difficulty recognising emotions, which is one of the characteristics of alexithymia, was positively connected with utilitarian values. People with trouble identifying emotions could find it difficult to experience regret when someone is sacrificed in the trolley case (Takamatsu & Takai, 2017). They also find it harder to relate to those who are harmed in the trolley dilemma on an emotional level due to an empathy deficit,

which leads them to make utilitarian decisions (Mao & Zhou, 2023; Takamatsu & Takai, 2017).

However, few studies found that moral decisions were not significantly predicted by alexithymia (Cecchetto et al., 2017; Mantchala et al., 2024), contradicting with other literatures (Chen et al., 2023; Patil & Silani, 2014b; Zhu, 2023). Cecchetto et al. (2017) conducted a study that included individuals with alexithymic traits as well as other non-alexithymia participants. They had their skin conductance and heartbeat recorded while they were presented with ethical dilemmas. Researchers discovered that those with trait alexithymia showed a smaller change in skin conductance compared to other participants given the same problems. It was found that empathy increased with skin conductance across general populations. Those with trait alexithymia did not experience this rise (Cecchetto et al., 2017). The authors found that although alexithymia affected individuals' emotional responses to moral choices, they did not alter their moral decisions. Instead, when conducting moral decision-making activities, participants appeared to depend more on reasoning about the specific details of the moral dilemma, than on their own emotional responses. Their moral decisions may be influenced by what they know to be socially acceptable instead of their psychophysiological responses (Cecchetto et al., 2017).

Studies on individuals with autism spectrum disorder (ASD) also suggest that we cannot assume that those with strong alexithymia may all have utilitarian moral judgments (Brewer et al., 2015; Mantchala et al., 2024; Patil et al., 2016). There were no variations in moral decisions between autistic and healthy participants, despite the fact that the former had higher alexithymia ratings (Mantchala et al., 2024). It is supported by Brewer et al. (2015), who discovered that the association between alexithymia and moral judgments only applies to people without ASD. Alexithymia is linked to exceptional moral acceptability judgments in normal people. People with greater levels of alexithymia considered it more acceptable to

make other people feel unhappy, afraid, disgusted, or in danger. However, moral acceptability judgments in people with ASD were not predicted by alexithymia. People with ASD did not rely solely on emotional judgments to determine the moral acceptability of emotion-evoking statements, even though typical people did so by considering the emotion that was likely to be evoked. Their results showed that people with ASD base their moral judgments on criteria other than their emotional reactions, which is consistent with the dual process model of morality (Brewer et al., 2015). According to Greene et al. (2001) and Greene et al. (2004), the dual-process theory states that moral choices either undergo processing intellectually or emotionally. According to this theory, both the emotional and reasoning processes play a significant role in moral decision-making. However, due to their inability to interpret emotions, people with high alexithymia are likely to rely more on the analytical process instead of the emotional process (Tay et al., 2016).

Meanwhile, Patil et al. (2016) suggested that individuals with ASD and healthy participants do not show different utilitarian tendencies. They proposed two conflicting systems that coexist among autistic people, and the effects cancel each other out. First, when asked to make a decision regarding a moral dilemma, people with autism may reject actions with harmful outcome, presumably due to “self-oriented personal distress” rather than “other-oriented empathic concern”. This leads to reduced utilitarian tendencies. However, alexithymic traits observed among some ASD individuals may also reduce empathic concern, leading to higher utilitarian tendencies. These effects then cancel each other out.

Alexithymia and Moral Decision-Making: The Role of Reasoning Ability

The current study hypothesised that reasoning style (analytical versus intuitive) might mediate the relationship between alexithymia and moral decision-making. However, there is a lack of studies which examine the relationship between alexithymia, reasoning style, and

moral decision-making. This makes the potential mediation and relevant explanations remain unclear.

According to Rinaldi et al. (2017), alexithymia is associated with a less rational cognitive style. This suggests that people with high alexithymia have poor rational thinking skills and might rely significantly on intuitive cognitive processes (Rinaldi et al., 2017). It is supported by Watkins' theories on major depressive disorder, which states that individuals with high alexithymia might not be skilled at being mindful of themselves, but they may be automatically trapped in an experiential processing style due to their incapacity to apply rational thought (Watkins & Teasdale, 2001; Watkins & Teasdale, 2004). In fact, Rinaldi et al. (2017) discovered that the rational and experiential processes are similar across the groups. The association between both processes in alexithymia may not be viewed as unequal, but rather as a particular defect in the application of rational thought to emotional content processing (Rinaldi et al., 2017). However, there were contradicting findings in past research. Based on Chan et al. (2023), individuals with higher levels of alexithymia have blunting affective reactions as compared to those with lower alexithymia levels, due to difficulty in identifying and comprehending others' feelings.

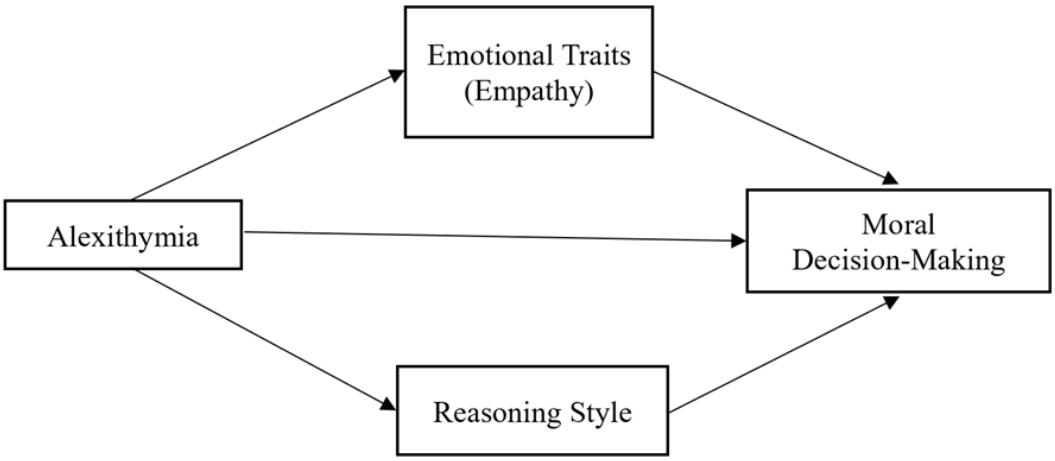
In addition, previous studies have revealed a link between reasoning style and moral decision-making. Li et al. (2018) discovered that individuals who depend more on analytical thinking mode have higher utilitarian inclinations, contributing to greater endorsement and acceptability of utilitarian behaviours, as compared to those with intuitive thinking. Conway and Gawronski (2013) mentioned that utilitarian inclinations are associated with the need for cognition. It was also found that when facing sacrificial dilemmas, people with higher reasoning ability or propensity are more likely to make utilitarian moral decisions (Patil et al., 2020). These findings are consistent with the dual-process theory (DPT) of moral decision-making, which states the role of analytical and deliberative reasoning styles in utilitarian

decision-making (Greene et al., 2001). Moreover, according to Paxton et al. (2014) and Spears et al. (2020), the Cognitive Reflection Test (CRT), developed by Frederick (2005) as one of the instruments measuring reasoning style, was disclosed to be related to or even predict utilitarian moral judgements. Yet, there was also an inconsistent finding that there is no significant correlation between CRT and utilitarian or deontological responses (Royzman et al., 2014).

Conceptual Framework

Figure 2.1

The conceptual framework of "Factors Affecting the Relationship between Alexithymia and Moral Decision-Making among University Students in Malaysia"



The present study examines four variables: alexithymia, emotional traits (empathy), reasoning style, and moral decision-making. *Figure 1* shows the conceptual framework model that visualises the relationships between these variables.

The study aims to investigate the mediating roles of empathy and/or reasoning style in the relationship between alexithymia and moral decision-making among university students in Malaysia. In H_1 which examines the relationship between alexithymia and moral decision-

making, alexithymia will serve as the independent variable (IV) while moral decision-making will be the dependent variable (DV). In H_2, empathy will serve as a potential mediator in the relationship between alexithymia and moral decision-making. Moreover, reasoning style will be another potential mediator in the correlation between alexithymia and moral decision-making as stated in H_3.

Theoretical Framework

Introspection-centric Simulation Theory (IST)

The relationship between alexithymia and empathy may be explained by Goldman's introspection-centric simulation theory (Goldman, 1992; Shanton & Goldman, 2010; Valdespino et al., 2017). This theory emphasises introspection as the main mechanism while including aspects of simulation theory. It aids in our comprehension of how we predict and comprehend the feelings, ideas, and behaviours of others (Goldman, 1992; Shanton & Goldman, 2010). According to simulation theory, people acquire another individual's viewpoint by simulating a similar mental state and using that information (Goldman, 1992). Meanwhile, introspection is the process of examining one's own inner state (Shanton & Goldman, 2010).

According to this theory, experiencing empathy requires introspection on a corresponding internal experience (Goldman, 2006). This is because introspection on the inner state offers crucial clues for accurately interpreting the interior states of others (Shanton & Goldman, 2010). Therefore, empathy requires the ability to consciously represent and analyze one's own feelings. A person's ability to empathise with others will decrease as their understanding of their own emotions declines (Burghart et al., 2024).

Alexithymia, characterised by a lack of introspection (Frawley & Smith, 2001) and imagination (Taylor et al., 1997), disturbs the mechanisms necessary for empathy. To

replicate the viewpoint of another person and produce the emotional emotions that result from the simulation, introspection and imagination are needed. Alexithymia impairs the ability to comprehend and empathize with the feelings of others by interfering with the proper introspection of one's own emotions. (Valdespino et al., 2017).

The Dual-Process Theory of Moral Decision-Making

The Dual-Process Theory (DPT) provides a useful framework for understanding how reasoning styles influence moral decision-making. According to DPT, moral decisions are influenced by two systems: System 1, which is intuitive, emotional, and fast; and System 2, which is analytical, controlled, and slow (Tay et al., 2016). Individuals with high alexithymia are likely to rely more on System 2, due to their difficulties in processing emotions, which may hinder their ability to make moral decisions based on affective input.

Several studies have tested the DPT in moral contexts, finding that while intuitive reasoning is often the default mode of moral decision-making, the analytical system can override intuitive judgments when individuals are required to engage in more deliberate, utilitarian decision-making (Greene et al., 2001). This suggests that analytical reasoning may serve as a compensatory mechanism for individuals with alexithymia, allowing them to make moral decisions even when emotional processing is impaired.

Ethics Position Theory (EPT)

The cognitive aspects of moral decision-making can be assessed using ethics position. Forsyth (2019) introduced the Ethics Position Theory (EPT), which is originated from psychological studies of variances in people’s moral judgments. According to the theory, an individual’s interpretations of moral issues are guided by two ideologies, which are idealism and relativism (Forsyth, 1992). Idealism refers to the conviction that moral behaviours

governed by ethical principles will bring about positive outcomes (Nickell & Herzog, 1996; Poór et al., 2015). Idealists prioritize humanitarianism, avoid confrontations, and prefer to make decisions that would not harm others in order to attain socially desirable consequences. (Forsyth & Nye, 1990; Newstead et al., 1996; O'Boyle & Forsyth, 2021; Oreg & Katz-Gerro, 2006). Relativists, on the other hand, reject the belief of basing moral decisions on universal moral norms. They will weigh the situation, the people involved, and the cultural context before making a judgement (Forsyth, 2019).

Ethics position theory is dimensional and typological. By considering the ranges along two continuums of idealism and relativism, and combining both dimensions, four ethics positions are determined: exceptionism, subjectivism, absolutism, and situationism (Forsyth, 2019; O'Boyle & Forsyth, 2021). Exceptionism corresponds to rule-utilitarianism. Rule-utilitarians are low in both relativism and idealism, and they tend to obey the moral norms that may optimize consequences. Subjectivism is associated with act-utilitarianism. Act-utilitarians, who have high relativism and low idealism, will take the context of the situation into account and adjust their moral actions to maximize the outcomes (Forsyth, 2019; Mulgan, 2014). Moreover, absolutists, who share similar concepts with deontologists, have a high level of idealism and a low level of relativism. They emphasize the compliance of moral norms and also the necessity to avoid harm. In addition, situationism is correlated with humanitarianism as well as high idealism and relativism. People with these characteristics promote people's well-being by minimizing harms, yet they are sceptical of the belief in moral principles as a guide (Forsyth, 2019).

Chapter 3

Methodology

Research Design

The relationship between alexithymia, empathy, reasoning style, and moral decision-making among Malaysian university students was examined in this study using a quantitative, cross-sectional research design. The term "quantitative research" describes a group of techniques and assumptions used to examine numerical trends in order to study social, psychological, and economic phenomena. An online survey was used in conjunction with the Qualtrics platform to gather data for this study, and the collected data was further assessed using the statistical program IBM SPSS Statistics 23. The study's aim informed to the participants in Qualtrics will be “This study looks at how emotional factors affect different kinds of decisions and responses”. This is to minimize demand characteristics and social desirability effects, which relate to indicators that can help participants in studies understand the hypothesis and influence their behaviour (Iarygina et al., 2025).

For the analysis method, Pearson correlation analysis and PROCESS macro were utilised in this study. The association between the variables was investigated using correlation analysis, and the regression between alexithymia and moral decision-making, and the mediation effects of empathy and reasoning style, were examined using a PROCESS macro mediation analysis.

A cross-sectional study was characterized by the collection of data at a certain moment in time (Kesmodel, 2018). It is immediate and more affordable to conduct because it only collects data from a specific population once (Wang & Cheng, 2020).

Sampling Procedures

Sampling Method

The study's target participants were university students in Malaysia. Study participants were chosen via convenience sampling, a kind of non-probability sampling. This sampling technique is a method of choosing participants from the intended target group based on accessibility (Golzar et al., 2022). It has a number of advantages, such as being inexpensive, time-efficient, and easy to use. We can find our intended population easily with this kind of sampling. Qualtrics was used to create the survey, which was then distributed to university students in Malaysia via social media platforms like Facebook, Instagram, and WhatsApp. Additionally, we promoted our survey at the University Tunku Abdul Rahman campus in Kampar.

Location of the Study

This study was centred in Malaysia and was not limited to any one state or area. The survey was administered online, and the links and QR code were shared via Facebook, Instagram, and WhatsApp with the target population. This approach allowed the study to get information from participants who are presently enrolled in different universities in Malaysia. Additionally, during appropriate interactions, interested individuals were provided with the survey's QR code and invited to join as participants.

Participants

The target population of the present study is university students in Malaysia. Their eligibility was not limited by their university, field of study or the state in which they are studying in Malaysia. There were some criteria that the participants needed to meet:

Participants must be at least eighteen years old, physically be in Malaysia when filling out the questionnaire, and willing to give their informed consent for this study.

Ethical Clearance Approval

Ethical clearance is essential to guarantee that the study adheres to the ethical guidelines, to avoid potential risks, and to protect the participants' rights. Thus, prior to conducting the pilot study, the complete set of questionnaires, including the cover page and informed consent, was submitted to the Scientific and Ethical Review Committee (SERC) of University Tunku Abdul Rahman (UTAR) for ethical approval. This is to ensure that the research is appropriate to be performed.

Sample Size

According to Zhang et al. (2020), a power analysis done using G*power (Version 3.1.9.2; Faul et al., 2007) stated that a minimum sample size of $N = 82$ was required to obtain sufficient power ($1 - \beta = 0.90$) with a medium effect size, $f = 0.25$. However, we intended to gather extra samples to account for missing and incomplete data. In our study, 194 responses were collected. Only 90 responses, however, were included in our study after the data was filtered.

Data Collection Procedures

Approval was obtained from The Scientific and Ethical Review Committee (SERC) of Universiti Tunku Abdul Rahman (UTAR), as this research involves human subjects. This approval ensures the study is conducted ethically and minimises potential risks. The target sample consists of university students in Malaysia aged 18 and above who understand English. Data was collected using Qualtrics, with questionnaires distributed via social media

links and QR codes. The questionnaire began with a consent form to ensure voluntary participation, followed by scales measuring alexithymia, empathy, reasoning style, ethics position, and moral decision-making.

Collected responses were screened to ensure they met the inclusion criteria, including consent, completion, and participant eligibility. Any unusable data was excluded. Statistical analyses were conducted using IBM SPSS version 23. The Pearson correlation analysis was used to determine relationships among the alexithymia (predictor) and ethics position and moral decision-making (outcome variable). Assumptions of normality were assessed, and the regression and mediating effects were examined using PROCESS macro mediation analysis. The outcome variable for this study is moral decision-making, the predictor is alexithymia, and empathy and reasoning style serve as mediators.

Instruments

Toronto Alexithymia Scale (TAS-20)

The Toronto Alexithymia Scale (TAS-20) is a 20-item instrument commonly applied to measure alexithymia. It is divided into three subscales: difficulty identifying feelings (DIF) with seven items, difficulty describing feelings (DDF) with five items, and externally oriented thinking (EOT) with eight items. Each item is rated based on a 5-point Likert scale, which is ranging from 1 = “strongly disagree” to 5 = “strongly agree”. Items 4, 5, 10, 18, and 19 are inverted. The sum score ranging from 20 to 100 was computed by adding up the score of each item, with a higher sum score representing a higher level of alexithymia. The TAS-20 reliability test revealed good internal consistency (α=.81), and test-retest reliability (r=.77, p<.01). TAS-20 was also found to have high levels of convergent and concurrent validity, where the three factors are theoretically consistent with the alexithymia construct, and the results across clinical and nonclinical contexts are stable (Bagby et al., 1994).

Interpersonal Reactivity Index (IRI)

Empathy is defined as one's responses when observing others' experiences and was measured by the Interpersonal Reactivity Index (IRI). The IRI comprises 28 items, with a 5-point Likert scale, ranging from 0 = "does not describe me well" to 4 = "describe me very well". There are four subscales, which are (1) perspective-taking ---(the tendency to adopt others' psychological points of view), (2) fantasy (the inclination to transpose oneself imaginatively into the emotions and behaviours of fictitious characters in books, films, and plays), (3) empathic concern (feeling sympathized and concerned of others), and (4) personal distress ("self-oriented" feelings of anxiety and uneasiness in stressful social contexts). Each subscale consists of 7 items. Items 3, 4, 7, 12, 13, 14, 15, 18, and 19 are reversely scored. The total score, ranging from 0 to 112, was calculated by summing up the score of every item. Higher scores indicate higher levels of empathy. The IRI was reported as having high internal consistency. The Cronbach's alpha (α) value ranged from .68 to .79, and test-retest reliability (r) ranged from .61 to .81 for the subscales. Convergent and divergent validity of the subscales are also discovered by examining their associations with other constructs. For example, perspective-taking was found to be related to interpersonal functioning and self-esteem, and unrelated to intelligence (Davis, 1980; Davis, 1983).

Extended Cognitive Reflection Test (CRT)

The variable reasoning style was measured using the extended Cognitive Reflection Test (CRT). This instrument uses two systems to assess particular cognitive abilities. System 1 corresponds to rapid, automatic, and intuitive thinking, whereas System 2 refers to deliberative, effortful, and analytical thinking (Frederick, 2005). The current study utilized the 22 items from research conducted by Baron et al. (2015). There are two types of

questions: arithmetic questions, which require respondents to perform calculations and provide subjective answers, as well as logical reasoning questions, with answers of "yes" or "no" based on respondents' interpretations. The questionnaire comprises four subscales: (1) Arithmetic no-lure (An) with six items, as well as (2) Belief consistent (Bc) and (3) Belief neutral (Bn) with four items respectively, and (4) Belief inconsistent (Bl) with eight items. Each item has a right and wrong answer; a correct answer yields one score, and an incorrect answer yields a zero score. The total score, ranging from 0 to 22, was calculated by adding up the scores obtained by each respondent. A higher score indicates a more analytical reasoning style and less use of an intuitive reasoning style.

The short Ethics Position Questionnaire (EPQ-5)

The short Ethics Position Questionnaire (EPQ-5) was utilized to assess the ethics position, which is about cognitions surrounding moral decision-making. This scale measures individual differences in moral perspectives, including situationism, absolutism, subjectivism, and exceptionism. There are 10 items in this instrument, and it uses a 5-point Likert scale that ranges from 1 = "strongly disagree" to 5 = "strongly agree". It is divided into two subscales, (1) idealism and (2) relativism, with five items each. There are no inverted items in the EPQ-5. For the scoring, the idealism score was computed by adding up the scores from item 1 to item 5, a higher score means that the respondent is more idealistic. On the other hand, the relativism score was calculated by adding up the scores from item 6 to item 10. The higher the score, the more relativistic the person is. Referring to the psychometric evaluation, EPQ-5 demonstrated good internal consistency, in which the Cronbach alpha (α) of idealism and relativism ranged from .70 to .85, and also test-retest reliabilities (r) of .67 and .66. Additionally, the two subscales also reported having good concurrent, convergent and divergent validity (Forsyth, 1980; Forsyth et al., 1988; O'Boyle & Forsyth, 2021).

Gawronski's Moral Dilemmas

The moral decision-making was measured by using the 24 moral dilemmas developed by Gawronski et al. (2017). It is a model that quantifies three dimensions of moral decision-making, which are sensitivity to consequences (*C*), sensitivity to norms (*N*), and action preference (*A*) when facing moral dilemmas. There are 24 moral dilemmas, made up of six dilemmas with four versions respectively: (1) proscriptive norm which benefits are greater than costs (ObGc), (2) proscriptive norm which costs are greater than benefits (ObSc), (3) prescriptive norm which benefits are greater than costs (EbGc), and (4) prescriptive norm which costs are greater than benefits (EbSc). A yes or no scale is applied in this instrument, depending on respondents' perception of whether it is acceptable to take action in a particular dilemma, and the scoring is "yes" = 1, "no" = 0.

The responses were then utilized in the calculation of CAN parameters by using an algorithm created by Liu and Liao (2021) (Zher-Wen et al., 2023). Firstly, the total scores for each version were computed, where total_ObGc = $p1$; total_ObSc = $p2$; total_EbGc = $p3$; total_EbSc = $p4$. Then, the *C* and *N* scores were calculated by using the formulae: $C = (p1 - p2 + p3 - p4)/2$, whereas $N = (p3 - p1 + p4 - p2)/2$. If the scores are lower than 0 (negative value), it means that the individual is sensitive to opposing the consequence/norm. A score of 0 shows a lack of sensitivity towards consequence/norm, whilst scores higher than 0 (positive value) indicate high sensitivity to endorsing the consequence/norm (Liu & Liao, 2021).

In addition, the average score of *A* (action preference) under the four situations was computed using the formula: $A = (p1 + p2 + p3 + p4)/4$. An *A* score greater than 0.5 indicates that the participant prefers to take action, whereas an *A* score lower than 0.5 reveals an inaction preference. However, if $A = 0.5$, the outcomes are different based on the *C* and *N* scores. If $A = 0.5$, and $C/N \neq 0$, this denotes that the person has a pure utilitarian or

deontological attitude. On the other hand, a result showing $A = 0.5$ and $C/N = 0$ represents random answering to the question (Liu & Liao, 2021). For the psychometric evaluation, Gawronski et al. (2020) reported that this instrument has adequate validity to gain insights into the studies of moral decisions.

Chapter 4

Results

Data Cleaning

In this study, a total of 194 responses were initially gathered. Data cleaning involved removing entries from participants who did not consent to take part, had missing responses, or answered fewer than seven out of nine attention check questions correctly. IBM SPSS Statistics version 23 was used in this study to clean and eliminate missing data from the dataset. One participant was excluded for not consenting to this study, and another had completed the survey twice, with their second submission removed from the dataset.

Additionally, 91 participants discontinued the survey partway through and were therefore excluded from the final dataset—this accounts for approximately 46.9% of the initial responses. Of these, 25 stopped at the Acknowledgement page, and 5 exited after viewing the Notice page. Eight participants dropped out during the demographic section, while 10 completed the demographics but stopped at Part A (dilemma about the virus). Four participants discontinued at Part B (TAS scale), two at Part C, and five at Part D (CRT). Seven participants left the survey at Part E (dilemma about ransom), three at Part F (IRI empathy), and another seven at Part G (dilemma about transplant). Six participants stopped at Part H (CRT part 2), three at Part I (dilemma about interrogation), and one each at Part J (EPQ), Part K (dilemma about vaccine), and the TNG page. Additionally, three participants exited Part L (CRT Part 3).

There were 11 respondents who filled out the survey, but their answers were excluded from the study as they scored lower than seven out of nine on the attention-check questions. After all exclusions, a total of 90 valid responses remained, representing 46.4% of the initial dataset.

Defining and Processing of Statistical Outliers

Casewise analysis was used to find possible outliers in the data before the mediation analyses. This involved examining standardised residuals for each of the four dependent variables. According to the results presented in Tables 4.1 to 4.4, several cases were identified as having residuals greater than ±2 standard deviations from the mean, suggesting possible outliers. Specifically, four cases were flagged in the model with EPQ Idealism as the dependent variable, three cases were identified in the EPQ Relativism model, four cases in the CAN-C model, and six cases in the CAN-N model.

Table 4.1

EPQ_Idealism model

Case Number, Mahalanobis Distance, Cooks' Distance and Centered Leverage Value of Potential Influential Cases

Case Number	Mahalanobis Distance	Cook's Distance	Centered Leverage Value
15	1.10664	.04642	.01243
47	.05925	.01510	.00067
51	2.47280	.04900	.02778
82	6.08425	.14698	.06836

Table 4.2

EPQ_Relativism model

Case Number	Mahalanobis Distance	Cook's Distance	Centered Leverage Value
14	6.13825	.09837	.06897
66	5.09765	.22224	.05728

74	6.89722	.26367	.07750

Table 4.3

CAN_C model

Case Number	Mahalanobis Distance	Cook's Distance	Centered Leverage Value
2	.41173	.02000	.00463
50	.83544	.02202	.00939
77	4.00733	.11499	.04503
80	1.13789	.05099	.01279

Table 4.4

CAN_N model

Case Number	Mahalanobis Distance	Cook's Distance	Centered Leverage Value
13	.71414	.02498	.00802
14	6.13825	.09983	.06897
59	3.75296	.10527	.04217
66	5.09765	.08260	.05728
67	.05753	.01386	.00065
75	2.91153	.06534	.03271

For a sample of 100, Barnett and Lewis (1994) state that a conservative cutoff value for Mahalanobis distance is greater than 15. The Mahalanobis distance values for each case are less than 15. Moreover, Stevens (2002) states that cases where Cook's distance is greater than one are potential outliers. All cases had no violations since each Cook's distance value

was less than 1. Furthermore, according to Stevens (2002), any case with a leverage larger than $\frac{3(k+1)}{n}$ is potentially an outlier. The calculation with the proper values plugged in is:

$$\frac{3(3+1)}{90} = 0.133$$

All cases had no violations since their leverage was less than 0.133. As a result, no cases need to be removed.

Test of Normality

Histogram

In the present study, the histograms for the variables alexithymia, empathy, reasoning style, and relativism showed a symmetric, bell-shaped curve, with a single peak centered around the mean, demonstrating normally distributed data. However, the histogram of idealism, CAN_C, and CAN_N displayed a negative skew. The majority of the data points were clustered on the right side, with a tail skewed towards the left. Moreover, CAN_A displayed a positive skew, with most of the data concentrated on the left side and the tail skewed towards the right (Refer to Appendix E).

The results indicated that there were no violations of the histogram normality assumptions of the variables alexithymia, empathy, reasoning style, and relativism. Yet, the normality assumptions were violated in the histograms of idealism, CAN_C, CAN_N, and CAN_A.

Quantile-Quantile (Q-Q) Plot

The assumption of normality was achieved by the quantile-quantile (Q-Q) plots for all variables and scales in this study. Most of the observed values were gathered along the diagonal line, showing that the data were normally distributed (Refer to Appendix F).

Skewness and Kurtosis

According to Byrne (2010) and Hair et al. (2010), the values of skewness between -2 and 2 are acceptable, while the acceptable range of kurtosis is between -7 and 7. Based on Table 4.1, the values of skewness and kurtosis of all variables are within the acceptable range. Therefore, it can be summarized that there were no violations of normality assumptions of skewness and kurtosis in this study (Refer to Appendix G and Table 4.5).

Table 4.5

Skewness and Kurtosis

Variable	Skewness	Kurtosis
Alexithymia	-.225	-.335
Empathy	-.174	.577
Reasoning style	.163	-.318
Ethics position:		
EPQ_Relativism	-.573	.048
EPQ_Idealism	-.807	2.448
Moral decision-making:		
CAN_C	.074	.499
CAN_N	-.353	.453
CAN_A	.943	1.897

Kolmogorov-Smirnov (K-S) Test

In the Kolmogorov-Smirnov (K-S) test, if the *p*-value is greater than the significance level (α) of .05, then the test is considered not significant, which means that the sample distribution is not significantly different from the population normal distribution, and the data

is normally distributed (Mishra et al., 2019). Referring to the results shown in Table 4.2, the *p*-values of the variables alexithymia, empathy, and reasoning style were greater than the α, revealing no violations in the K-S test of these three variables. However, violations of the K-S test were observed in ethics position (idealism and relativism) and moral decision-making (CAN_C, CAN_N, and CAN_A) as their *p*-values were smaller than the α. Thus, it was concluded that the normality assumptions were met only in the K-S test of alexithymia, empathy, and reasoning style, but not in the K-S test of ethics position and moral decision-making (Refer to Appendix H and Table 4.6).

Table 4.6

K-S Test

Variable	Statistic (*D*)	*p*-value
Alexithymia	.071	.200
Empathy	.087	.086
Reasoning style	.092	.059
Ethics position:		
EPQ_Relativism *	.143	.000
EPQ_Idealism *	.129	.001
Moral decision-making:		
CAN_C *	.122	.002
CAN_N *	.102	.021
CAN_A *	.181	.000

* Violate K-S test

Summary for Assumptions of Normality

Five normality indicators were assessed in the current study: Histograms, Q-Q plots, skewness, kurtosis, and K-S test. In conclusion, in the variables of alexithymia, empathy, and reasoning style, there were no violations of all the normality indicators, indicating that the data of these variables have normal distributions. For the ethics position, relativism [EPQ_Relativism] violated the K-S test normality assumption. For idealism, CAN_C, CAN_N, and CAN_A, the normality assumptions of their histograms and K-S tests were violated.

However, Thode (2002) reported the low power of the K-S test and stated that it should not be seriously considered in evaluating normality. In addition, no violations of more than two normality indicators were observed in every variable. Hence, it was considered and concluded that the normality assumptions were achieved in this study.

Descriptive Statistic

Demographic Characteristics

The final sample consisted of 90 university students in Malaysia, aged eighteen years old and above. Among them, 21.1% (n = 19) were male, 77.8% (n = 70) were female, and 1.1% (n = 1) preferred not to say. The racial composition was predominantly Chinese, 83.3% (n = 75), with 10% (n = 9) identifying as Malay, 3.3% (n = 3) as Indian, (n = 2) as Melanau and (n = 1) as Siamese (Others 3.3%, n = 3).

Next, the mean age of the participants is 23.73 (SD = 4.65), with the youngest age of 18 (n = 1) and the oldest age of 45 (n = 1). Almost half of the participants are from UTAR (47.8%, n = 43), while the others are from 20 various institutions such as USM, UPM, UKM, UM, TARUMT, UTM, Sunway University and Taylor's University.

Table 4.7

Participants Demographics (n = 90)

	n	Percentage	M	SD
Gender				
Male	19	21.1		
Female	70	77.8		
Prefer not to say	1	1.1		
Age			23.73	4.65
Race				
Chinese	75	83.3		
Malay	9	10		
Indian	3	3.3		
Others	3	3.3		

Note. *M* = Mean, *SD* = Standard Deviation

Topic-specific Characteristics

For this study, the mean score for the TAS was 54.79 (*SD* = 11.54), which showed that participants experienced a slightly high level of alexithymia (Bagby et al., 1994). The mean score for IRI was 69.69 (*SD* = 10.79), suggesting a high level of empathy among most participants (Davis, 1980; Davis, 1983). For CRT, the mean score was 12.58 (*SD* = 3.68), suggesting a slightly more analytical reasoning style among participants (Baron et al., 2015). The mean score for EPQ (Idealism) was 19.51 (*SD* = 3.57), and the mean score for EPQ (Relativism) was 18.7 (*SD* = 3.39). This indicates a higher level of both idealistic and relativistic among participants (Forsyth, 1980; Forsyth et al., 1988; O'Boyle & Forsyth, 2021). Lastly, the mean score for CAN-C was 0.21 (*SD* = 0.2), and the mean score for CAN-

N was 0.18 (*SD* = 0.31). This indicates high sensitivity to endorsing the consequence/norm in participants (Liu & Liao, 2021).

Table 4.8

Topic-Specific Characteristics (n=90)

	Mean	Standard Deviation
TAS	54.79	11.54
IRI	69.69	10.79
CRT	12.58	3.68
EPQ (Idealism)	19.51	3.57
EPQ (Relativism)	18.70	3.39
CAN_C	0.21	0.20
CAN_N	0.18	0.31

Correlation Analysis

A correlation analysis was implemented to examine the bivariate correlations between pairs of variables in this study. The results portrayed six significant correlations. Referring to Table 4.8, there is a significant positive relationship between alexithymia and empathy ($r = .267$, $p < .05$). A significant positive correlation was also observed between alexithymia and the action preference [CAN_A] ($r = .207$, $p < .05$). Moreover, empathy was found to be positively correlated with idealism [EPQ_Idealism] ($r = .275$, $p < .01$). The results also revealed a significant positive association between idealism [EPQ_Idealism] and sensitivity to norms [CAN_N] ($r = .214$, $p < .05$). In addition, it was reported that relativism [EPQ_Relativism] is negatively associated with sensitivity to norms [CAN_N] ($r = -.255$, $p < .05$), and positively correlated with action preference [CAN_A] ($r = .246$, $p < .05$).

Table 4.9

Correlations for Study Variables

	1	2	3	4	5	6	7	8
1. Alexithymia	1							
2. Empathy	.267*	1						
3. Reasoning style	-.206	-.005	1					
4. EPQ_Idealism	-.013	.275**	-.086	1				
5. EPQ_Relativism	.166	.182	-.075	-.00	1			
6. CAN_C	-.112	-.098	.181	-.079	-.011	1		
7. CAN_N	-.134	-.106	.181	.214*	-.255*	-.057	1	
8. CAN_A	.207*	.127	-.107	.162	.246*	-.007	-.009	1
Mean	54.79	69.69	12.58	19.51	18.70	.2120	.1824	.5384
Standard Deviation	11.54	10.79	3.68	3.57	3.39	.2027	.3133	.1145

**. Correlation is significant at the .01 level (2-tailed).
*. Correlation is significant at the .05 level (2-tailed).

Hayes' PROCESS Macro Model Four

SPSS's PROCESS macro, model number four, was employed to do the mediation analysis (Hayes, 2013). It assessed the mediating role of empathy and reasoning style on the relationship between alexithymia and moral decision-making. In accordance with the four different moral-related factors (EPQ_Idealism, EPQ_Relativism, CAN_C and CAN_N), the analysis was conducted four times. As shown in Appendix H, the analysis used alexithymia as the predictor, the several factors assessing moral decision-making as the outcome variable, empathy as the first mediator (M1), and reasoning style as the second mediator (M2).

The result showed a significant indirect effect of alexithymia on idealism through empathy ($b = 0.0252$, $t = 1.636$), which was the only significant finding in our study. The overall model for the relationship of alexihymia on EPQ_idealism through empathy (M1) is significant, $F(1,88) = 6.76$, $p < .05$, $R^2 = .07$. There was a significant relationship between alexithymia and empathy ($b = 0.2496$, $p < .05$), as well as a significant relationship between empathy and EPQ_Idealism ($b = 0.1011$, $p < .05$). Furthermore, the direct effect of alexithymia on idealism in the presence of the mediators was also found non-significant ($b = -0.0363$, $p > 0.005$). Hence, empathy fully mediated the relationship between alexithymia and idealism.

Chapter 5

Discussion

Alexithymia and Moral Decision-Making

In this study, the hypothesis proposed that there is a significant relationship between alexithymia and moral decision-making among university students in Malaysia. However, the result, which demonstrated a non-significant correlation between these two variables, rejected this hypothesis. This result contradicts the previous findings, which suggested that alexithymia correlates with moral judgement (Chen et al., 2023; Patil & Silani, 2014b; Zhang et al., 2020; Zhu, 2023). Most of them suggested that high alexithymia leads to a utilitarian choice (Chen et al., 2023; Zhang et al., 2020; Zhu, 2023).

Our findings align with a few studies which discovered that alexithymia did not significantly predict moral decisions (Cecchetto et al., 2017; Mantchala et al., 2024). According to Cecchetto et al. (2017), although people's emotional reactions to moral judgements were impacted by alexithymia, their moral judgements remained unchanged. Rather than their psychophysiological reactions, their moral judgements might be impacted by what they perceive to be socially acceptable. Moreover, another study, which focuses on autism spectrum disorder (ASD), suggested that we cannot presume that all people with severe alexithymia have utilitarian moral judgements (Mantchala et al., 2024). Their findings discovered that there were no differences in moral judgements between participants with autism and those without, despite the former having greater alexithymia ratings.

Empathy as a Mediator

Based on our findings, the relationship between alexithymia, empathy, and moral decision-making was not significant; therefore, Hypothesis 2 was rejected. The result contrasts with previous findings, which found that the relationship between moral judgement

and alexithymia has been explained via empathy (Patil & Silani, 2014; Takamatsu & Takai, 2017; Zhang et al., 2020). They explained this relationship by suggesting that individuals with alexithymia tend to show lower empathic concern, which reduces their emotional connection to others' suffering. This empathy deficit makes it harder for them to relate to those harmed in moral dilemmas, such as the trolley problem, ultimately increasing the likelihood of utilitarian decision-making (Mao & Zhou, 2023; Patil et al., 2016; Takamatsu & Takai, 2017; Zhang et al., 2020).

Instead of moral decision-making, the findings provide partial support for a mediating role of empathy in the relationship between alexithymia and ethics position. Specifically, empathy significantly mediated the link between alexithymia and idealism, but not relativism. Moreover, given that the direct relationship between alexithymia and idealism was not significant, the findings suggest that empathy fully mediates the effect of alexithymia on idealism.

Our findings revealed a significant and positive relationship between alexithymia and empathy, indicating that individuals with higher levels of alexithymia also reported higher levels of empathy. This result contrasts with previous literature (Aslan et al., 2020; Williams & Wood, 2009), which often suggests a negative association between these variables. However, there are a few studies that suggest that individuals with high levels of alexithymia tend to experience greater personal distress, which is one of the facets of affective empathy (Banzhaf et al., 2018; Brewer et al., 2018; Moriguchi et al., 2007; Grynberg et al., 2010). High levels of personal distress may be present in alexithymia due to recognised issues with emotion regulation (Brewer et al., 2018; Joormann and Stanton, 2016). Grynberg et al. (2010) also explained that individuals with alexithymia might experience personal distress when witnessing others' suffering because they are unable to recognise, distinguish, and regulate the emotions that are elicited. Studies have shown that labeling emotions can help reduce

their intensity (Foland-Ross et al., 2010; Lieberman et al., 2007; Mazefsky & White, 2014), so those with alexithymia may struggle to manage their emotional responses effectively. Another possible explanation for the high levels of personal distress reported by individuals with alexithymia is that they may have a weaker distinction between themselves and others. When witnessing someone else's pain, they might have trouble separating the other person's feelings from their own. This blurred self-other boundary can lead to increased personal distress, as they may experience the other person's suffering as if it were their own (Brewer et al., 2018). Additionally, alexithymia was found to have a stronger impact on personal distress among individuals with depression than in the control group (Banzhaf et al., 2018). Given the established link between personal distress and alexithymia, future research could specifically investigate this relationship in greater detail. This would help address a limitation of the present study, which assessed empathy as a whole rather than examining its distinct subcomponents.

Moreover, empathy was found to be significantly and positively associated with idealism. According to Özdinç et al. (2025), idealists' concern for the well-being of others is associated with higher levels of empathy. Davis et al. (2001) also suggested that empathy is closely related to idealism. People with higher idealism tend to show more empathy, including both cognitive empathy (like perspective-taking) and emotional empathy (like compassion and warmth) (Davis et al., 2001). It was explained that idealistic individuals strongly believe in avoiding harm to others (Forsyth et al., 1988). This concern for others' well-being likely depends on their ability to understand others' perspectives and emotionally connect with them, which are key elements of empathy (Davis et al., 2001).

Importantly, the mediation analysis demonstrated a significant and positive indirect effect from alexithymia to idealism through empathy, suggesting that empathy serves as a meaningful pathway through which alexithymia may influence idealism. There is a limited

amount of research exploring the relationship between alexithymia, empathy, and idealism. Yildiz and Demirsoy (2024) suggested that ethical positions are significantly influenced by the degree of alexithymia. However, their findings differ from ours, as they observed that higher levels of alexithymia were associated with a stronger tendency toward relativistic thinking among students. They discovered that those with high alexithymia scores exhibit much higher levels of relativism and lower levels of idealism. They suggested that the subjective perspective taken by individuals with high levels of alexithymia, which is more self-centered and less focused on how their actions affect others, indicates that these individuals may have difficulty empathising because of emotional insufficiency.

Given the lack of prior studies on this topic, future research is encouraged to investigate and replicate these relationships. Since empathy was found to fully mediate the relationship between alexithymia and idealism, future studies could explore this mediation effect across different populations, cultural backgrounds, or using longitudinal designs to observe changes over time. Additionally, researchers may consider examining other possible mediators or moderators to gain a deeper understanding of the mechanisms underlying this relationship.

Reasoning Style as a Mediator

The third hypothesis proposed that reasoning style (analytical versus intuitive reasoning style) mediates the relationship between alexithymia and moral decision-making. The results of the present study, however, demonstrated a non-significant indirect effect of alexithymia on moral decision-making through reasoning style, suggesting that reasoning style has no discernible effect on the impact of alexithymia on moral decision-making. As a result, the hypothesis is not supported. This finding is inconsistent with the results of research conducted by Patil and Silani (2014), which found a link between alexithymia and

utilitarianism. This study discussed that individuals living with alexithymia who have weak affective reactions usually engage in deliberative reasoning processes, leading to utilitarian moral decision-making.

There was limited prior research that examined the mediating role of reasoning style in the association between alexithymia and moral decision-making to help elaborate on the current findings. A few mediators and interpretations of the relationship between alexithymia and moral decision-making were discovered in earlier research. According to Chen et al. (2023), alexithymia predicts moral judgments due to blunting affective reactions to moral norm violations and difficulty in comprehending others' feelings when facing harm. Patil and Silani (2014) found that the prediction of trait alexithymia on utilitarian moral judgments was mediated by reduced empathic concern. Furthermore, the impact of alexithymia on utilitarian decision-making was found to be influenced by psychopathy, which is characterised by deficits of empathy and emotional reactivity (Şandor, 2025). Apart from that, Yildiz and Demirsoy (2024) discovered that difficulty empathising, lack of sensitivity to the consequences of one's actions on others, and egoism are associated with higher levels of alexithymia, resulting in a more relativistic ethical position.

Based on the findings of the previous studies, the correlation between alexithymia and moral judgments is mainly explained by a lack of empathy and deficiencies in emotional awareness and processing. This highlighted the role of affective factors in shaping the relationship, rather than cognitive components such as reasoning style. Yet, due to the limited data and other limitations in the current study, it was not recommended to draw a conclusion that reasoning style cannot be a potential mediator. On the contrary, to fill the study gap, it is suggested that future studies examine the mediating role of reasoning style in the relationship between alexithymia and moral decision-making in greater detail using various methodologies, instruments, target participants, and so on.

Implications

Theoretical Implication

This study contributes to the existing literature by offering new insights into the relationship between alexithymia, empathy, reasoning style, and moral decision-making. While previous studies reported a direct and significant relationship between alexithymia and moral decision-making, which often points to a utilitarian tendency (Chen et al., 2023; Zhang et al., 2020), our results showed no such direct association. Instead, our findings revealed that empathy fully mediated the relationship between alexithymia and idealism, rather than moral decision-making. This suggests a shift in focus that emotional traits like empathy may influence broader ethical orientations (such as idealism) rather than specific moral choices in dilemmas.

Moreover, our study found that reasoning style (analytical vs. intuitive) was not a significant mediator. This challenges the assumption that cognitive processing style significantly influences the link between emotional traits like alexithymia and moral judgment. Additionally, our study measured different aspects of moral characteristics, including two from the Ethical Position Questionnaire (idealism and relativism) and two context-based moral dilemma scales (CAN-C and CAN-N), offering a broader and more nuanced understanding of moral functioning.

Practical Implication

Practically, these findings suggest that enhancing empathy, particularly among individuals with higher alexithymia traits, may foster more idealistic ethical beliefs. This insight may be useful for educators and mental health professionals in designing interventions or moral education programs. Encouraging emotional awareness and empathy development

could help promote more prosocial and harm-avoidant values in ethical reasoning, especially in youth and university populations.

Limitations

Several limitations of this study should be acknowledged. First, the data collection period was short, and the sample size was relatively small (n = 90), which limits the generalizability of the findings. Additionally, the study relied solely on self-report measures, which are susceptible to social desirability bias and participants' limited self-awareness. According to Larson (2019), people tend to underreport negative social behaviours and overreport positive ones. The gender distribution was highly imbalanced, with only 19 male and 70 female participants, and the sample was predominantly Chinese (83%), which may not represent the broader university student population in Malaysia.

Recommendations

Given these limitations, future studies should consider using a larger and more diverse sample to improve external validity. To enhance the reliability of findings, incorporating behavioral tasks or multi-informant assessments would help validate self-report data. Additionally, future research should aim for greater demographic diversity to ensure a more representative sample. Longitudinal or experimental designs would be beneficial to explore causal relationships. Finally, testing alternative mediators, such as emotional regulation, social norms, or cultural values, could further enhance understanding of these dynamics.

Conclusion

In conclusion, all the hypotheses in this study were rejected. However, rather than moral decision-making, the results showed a mediating effect of empathy on the relationship

between alexithymia and idealism. It is recommended that future research explore additional factors that may mediate the connection between alexithymia and moral decision-making.

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Appendix A

Questionnaire

Universiti Tunku Abdul Rahman

Department of Psychology and Counselling

Faculty of Arts and Social Science

UAPZ3013 Final Year Project II

Year 3 Trimester 3 (202501)

Introduction

This research examines different types of decision-making. You will be presented with a variety of questions involving attitudes, reasoning, moral judgements, etc.

Procedures and Confidentiality

The following questionnaire will require approximately 25-30 minutes to complete. All information provided will remain **private and confidential**. The information given will only be reported as group data with no identifying information and only be used for academic purposes.

Participation

All the information gathered will remain

anonymous and confidential. Your information will not be disclosed to any unauthorized person and will be accessible only by group members. Participation in this study is voluntary, you are free to withdraw with consent and discontinue participation at any time without prejudice. Your responses will be coded numerically in the research assignment for the research interpretation. Your cooperation would be greatly appreciated.

Compensation for completing the study

You will receive **RM8 via Touch 'n Go e-wallet** for successfully completing the whole questionnaire.

Ethical review

The research design has been assessed by the Scientific and Ethical Review Committee (SERC) of Universiti Tunku Abdul Rahman (UTAR), and adheres to the ethical guidelines.

If you choose to participate in this project, please answer all the questions as honestly as possible and return the completed questionnaire promptly.

Personal Data Protection Statement

Please be informed that in accordance with Personal Data Protection Act 2010 (PDPA) which came into force on 15 November 2013, Universiti Tunku Abdul Rahman (UTAR) is hereby bound to make notice and require consent in relation to collection, recording, storage, usage and retention of personal information.

Notice:

1. Personal data refers to any information which may directly or indirectly identify a person which could include sensitive personal data and expression of opinion. Among others it includes:

- Gender
- Age
- Ethnicity
- Nationality
- University name
- Level of study
- Phone number (for the transaction of compensation for completing the study)

- Name (for the transaction of compensation for completing the study)

2. The purposes for which your personal data may be used are inclusive but not limited to:
- For assessment of any application to UTAR
- For processing any benefits and services
- For communication purposes
- For advertorial and news
- For general administration and record purposes
- For enhancing the value of education
- For educational and related purposes consequential to UTAR
- For the purpose of our corporate governance
- For consideration as a guarantor for UTAR staff/ student applying for his/her scholarship/ study loan

3. Your personal data may be transferred and/or disclosed to third party and/or UTAR collaborative partners including but not limited to the respective and appointed outsourcing agents for purpose of fulfilling our obligations to you in respect of the purposes and all such other purposes that are related to the purposes and also in providing integrated services, maintaining

and storing records. Your data may be shared when required by laws and when disclosure is necessary to comply with applicable laws.

4. Any personal information retained by UTAR shall be destroyed and/or deleted in accordance with our retention policy applicable for us in the event such information is no longer required.

5. UTAR is committed in ensuring the confidentiality, protection, security and accuracy of your personal information made available to us and it has been our ongoing strict policy to ensure that your personal information is accurate, complete, not misleading and updated. UTAR would also ensure that your personal data shall not be used for political and commercial purposes.

Consent Form for Research Participation and Personal Data Protection

Note: This consent form will remain with the UTAR researchers for their records.

1. By submitting this form you hereby authorise

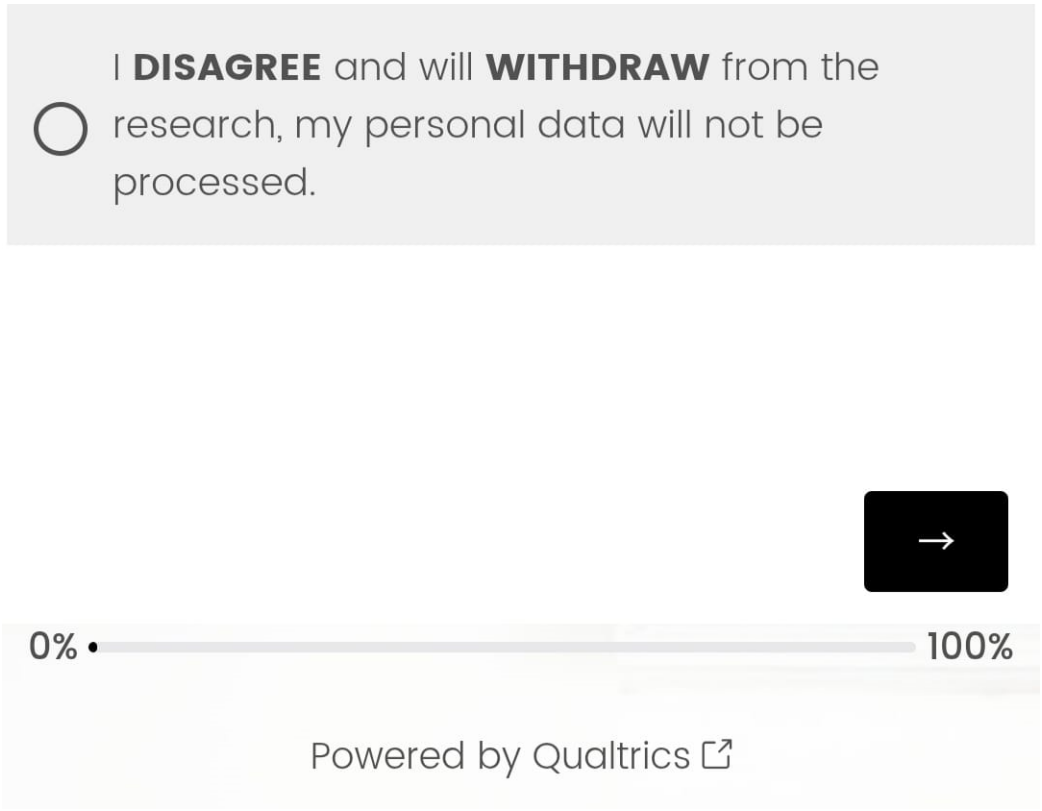
and consent to us processing (including disclosing) your personal data and any updates of your information, for the purposes and/or for any other purposes related to the purpose.

2. If you do not consent or subsequently withdraw your consent to the processing and disclosure of your personal data, UTAR will not be able to fulfill our obligations or to contact you or to assist you in respect of the purposes and/or for any other purposes related to the purpose.

3. You may access and update your personal data by writing to us at:
ngyihui923@1utar.my (Ng Yi Hui)
2103520@1utar.my (Tan Yan Er)
yeohkaisuan@1utar.my (Yeoh Kai Suan)

Acknowledgment of Personal Data Protection Notice

○ I have been notified and that I hereby understood, consented and **AGREED** per UTAR above notice.


I DISAGREE and will WITHDRAW from the research, my personal data will not be processed.
→
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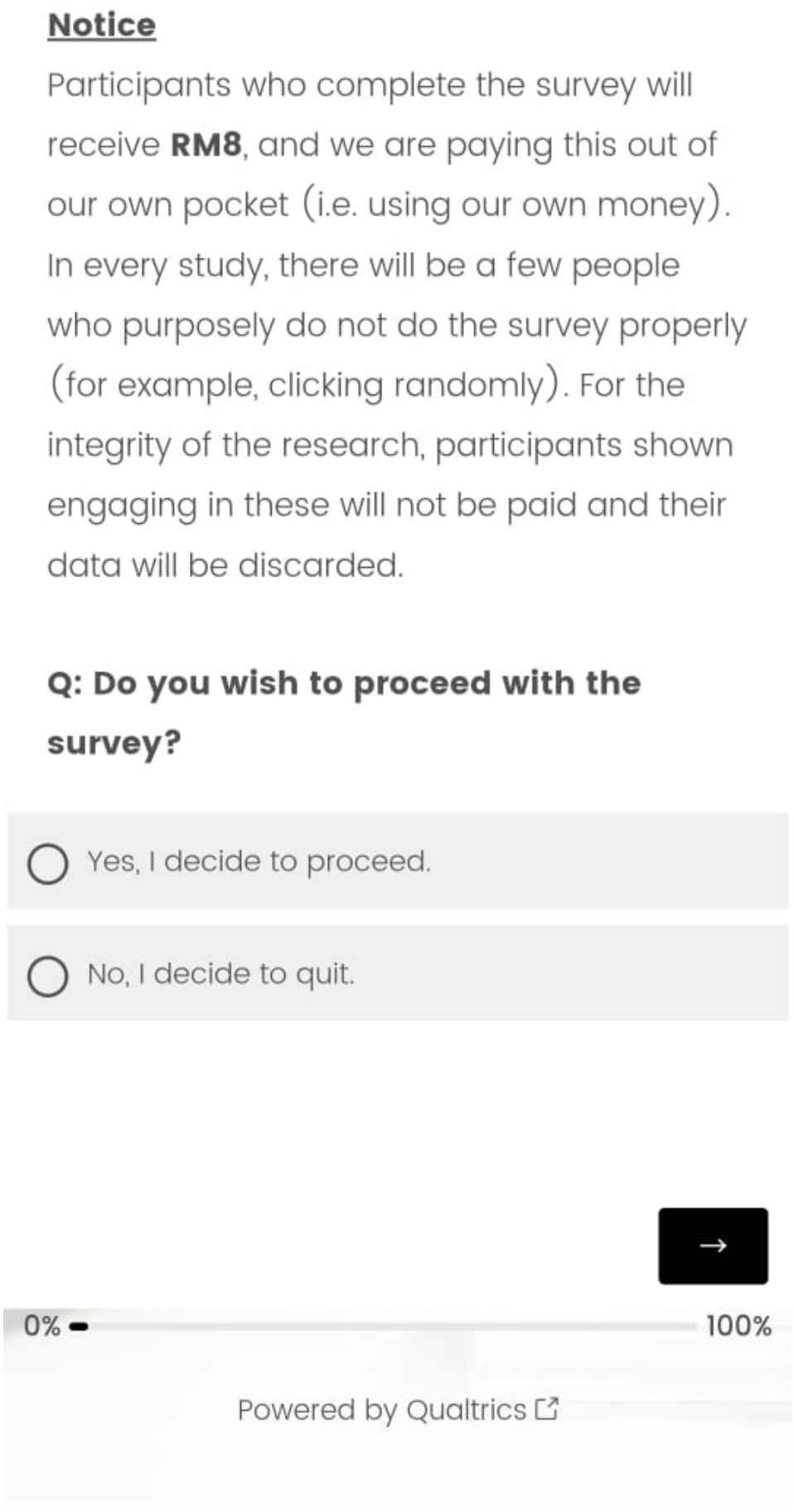
100%
Powered by Qualtrics



Notice

Participants who complete the survey will receive **RM8**, and we are paying this out of our own pocket (i.e. using our own money). In every study, there will be a few people who purposely do not do the survey properly (for example, clicking randomly). For the integrity of the research, participants shown engaging in these will not be paid and their data will be discarded.

Q: Do you wish to proceed with the survey?

◯ Yes, I decide to proceed.

◯ No, I decide to quit.

→

0% 100%

Powered by Qualtrics

Gender

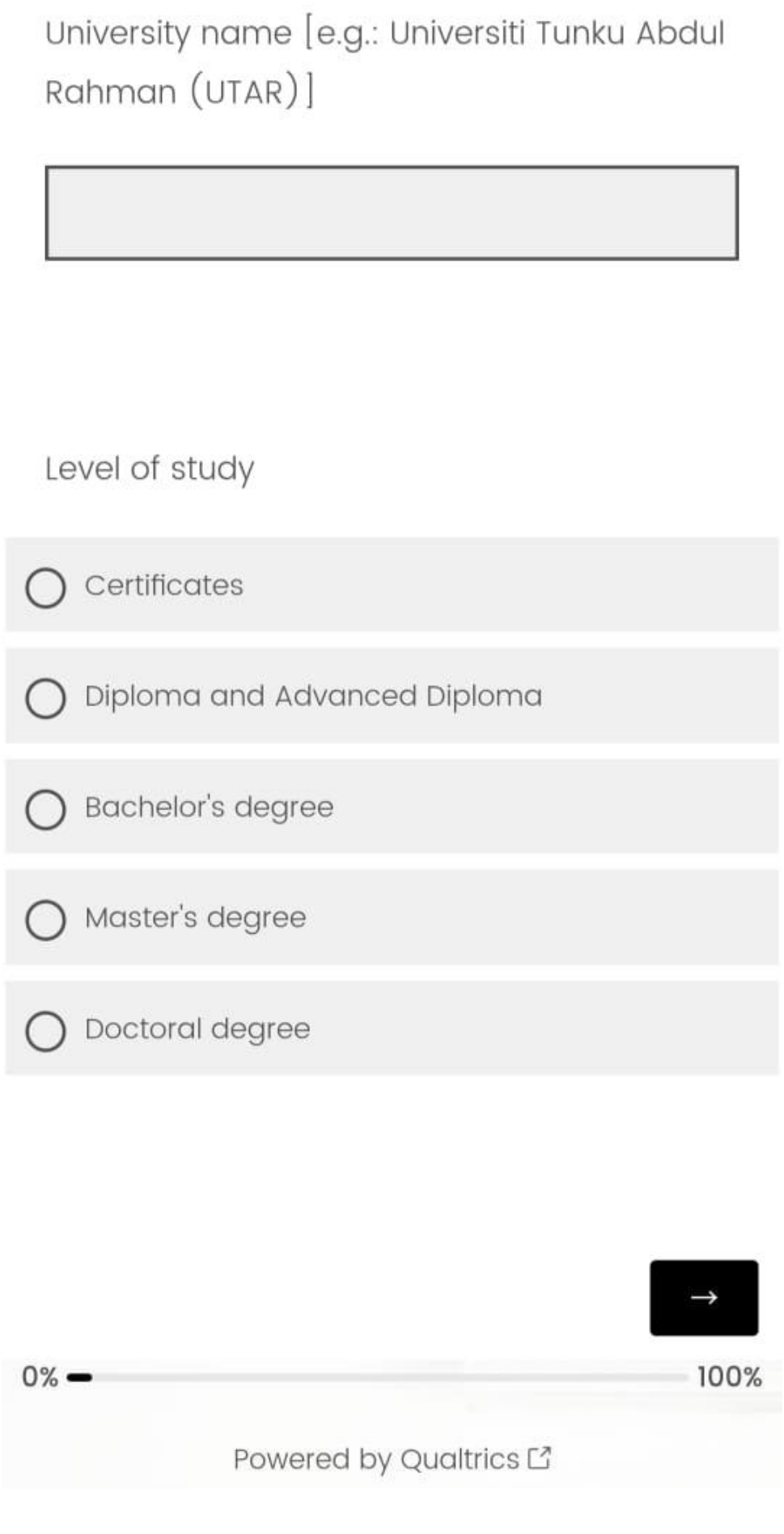
- ○ Male
- ○ Female
- ○ Non-binary / third gender
- ○ Prefer not to say

Age (e.g.: 22)

Ethnicity

- ○ Malay
- ○ Chinese

Nationality


University name [e.g.: Universiti Tunku Abdul Rahman (UTAR)]
Level of study
Certificates
Diploma and Advanced Diploma
Bachelor's degree
Master's degree
Doctoral degree
→
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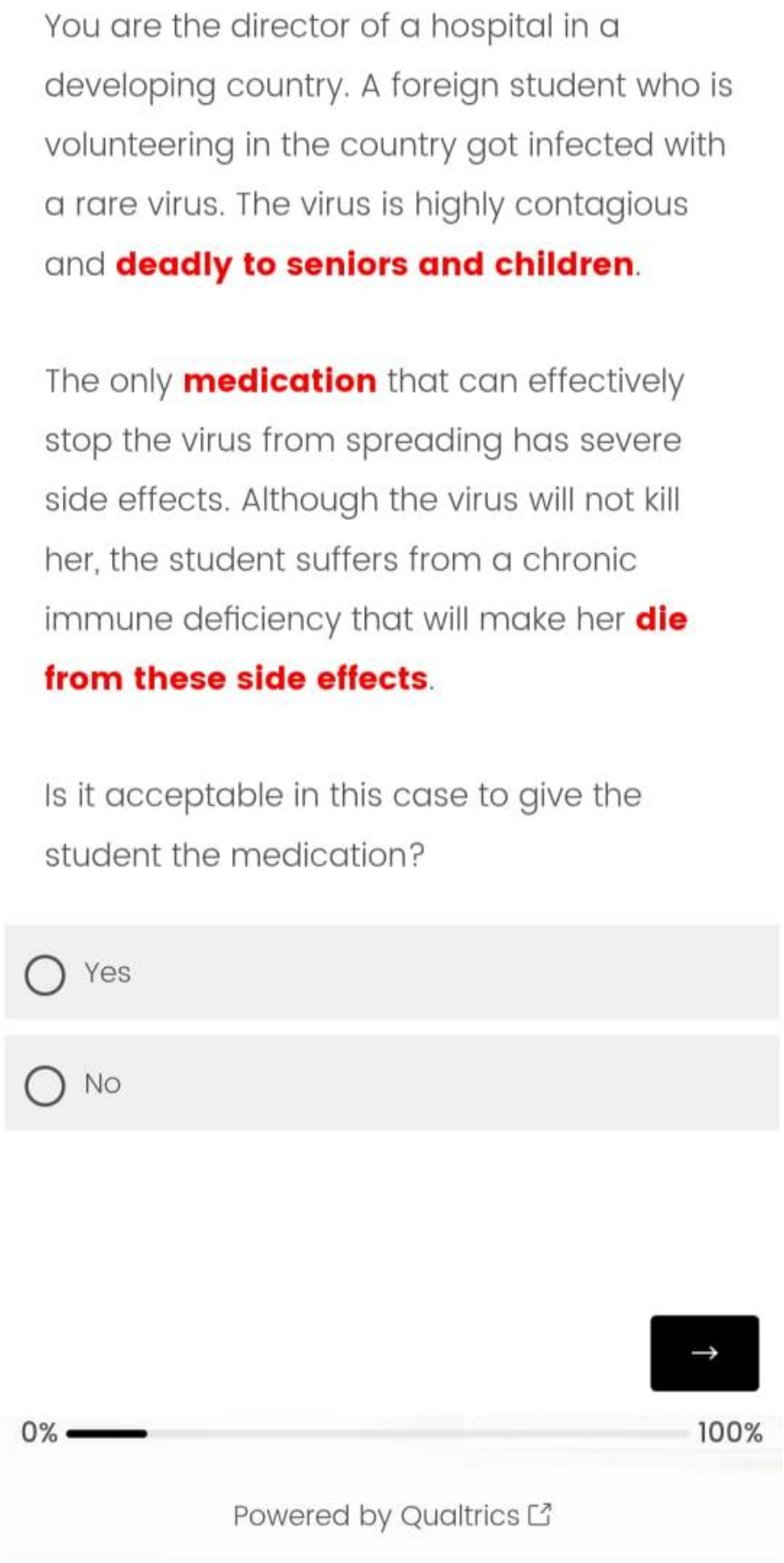
Powered by Qualtrics

Part A

You will now be presented with 4 ethical scenarios involving **whether to treat a student infected with a virus**. The 4 scenarios are highly similar, but with some key differences.

After reading each scenario, you will be asked to make a judgment about whether you find the described action appropriate or inappropriate. There are no right or wrong answers, so please give your honest reaction.


You are the director of a hospital in a developing country. A foreign student who is volunteering in the country got infected with a rare virus. The virus is highly contagious and deadly to seniors and children.
The only medication that can effectively stop the virus from spreading has severe side effects. Although the virus will not kill her, the student suffers from a chronic immune deficiency that will make her die from these side effects.
Is it acceptable in this case to give the student the medication?
Yes
No
→
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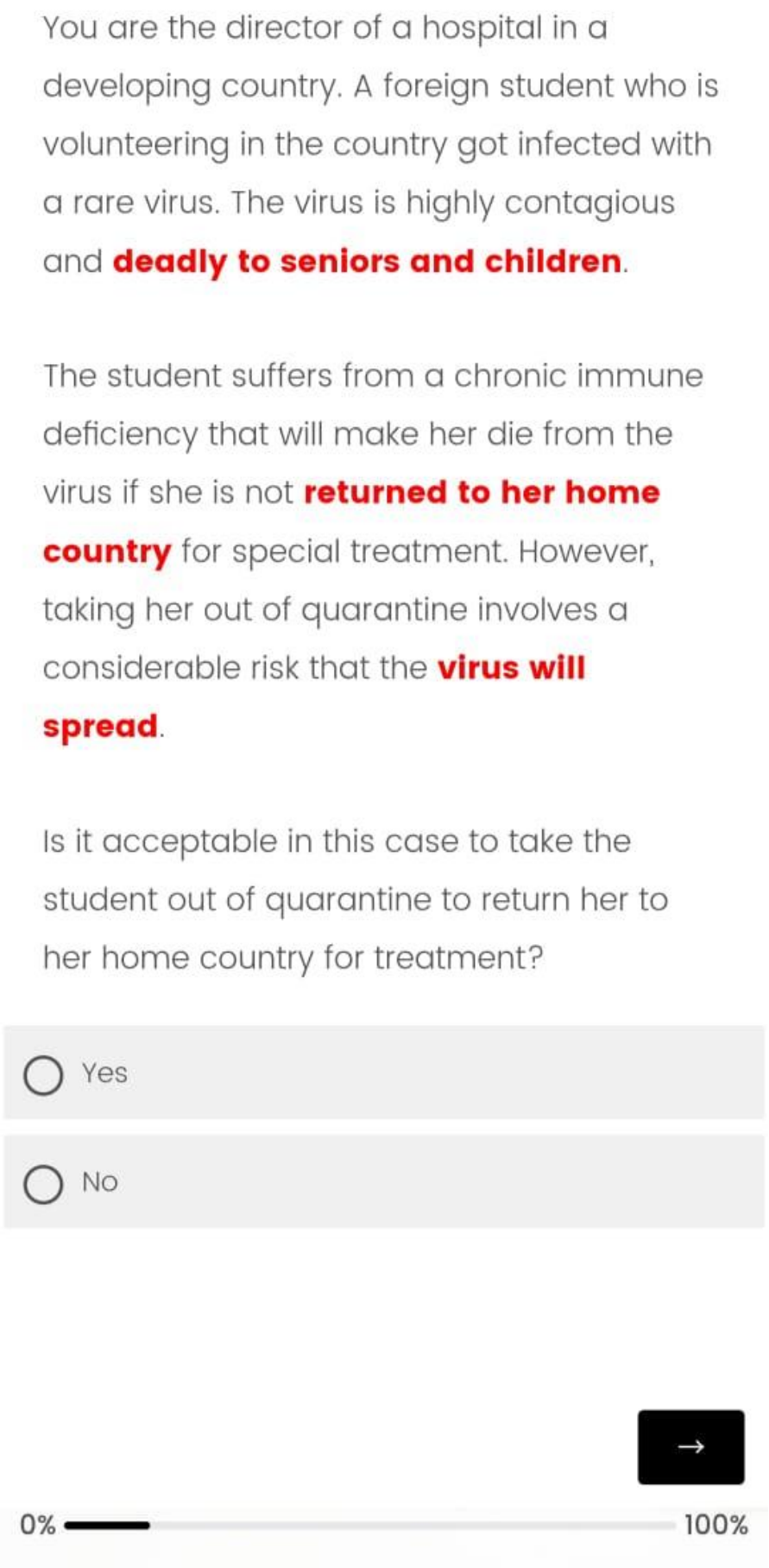
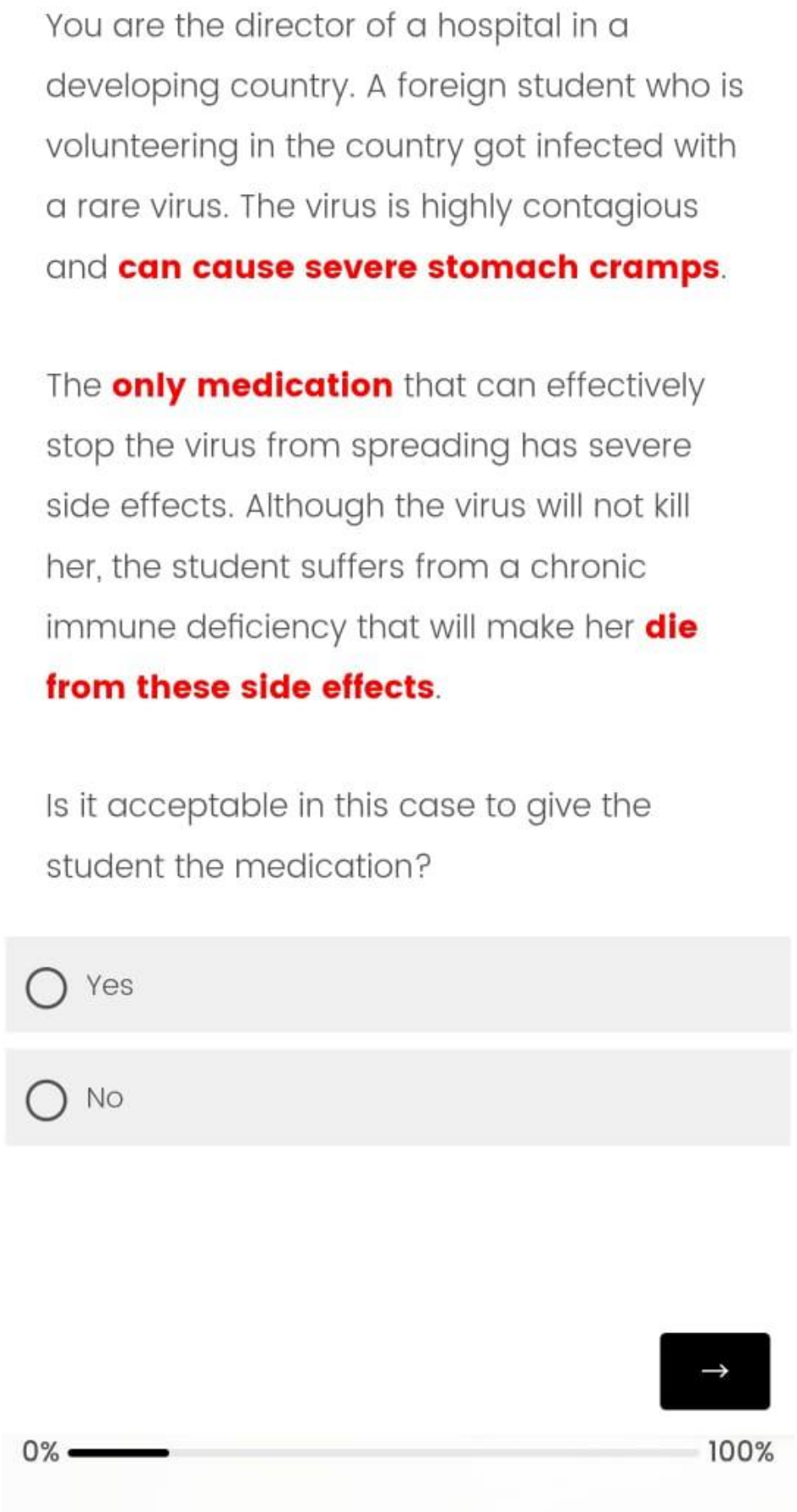
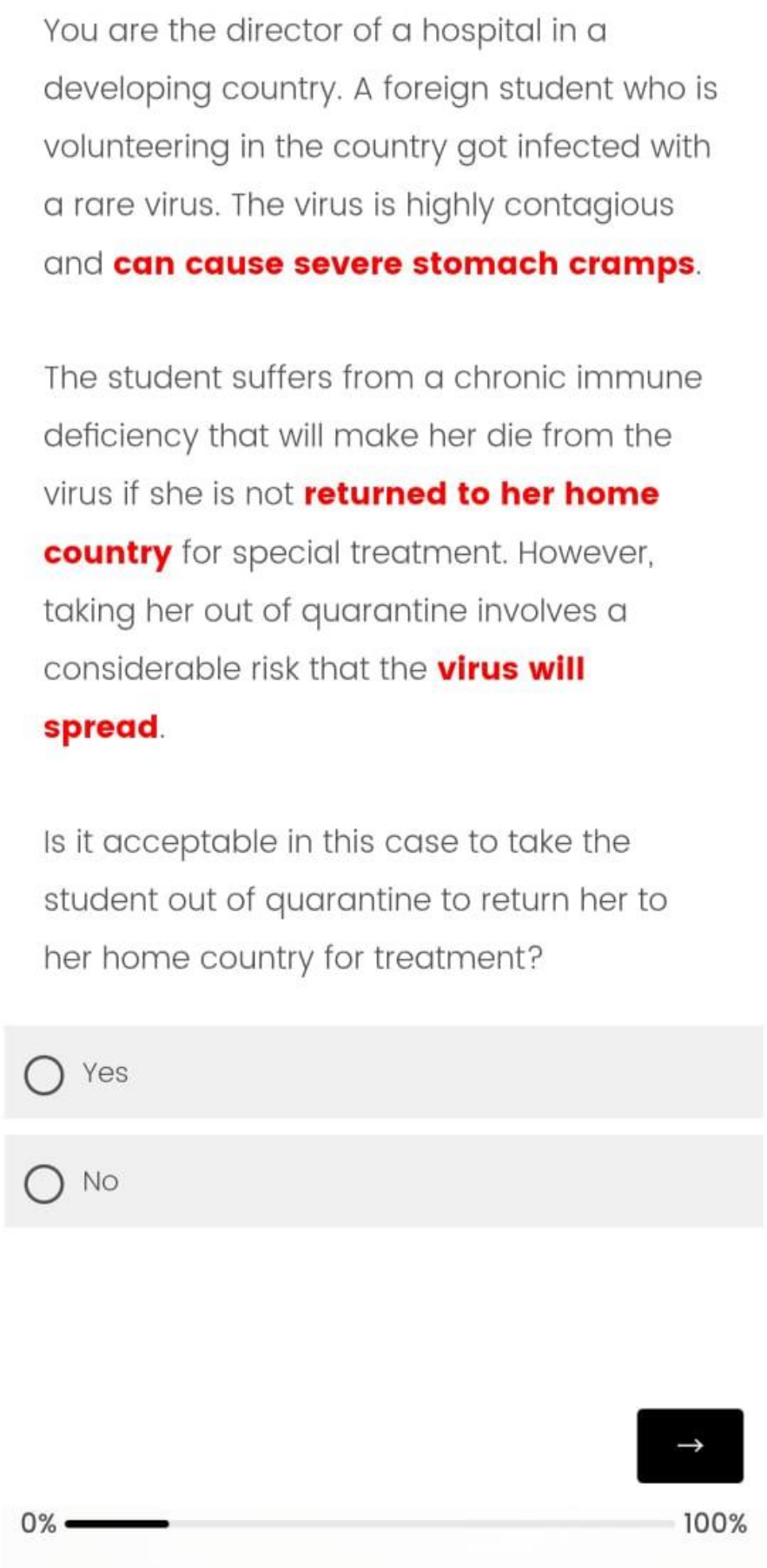

You are the director of a hospital in a developing country. A foreign student who is volunteering in the country got infected with a rare virus. The virus is highly contagious and deadly to seniors and children.
The student suffers from a chronic immune deficiency that will make her die from the virus if she is not returned to her home country for special treatment. However, taking her out of quarantine involves a considerable risk that the virus will spread.
Is it acceptable in this case to take the student out of quarantine to return her to her home country for treatment?
Yes
No
→
0%
100%


You are the director of a hospital in a developing country. A foreign student who is volunteering in the country got infected with a rare virus. The virus is highly contagious and can cause severe stomach cramps.
The only medication that can effectively stop the virus from spreading has severe side effects. Although the virus will not kill her, the student suffers from a chronic immune deficiency that will make her die from these side effects.
Is it acceptable in this case to give the student the medication?
Yes
No
→
0%
100%


You are the director of a hospital in a developing country. A foreign student who is volunteering in the country got infected with a rare virus. The virus is highly contagious and can cause severe stomach cramps.
The student suffers from a chronic immune deficiency that will make her die from the virus if she is not returned to her home country for special treatment. However, taking her out of quarantine involves a considerable risk that the virus will spread.
Is it acceptable in this case to take the student out of quarantine to return her to her home country for treatment?
Yes
No
→
0%
100%

Part B

Please read the following statements and for each, choose one (1) option that best represents you.
There are no right or wrong answers, so please give your honest reaction.

I am often confused about what emotion I am feeling.

- ○ Strongly disagree
- ○ Disagree
- ○ Neither agree nor disagree
- ○ Agree
- ○ Strongly agree

It is difficult for me to find the right words for my feelings.

I have physical sensations that even doctors don't understand.

I am able to describe my feelings easily.

I prefer to analyze problems rather than just describe them.

When I am upset, I don't know if I am sad, frightened, or angry.

I am often puzzled by sensations in my body.

I prefer to just let things happen rather than to understand why they turned out that way.

I have feelings that I can't quite identify.

Being in touch with emotions is essential.

I find it hard to describe how I feel about people.

People tell me to describe my feelings more.

I don't know what's going on inside me.

I often don't know why I am angry.

If you read this question, please choose "Agree".

I prefer talking to people about their daily activities rather than their feelings.

I prefer to watch "light" entertainment shows rather than psychological dramas.

It is difficult for me to reveal my innermost feelings, even to close friends.

I can feel close to someone, even in moments of silence.

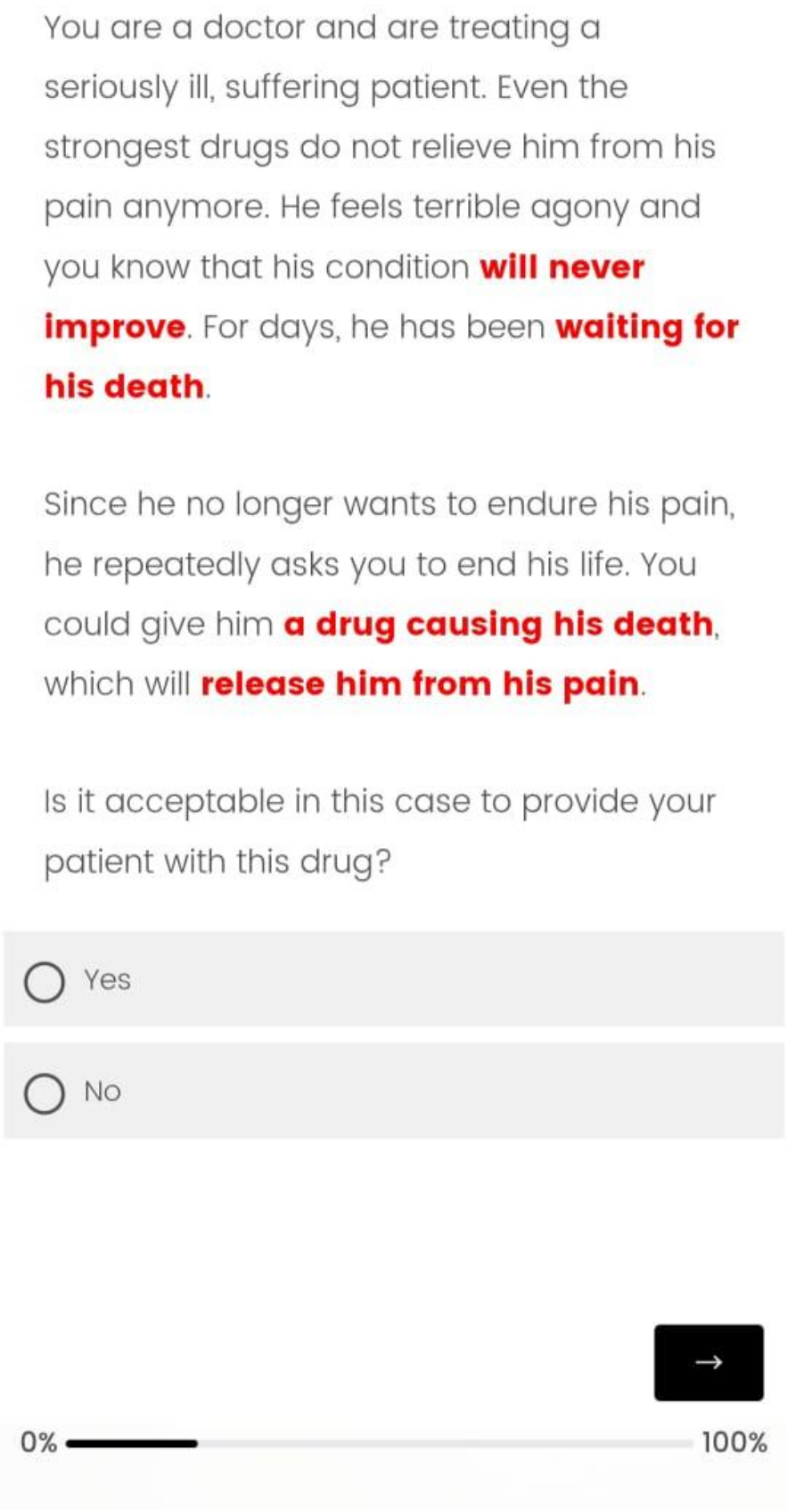
I find examination of my feelings useful in solving personal problems.

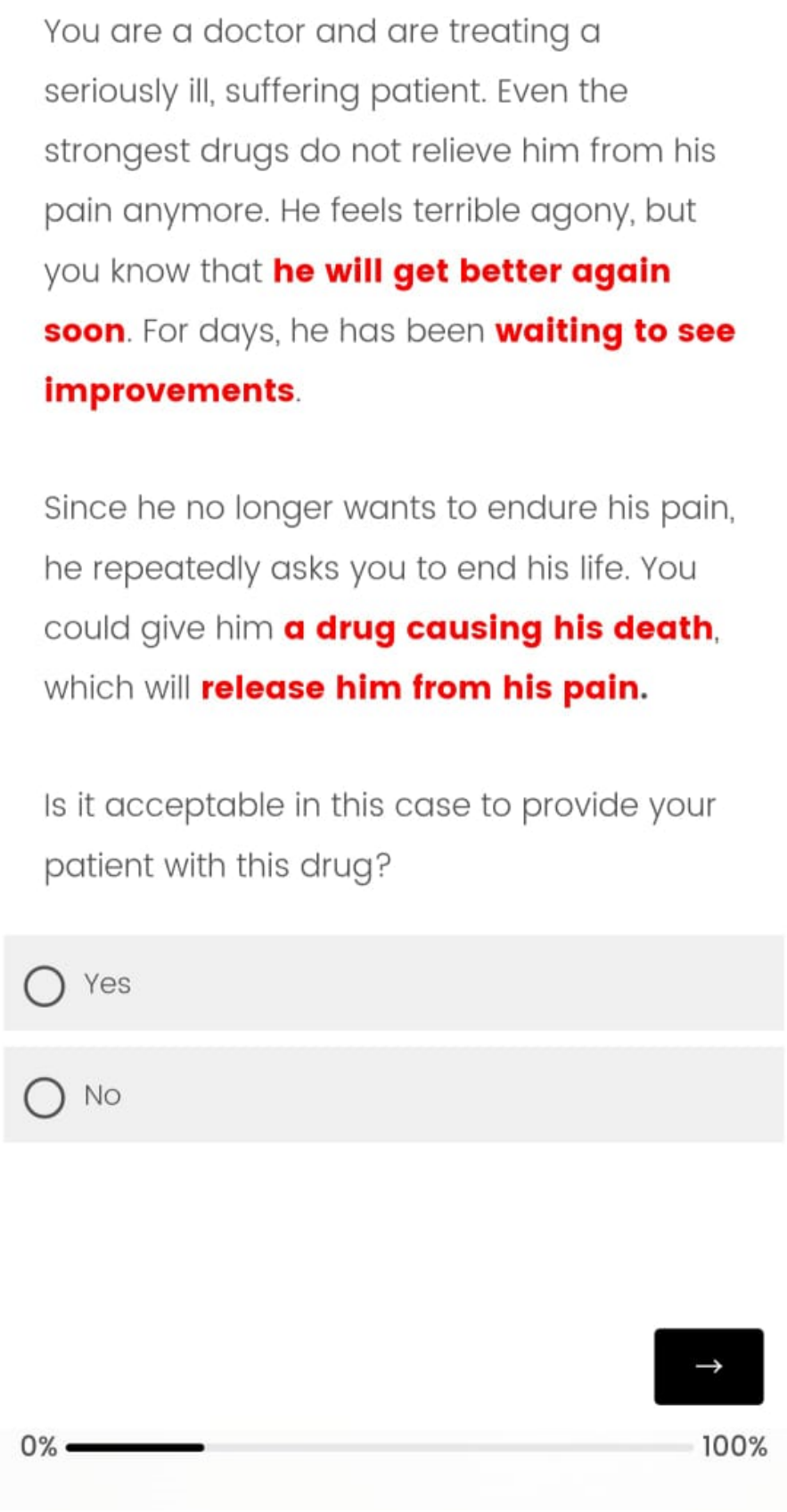
I look for hidden meanings in movies or plays.

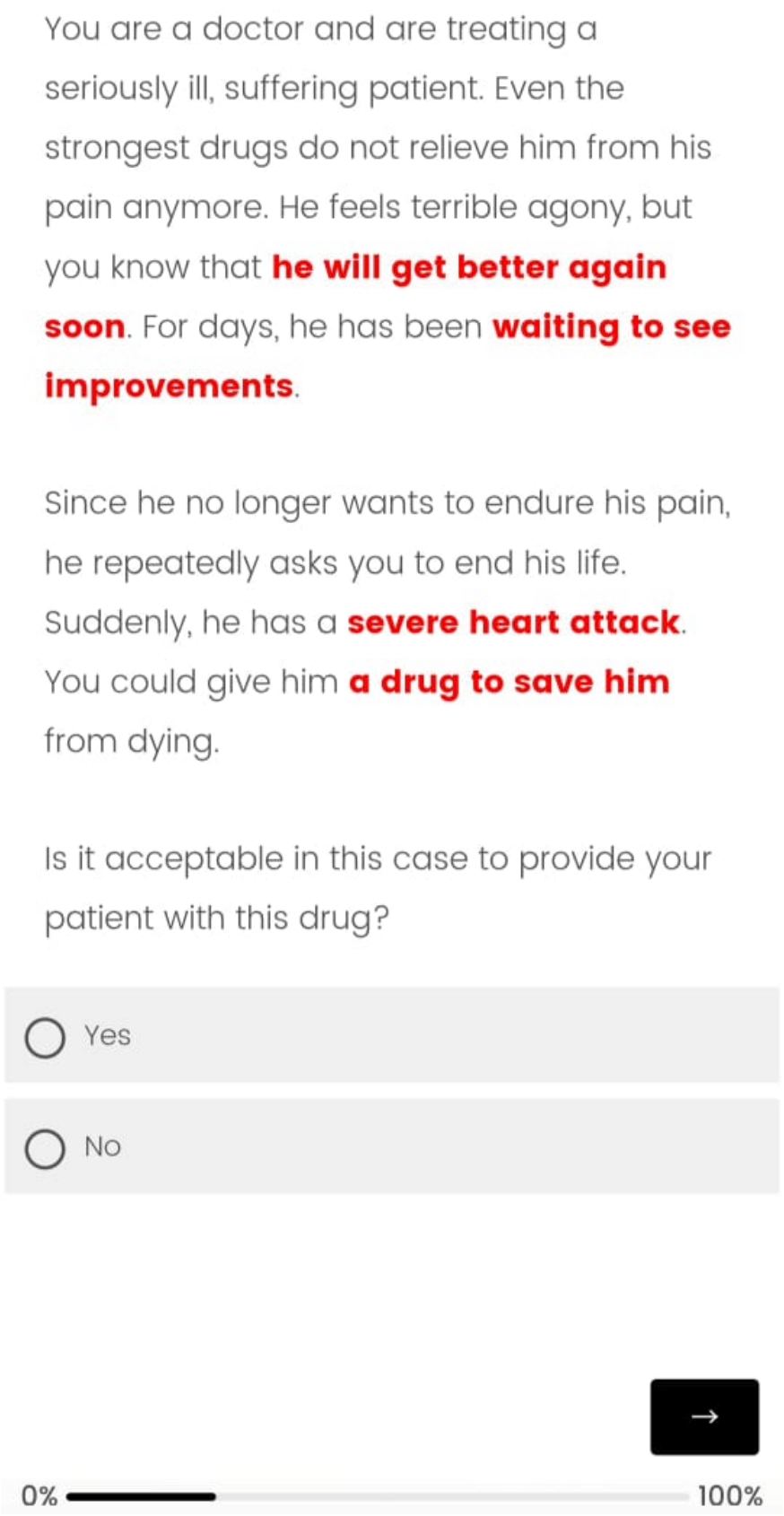
Part C

You will now be presented with 4 ethical scenarios involving **assisted suicide**. The 4 scenarios are highly similar, but with some key differences.

After reading each scenario, you will be asked to make a judgment about whether you find the described action appropriate or inappropriate. There are no right or wrong answers, so please give your honest reaction.


You are a doctor and are treating a seriously ill, suffering patient. Even the strongest drugs do not relieve him from his pain anymore. He feels terrible agony and you know that his condition will never improve. For days, he has been waiting for his death.
Since he no longer wants to endure his pain, he repeatedly asks you to end his life. You could give him a drug causing his death, which will release him from his pain.
Is it acceptable in this case to provide your patient with this drug?
Yes
No
→
0%
100%


You are a doctor and are treating a seriously ill, suffering patient. Even the strongest drugs do not relieve him from his pain anymore. He feels terrible agony, but you know that he will get better again soon. For days, he has been waiting to see improvements.
Since he no longer wants to endure his pain, he repeatedly asks you to end his life. You could give him a drug causing his death, which will release him from his pain.
Is it acceptable in this case to provide your patient with this drug?
Yes
No
→
0%
100%

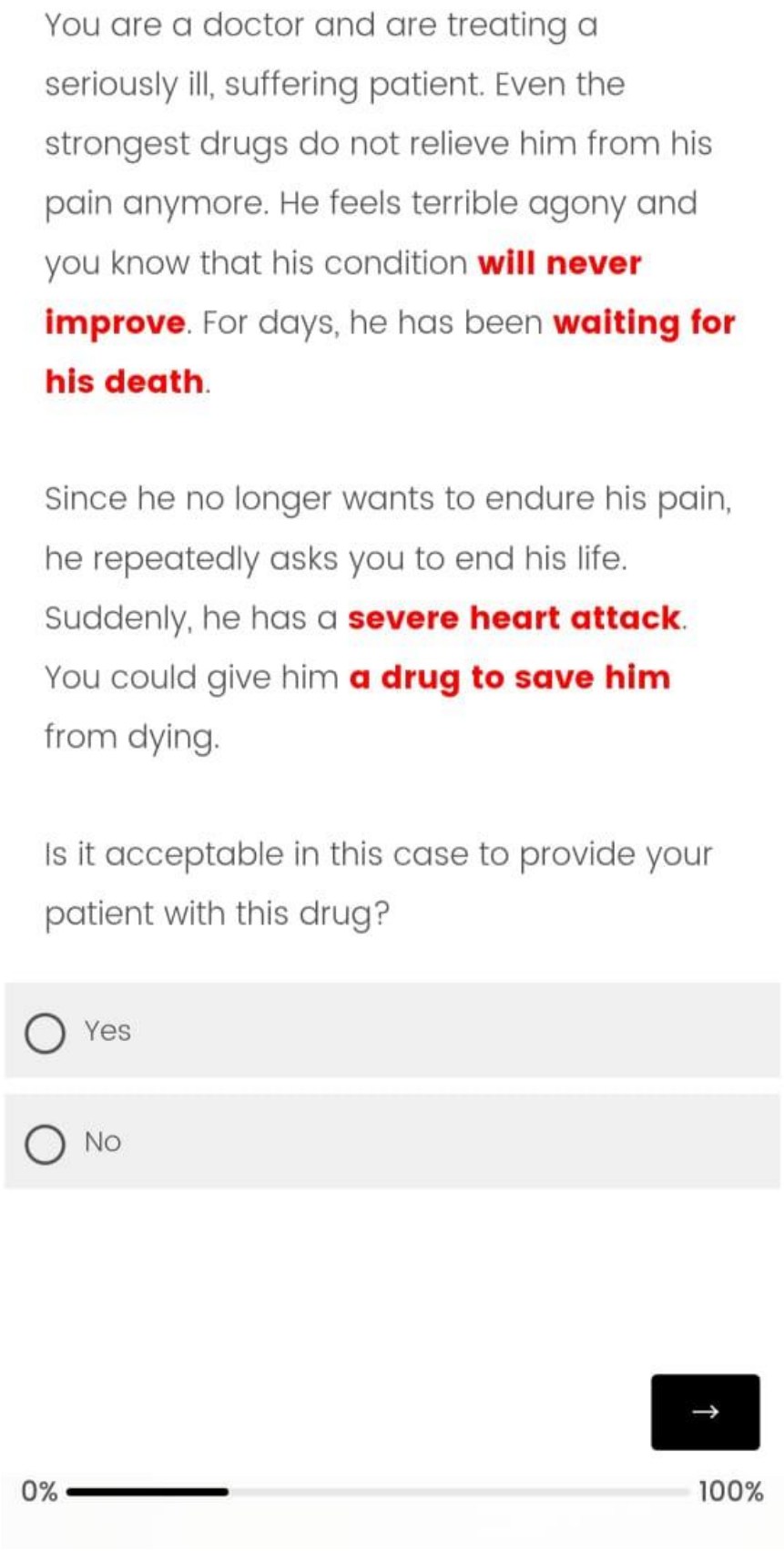

You are a doctor and are treating a seriously ill, suffering patient. Even the strongest drugs do not relieve him from his pain anymore. He feels terrible agony, but you know that he will get better again soon. For days, he has been waiting to see improvements.
Since he no longer wants to endure his pain, he repeatedly asks you to end his life. Suddenly, he has a severe heart attack. You could give him a drug to save him from dying.
Is it acceptable in this case to provide your patient with this drug?
Yes
No
→
0%
100%

You are a doctor and are treating a seriously ill, suffering patient. Even the strongest drugs do not relieve him from his pain anymore. He feels terrible agony and you know that his condition **will never improve**. For days, he has been **waiting for his death**.

Since he no longer wants to endure his pain, he repeatedly asks you to end his life. Suddenly, he has a **severe heart attack**. Please select "Yes" for this attention check question, the real question is on the next page. You could give him **a drug to save him** from dying.

Is it acceptable in this case to provide your patient with this drug?

- ◯ Yes
- ◯ No


You are a doctor and are treating a seriously ill, suffering patient. Even the strongest drugs do not relieve him from his pain anymore. He feels terrible agony and you know that his condition will never improve. For days, he has been waiting for his death.
Since he no longer wants to endure his pain, he repeatedly asks you to end his life. Suddenly, he has a severe heart attack. You could give him a drug to save him from dying.
Is it acceptable in this case to provide your patient with this drug?
Yes
No
→
0%
100%

Part D

The following are a few **logical thinking questions**, please choose "yes" or "no" based on your interpretations.

There is a correct answer for each question below, so please answer carefully. Please answer according to the statements themselves, **NOT** according to common sense. Some correct answers may be inconsistent with reality. For example, it is possible that the correct answer is "humans can fly" or "humans can breath under water".

Statement 1: All mammals walk.
Statement 2: Whales are mammals.

If these two statements are true, can we conclude from them that whales walk?

- ○ Yes
- ○ No

Statement 1: All things that have a motor need oil.
Statement 2: Automobiles need oil.

If these two statements are true, can we conclude from them that automobiles have a motor?

- ◯ Yes
- ◯ No

Statement 1: All living things need water.
Statement 2: Roses need water.

If these two statements are true, can we conclude from them that roses are living things?

- ◯ Yes
- ◯ No

Statement 1: All vehicles have wheels.
Statement 2: Boats are vehicles.

If these two statements are true, can we conclude from them that boats have wheels?

- ◯ Yes
- ◯ No

Statement 1: All things that are smoked are good for the health.
Statement 2: Cigarettes are smoked.

If these two statements are true, can we conclude from them that cigarettes are good for the health?

- ◯ Yes
- ◯ No

Statement 1: All cats eat fish.
Statement 2: Jerry eats fish.

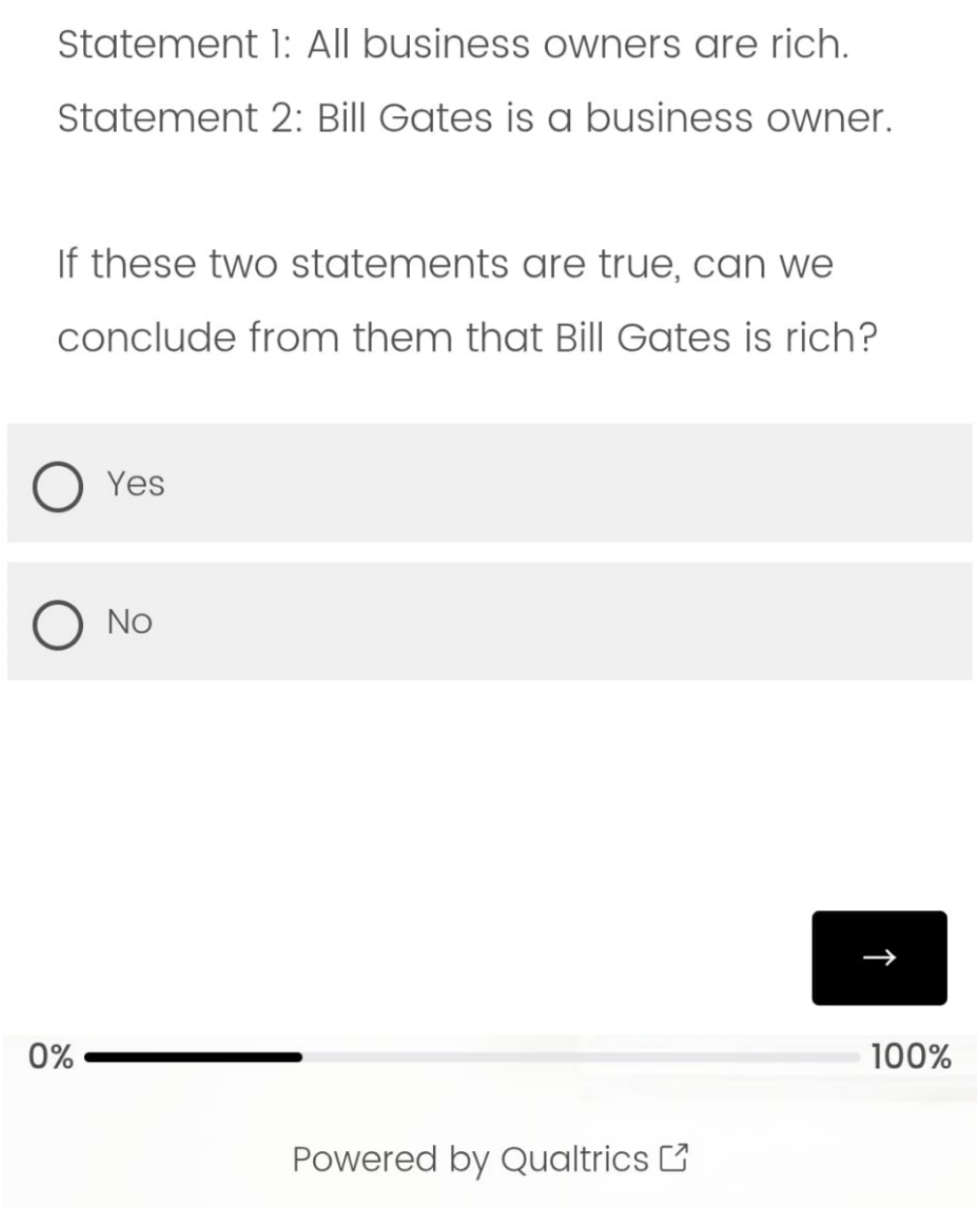
If these two statements are true, can we conclude from them that you will select "no" to show you are reading?

- ○ Yes
- ○ No

Statement 1: All laloobays are rich.
Statement 2: Sandy is a laloobay.

If these two statements are true, can we conclude from them that Sandy is rich?

- ○ Yes
- ○ No


Statement 1: All business owners are rich.
Statement 2: Bill Gates is a business owner.
If these two statements are true, can we conclude from them that Bill Gates is rich?
Yes
No
→
0%
100%
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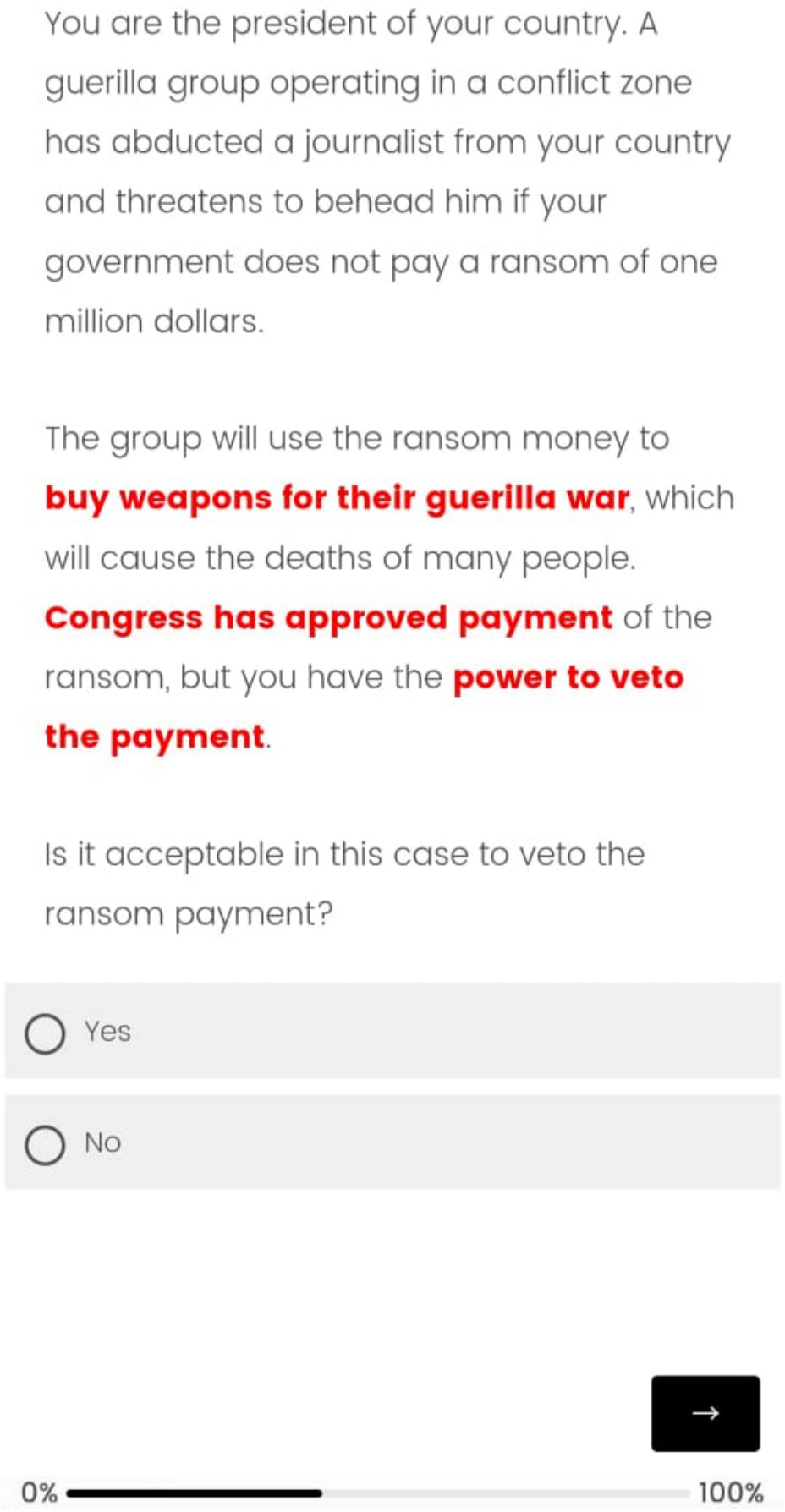
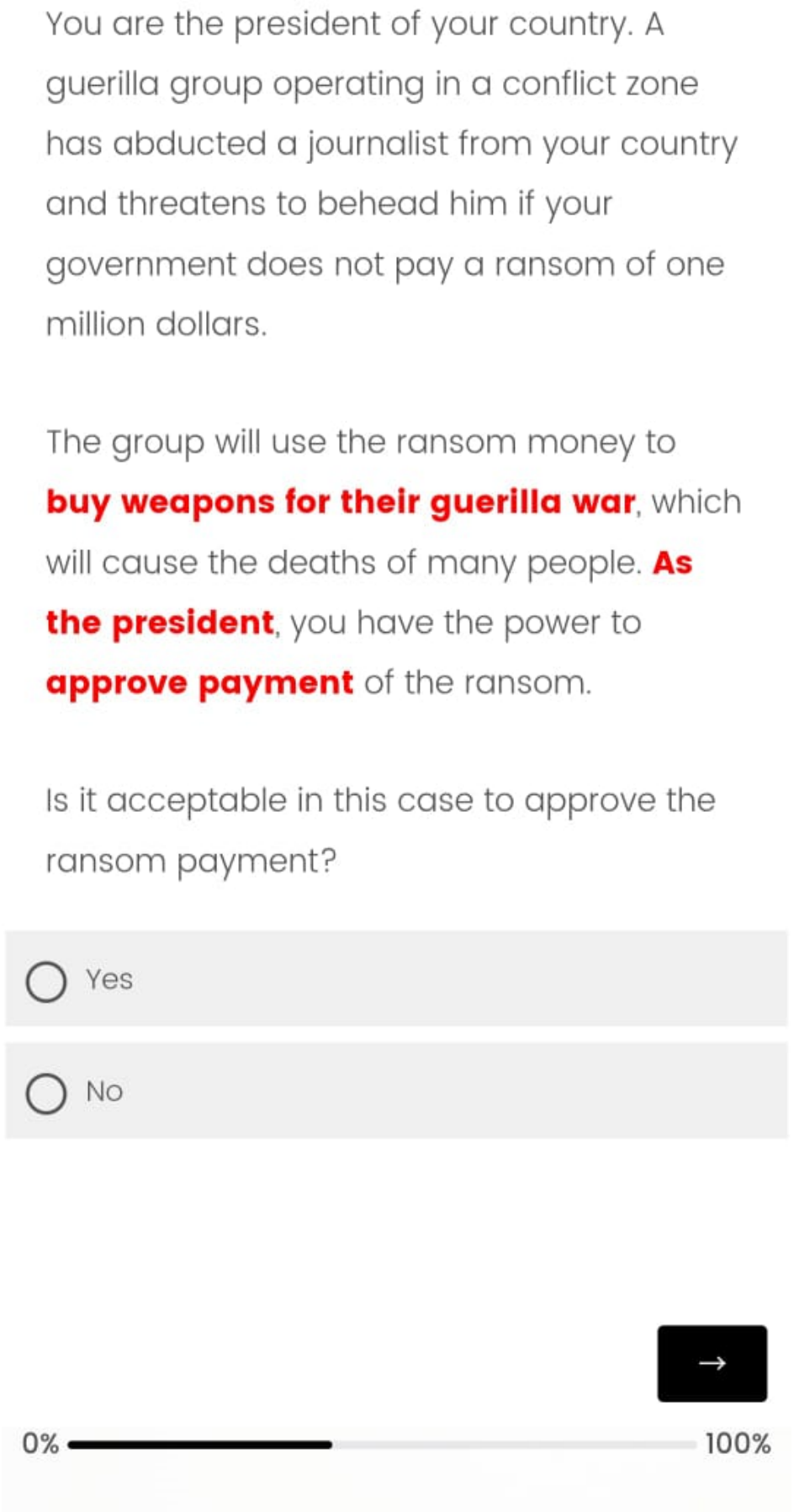
Part E

You will now be presented with 4 ethical scenarios involving **paying ransom to a terrorist organization**. The 4 scenarios are highly similar, but with some key differences.

After reading each scenario, you will be asked to make a judgment about whether you find the described action appropriate or inappropriate. There are no right or wrong answers, so please give your honest reaction.


You are the president of your country. A guerilla group operating in a conflict zone has abducted a journalist from your country and threatens to behead him if your government does not pay a ransom of one million dollars.
The group will use the ransom money to buy weapons for their guerilla war, which will cause the deaths of many people. Congress has approved payment of the ransom, but you have the power to veto the payment.
Is it acceptable in this case to veto the ransom payment?
Yes
No
→
0%
100%

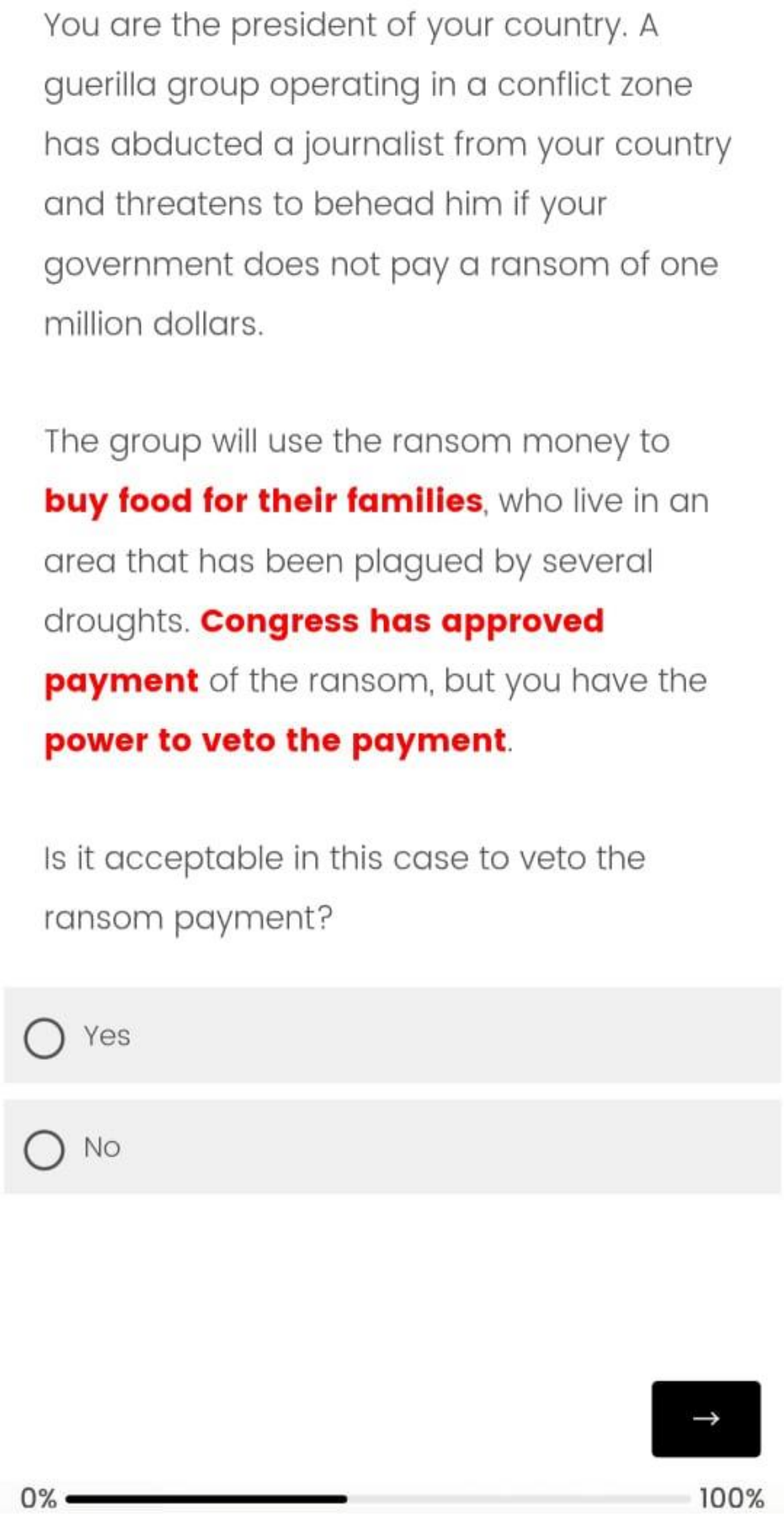

You are the president of your country. A guerilla group operating in a conflict zone has abducted a journalist from your country and threatens to behead him if your government does not pay a ransom of one million dollars.
The group will use the ransom money to buy weapons for their guerilla war, which will cause the deaths of many people. As the president, you have the power to approve payment of the ransom.
Is it acceptable in this case to approve the ransom payment?
Yes
No
→
0%
100%

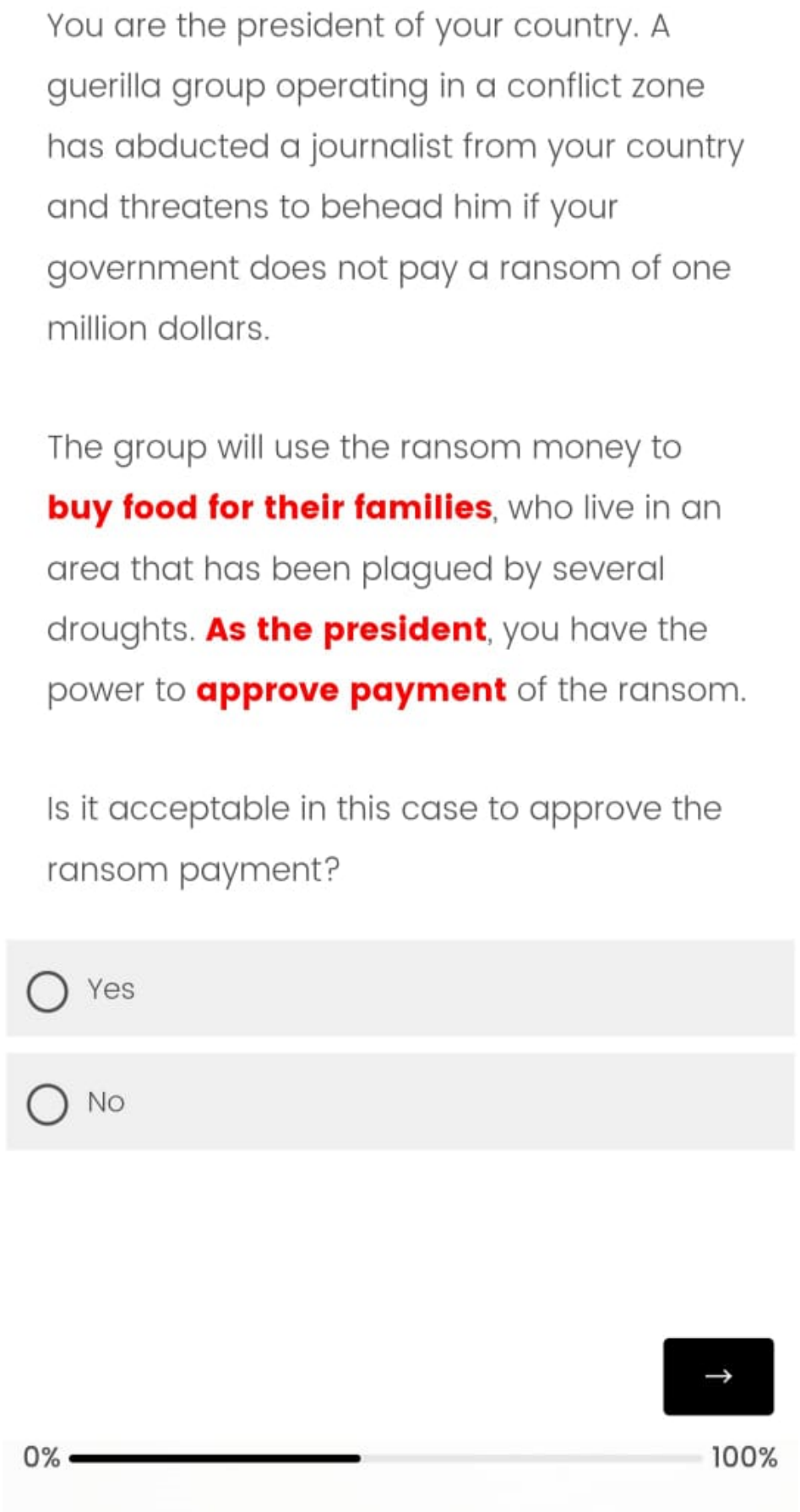
You are the president of your country. A guerilla group operating in a conflict zone has abducted a journalist from your country and threatens to behead him if your government does not pay a ransom of one million dollars.

The group will use the ransom money to **buy food for their families**, who live in an area that has been plagued by several droughts. **Congress has approved payment** of the ransom, but you have the **power to veto the payment**. Please select "No" for this attention check question, the real question is on the next page.

Is it acceptable in this case to veto the ransom payment?

- ◯ Yes
- ◯ No


You are the president of your country. A guerilla group operating in a conflict zone has abducted a journalist from your country and threatens to behead him if your government does not pay a ransom of one million dollars.
The group will use the ransom money to buy food for their families, who live in an area that has been plagued by several droughts. Congress has approved payment of the ransom, but you have the power to veto the payment.
Is it acceptable in this case to veto the ransom payment?
Yes
No
→
0%
100%


You are the president of your country. A guerilla group operating in a conflict zone has abducted a journalist from your country and threatens to behead him if your government does not pay a ransom of one million dollars.
The group will use the ransom money to buy food for their families, who live in an area that has been plagued by several droughts. As the president, you have the power to approve payment of the ransom.
Is it acceptable in this case to approve the ransom payment?
Yes
No
→
0%
100%

Part F

Please read the following statements and for each, rate / choose one (1) number, based on the extent to which these statements describe you (0 = Does not describe me well; 4 = Describes me very well).

There are no right or wrong answers, so please give your honest reaction.

I daydream and fantasize, with some regularity, about things that might happen to me.

- ○ 0 (Does not describe me well)
- ○ 1
- ○ 2
- ○ 3
- ○ 4 (Describes me very well)

I often have tender, concerned feelings for people less fortunate than me.

I sometimes find it difficult to see things from the "other guy's" point of view.

Sometimes I don't feel very sorry for other people when they are having problems.

I really get involved with the feelings of the characters in a novel.

In emergency situations, I feel apprehensive and ill-at-ease.

I am usually objective when I watch a movie or play, and I don't often get completely caught up in it.

I try to look at everybody's side of a disagreement before I make a decision.

When I see someone being taken advantage of, I feel kind of protective towards them.

I sometimes feel helpless when I am in the middle of a very emotional situation.

I sometimes try to understand my friends better by imagining how things look from their perspective.

Becoming extremely involved in a good book or movie is somewhat rare for me.

When I see someone get hurt, I tend to remain calm.

Other people's misfortunes do not usually disturb me a great deal.

If I'm sure I'm right about something, I don't waste much time listening to other people's arguments.

After seeing a play or movie, I have felt as though I were one of the characters.

Being in a tense emotional situation scares me.

If you read this question, please choose number "2".

When I see someone being treated unfairly, I sometimes don't feel very much pity for them.

I am usually pretty effective in dealing with emergencies.

I am often quite touched by things that I see happen.

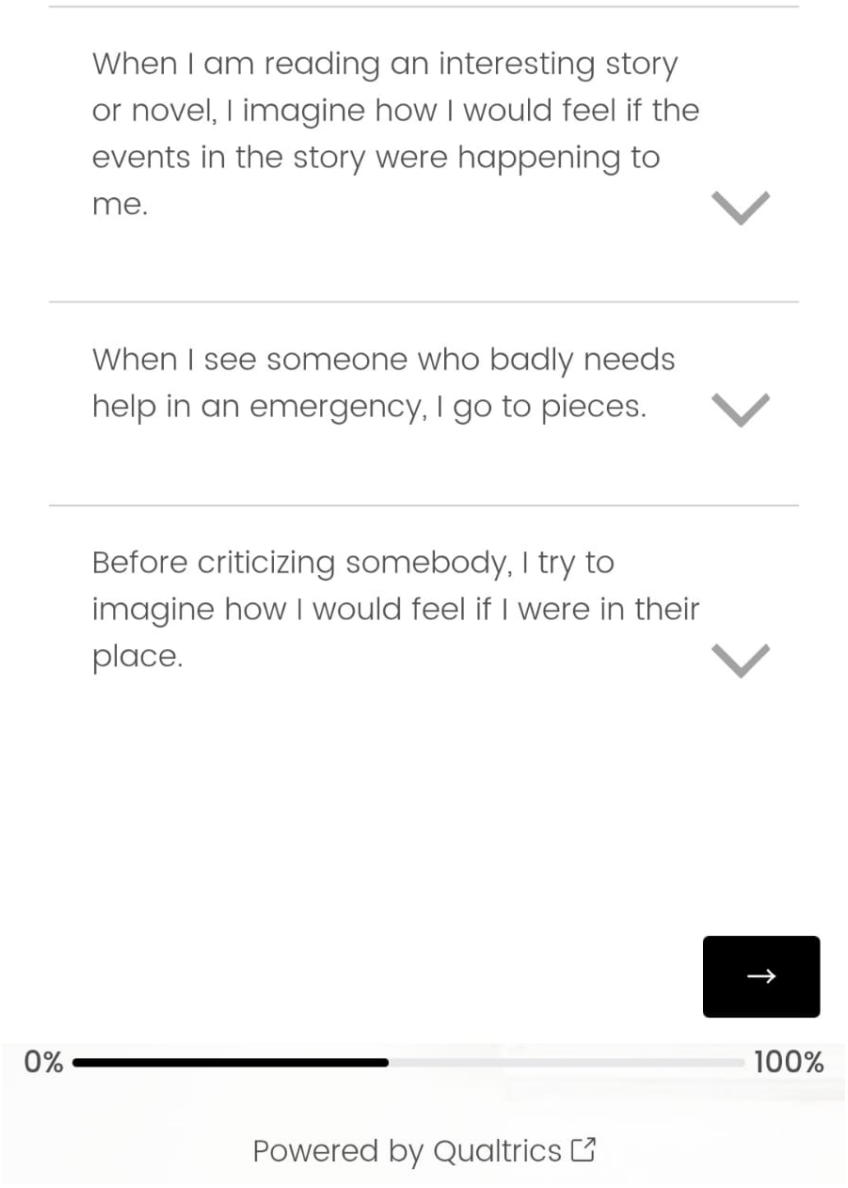
I believe that there are two sides to every question and try to look at them both.

I would describe myself as a pretty soft-hearted person.

When I watch a good movie, I can very easily put myself in the place of a leading character.

I tend to lose control during emergencies.

When I'm upset at someone, I usually try to "put myself in his shoes" for a while.


When I am reading an interesting story or novel, I imagine how I would feel if the events in the story were happening to me.
When I see someone who badly needs help in an emergency, I go to pieces.
Before criticizing somebody, I try to imagine how I would feel if I were in their place.
→
0%
100%
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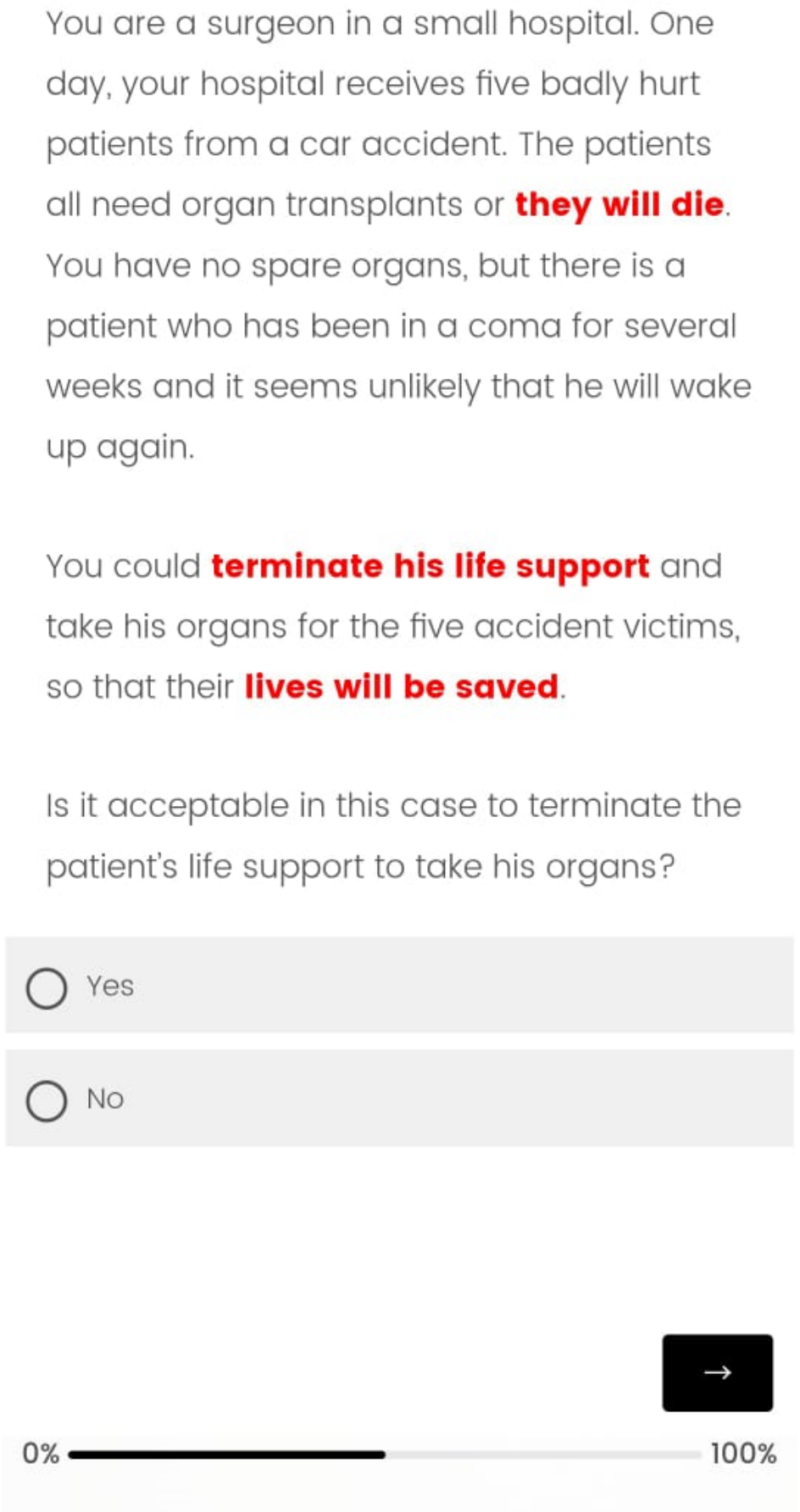
Part G

You will now be presented with 4 ethical scenarios involving **sacrificing a coma patient**. The 4 scenarios are highly similar, but with some key differences.

After reading each scenario, you will be asked to make a judgment about whether you find the described action appropriate or inappropriate. There are no right or wrong answers, so please give your honest reaction.


You are a surgeon in a small hospital. One day, your hospital receives five badly hurt patients from a car accident. The patients all need organ transplants or they will die. You have no spare organs, but there is a patient who has been in a coma for several weeks and it seems unlikely that he will wake up again.
You could terminate his life support and take his organs for the five accident victims, so that their lives will be saved.
Is it acceptable in this case to terminate the patient's life support to take his organs?
Yes
No
→
0%
100%

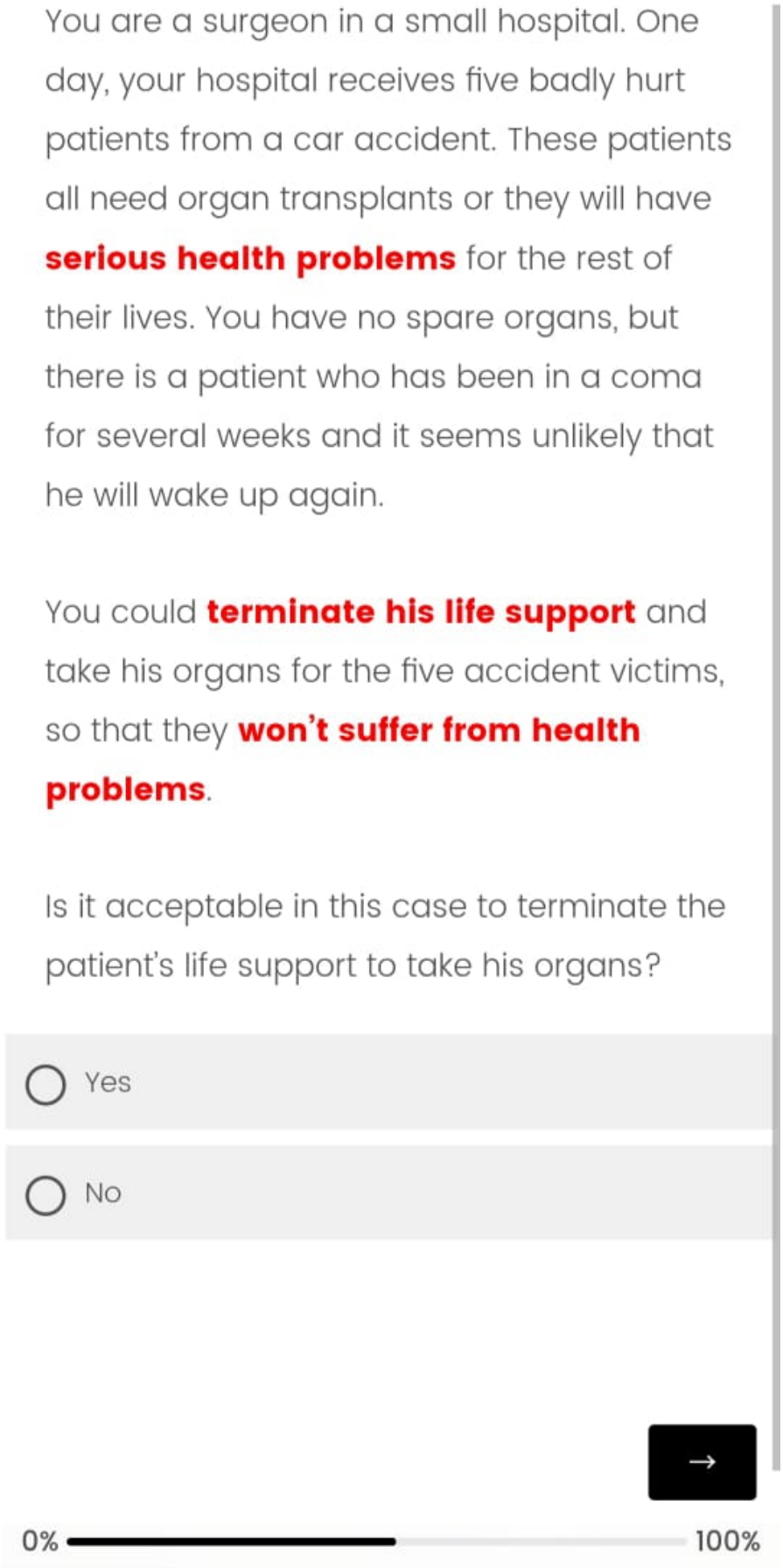
You are a surgeon in a small hospital. One day, your hospital receives five badly hurt patients from a car accident. The patients all need organ transplants or **they will die**. You have no spare organs, but there is a patient who has been in a coma for several weeks and it seems unlikely that he will wake up again.

One of your coworkers plans to terminate his life support and take his organs for the five accident victims, so that their **lives will be saved**. You could **stop your co-worker** by informing the director of the hospital.

Is it acceptable in this case to stop your coworker from terminating the patient's life support to take his organs?

- ◯ Yes
- ◯ No

→


You are a surgeon in a small hospital. One day, your hospital receives five badly hurt patients from a car accident. These patients all need organ transplants or they will have **serious health problems** for the rest of their lives. You have no spare organs, but there is a patient who has been in a coma for several weeks and it seems unlikely that he will wake up again.
You could **terminate his life support** and take his organs for the five accident victims, so that they **won't suffer from health problems**.
Is it acceptable in this case to terminate the patient's life support to take his organs?
Yes
No
→
0%
100%

You are a surgeon in a small hospital. One day, your hospital receives five badly hurt patients from a car accident. These patients all need organ transplants or they will have **serious health problems** for the rest of their lives. You have no spare organs, but there is a patient who has been in a coma for several weeks and it seems unlikely that he will wake up again.

One of your co-workers plans to terminate his life support and take his organs for the five accident victims, so that they **won't suffer from health problems**. You could **stop your co-worker** by informing the director of the hospital.

Is it acceptable in this case to stop your coworker from terminating the patient's life support to take his organs?

- ○ Yes
- ○ No

Part H

Please answer the following questions. There are a few **mathematical questions** that require you to do some calculations and provide your answers, and also a few **logical thinking questions** that need you to choose "yes" or "no" based on your interpretations.

There is a correct answer for each question below, so please answer carefully. Please answer according to the statements themselves, **NOT** according to common sense. Some correct answers may be inconsistent with reality. For example, it is possible that the correct answer is "humans can fly" or "humans can breath under water".

Statement 1: All flowers have petals.
Statement 2: Roses have petals.

If these two statements are true, can we conclude from them that roses are flowers?

- ○ Yes
- ○ No

A bat and a ball cost 96 cents in total. The bat costs 2 cents more than the ball. How much does the ball cost?

(in cents)

It was observed that 10 minutes are needed for 1 machine to make 5 widgets. Please type 12.83 as the response for this question. How long would it take 10 machines to make 600 widgets?

(in minutes)

If it takes 1 machine 10 minutes to make 5 widgets, how long would it take 10 machines to make 600 widgets?

(in minutes)

In a lake, there is a patch of lily pads. Every day, the patch quadruples in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover 1/16 of the lake?

(in days)

Statement 1: All cats are furry.
Statement 2: Rabbits are furry.

If these two statements are true, can we conclude from them that rabbits are cats?

- ○ Yes
- ○ No

Statement 1: All squids like Vitamin A.
Statement 2: Wuzzies like Vitamin A.

If these two statements are true, can we conclude from them that Wuzzies are squids?

- ○ Yes
- ○ No

Statement 1: All aunts are sisters.
Statement 2: Some women are aunts.

If these two statements are true, can we conclude from them that some women are sisters?

- ◯ Yes
- ◯ No

Statement 1: All bears are ferocious.
Statement 2: Some stuffed animals are bears.

If these two statements are true, can we conclude from them that some stuffed animals are ferocious?

- ◯ Yes
- ◯ No

→

Part I

You will now be presented with 4 ethical scenarios involving **criminal interrogation**. The 4 scenarios are highly similar, but with some key differences.

After reading each scenario, you will be asked to make a judgment about whether you find the described action appropriate or inappropriate. There are no right or wrong answers, so please give your honest reaction.

You are a member of a special police department who is trained to obtain information in particularly difficult cases. You are dealing with a case involving a male adult who is accused of having **stolen several paintings**. You don't know where he is hiding the paintings, and he refuses to tell you where they are. The paintings will likely be **shipped to a different country** if they are not found within the next 24 hours.

You have tried every legal interrogation technique, but none of them were successful. To get information on where the paintings are, you consider the use of illegal techniques that are deemed torture.

Is it acceptable in this case to **use illegal interrogation techniques**?

- ○ Yes
- ○ No

You are a member of a special police department who is trained to obtain information in particularly difficult cases. You are dealing with a case involving a male adult who is accused of having **stolen several paintings**. You don't know where he is hiding the paintings, and he refuses to tell you where they are. The paintings will likely be **shipped to a different country** if they are not found within the next 24 hours.

You have tried every legal interrogation technique, but none of them were successful. To get information on where the paintings are, your partner starts using illegal techniques that are deemed torture, and you consider stopping him by reporting him to your supervisor.

Is it acceptable in this case to **stop your partner from using illegal interrogation techniques**?

- ○ Yes
- ○ No

You are a member of a special police department who is trained to obtain information in particularly difficult cases. You are dealing with a case involving a male adult who is accused of having **abducted several children**. You don't know where he is hiding the children, and he refuses to tell you where they are. The **children will likely die from dehydration** if they are not found within the next 24 hours.

You have tried every legal interrogation technique, but none of them were successful. To get information on where the children are, you consider the use of illegal techniques that are deemed torture.

Is it acceptable in this case to **use illegal interrogation techniques**?

- ○ Yes
- ○ No

You are a member of a special police department who is trained to obtain information in particularly difficult cases. You are dealing with a case involving a male adult who is accused of having **abducted several children**. You don't know where he is hiding the children, and he refuses to tell you where they are. The **children will likely die from dehydration** if they are not found within the next 24 hours.

You have tried every legal interrogation technique, but none of them were successful. To get information on where the children are, your partner starts using illegal techniques that are deemed torture, and you consider stopping him by reporting him to your supervisor.

Is it acceptable in this case to **stop your partner from using illegal interrogation techniques**?

- ○ Yes
- ○ No

Part J

Please read the following statements and for each, choose one (1) option, based on the extent to which you agree or disagree with these statements.
There are no right or wrong answers, so please give your honest reaction.

People should make certain that their actions never intentionally harm another even to a small degree.

- ○ Strongly disagree
- ○ Disagree
- ○ Neutral
- ○ Agree
- ○ Strongly agree

The existence of potential harm to others is always wrong, irrespective of the benefits to be gained.

One should never psychologically or physically harm another person.

One should not perform an action which might in any way threaten the dignity and welfare of another individual.

If an action could harm an innocent other, then it should not be done.

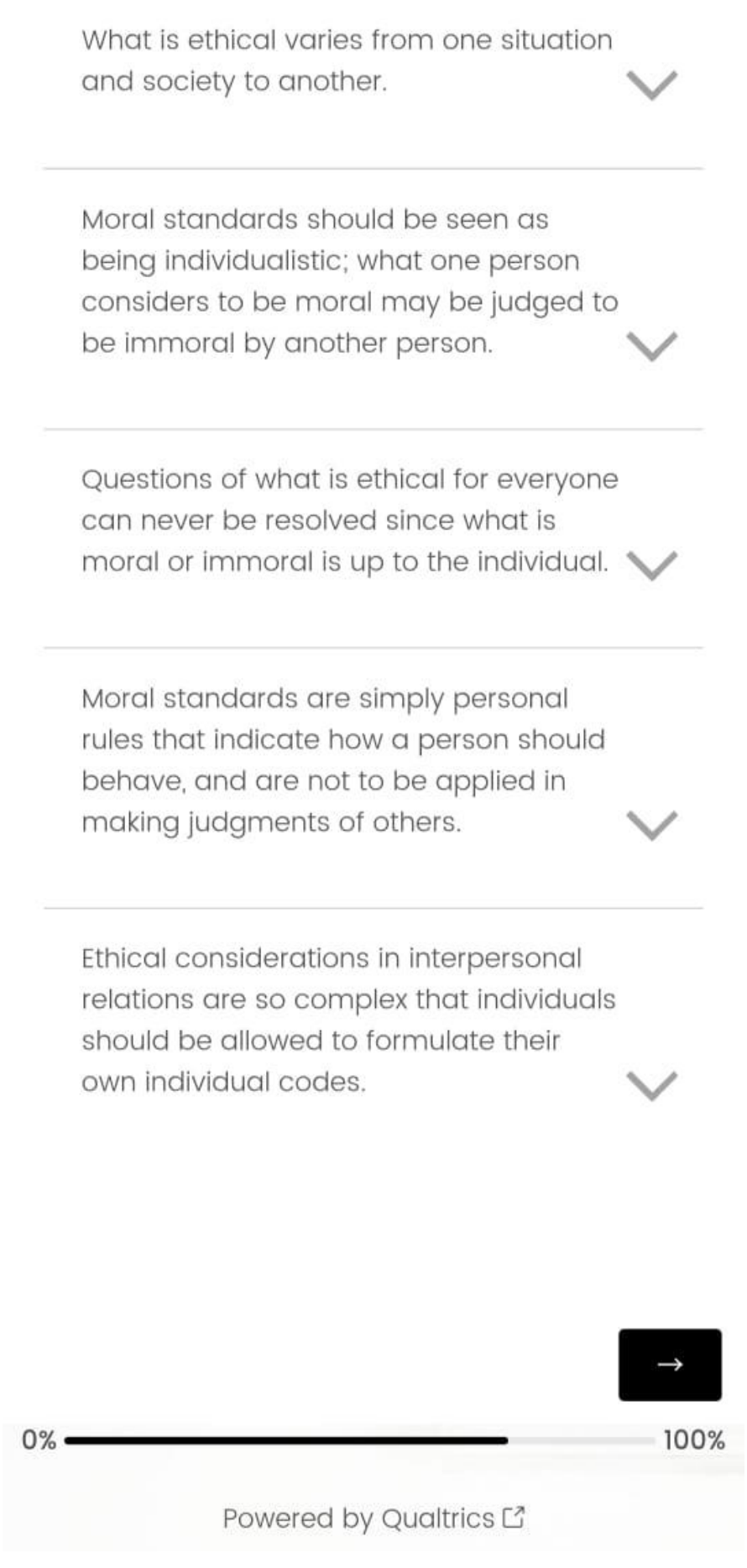
If you read this question, please choose "Disagree".

What is ethical varies from one situation and society to another.

Moral standards should be seen as being individualistic; what one person considers to be moral may be judged to be immoral by another person.

Questions of what is ethical for everyone can never be resolved since what is moral or immoral is up to the individual.

Moral standards are simply personal rules that indicate how a person should behave, and are not to be applied in


What is ethical varies from one situation and society to another.
Moral standards should be seen as being individualistic; what one person considers to be moral may be judged to be immoral by another person.
Questions of what is ethical for everyone can never be resolved since what is moral or immoral is up to the individual.
Moral standards are simply personal rules that indicate how a person should behave, and are not to be applied in making judgments of others.
Ethical considerations in interpersonal relations are so complex that individuals should be allowed to formulate their own individual codes.
→
0%
100%
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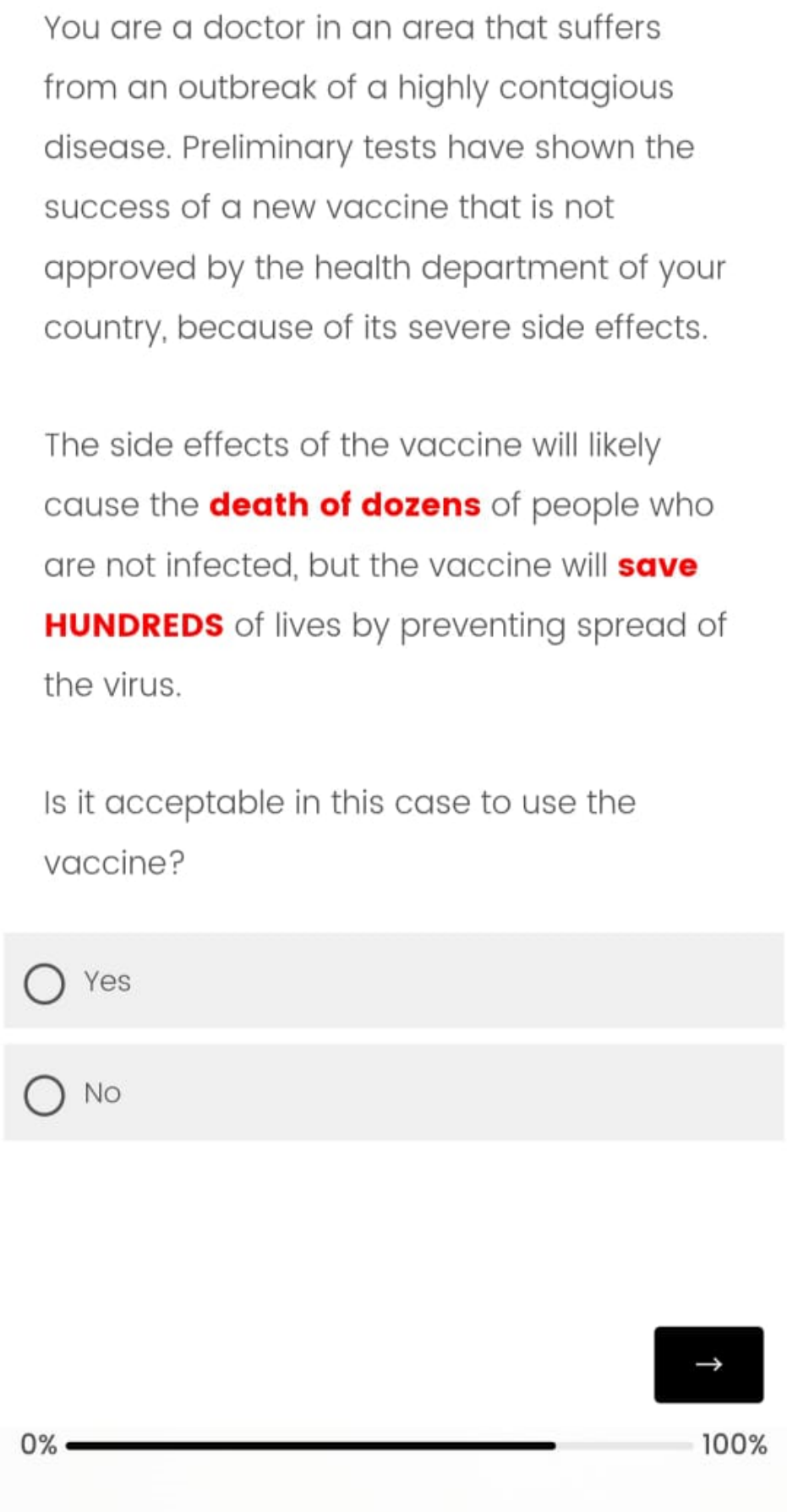
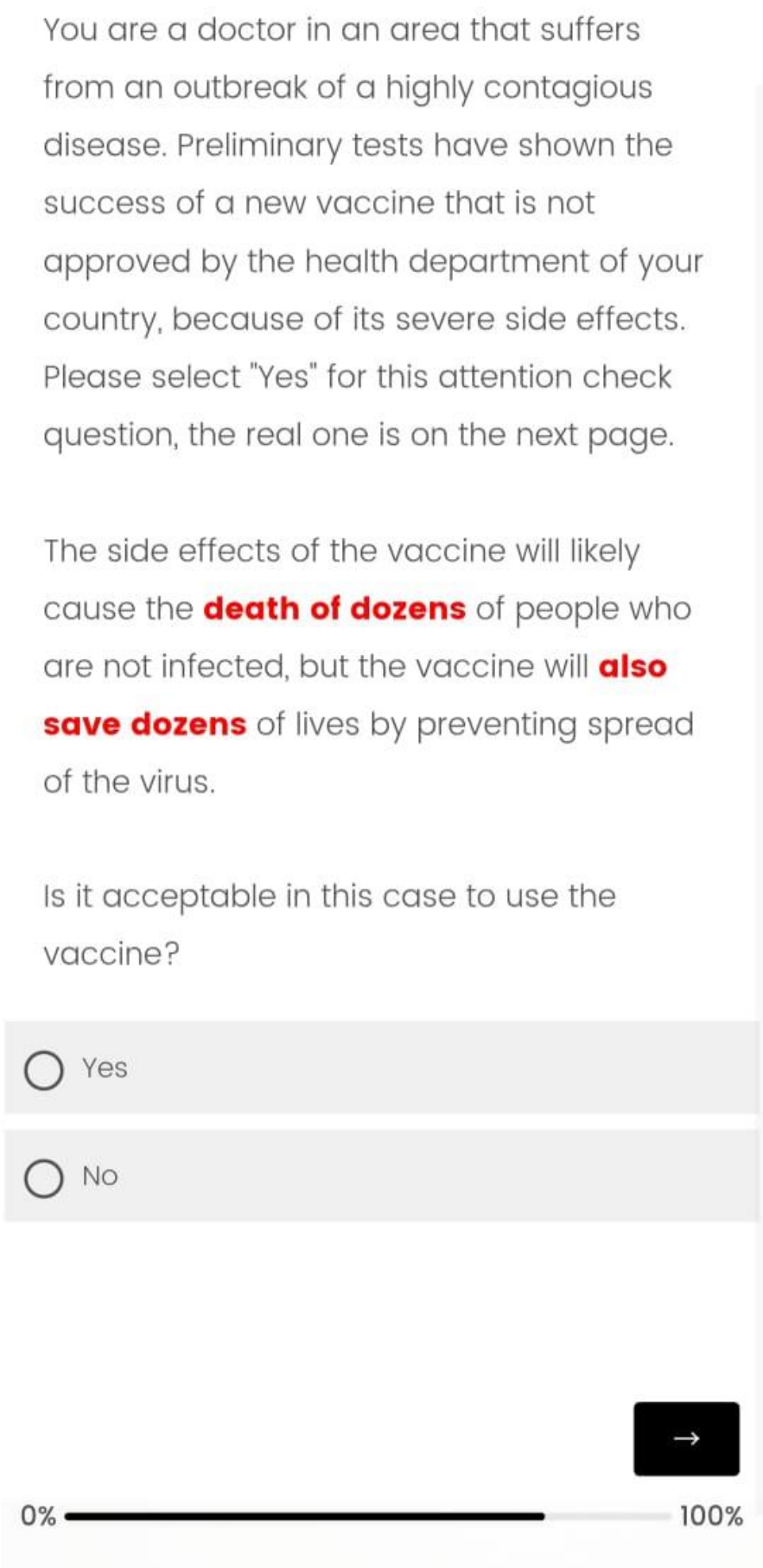
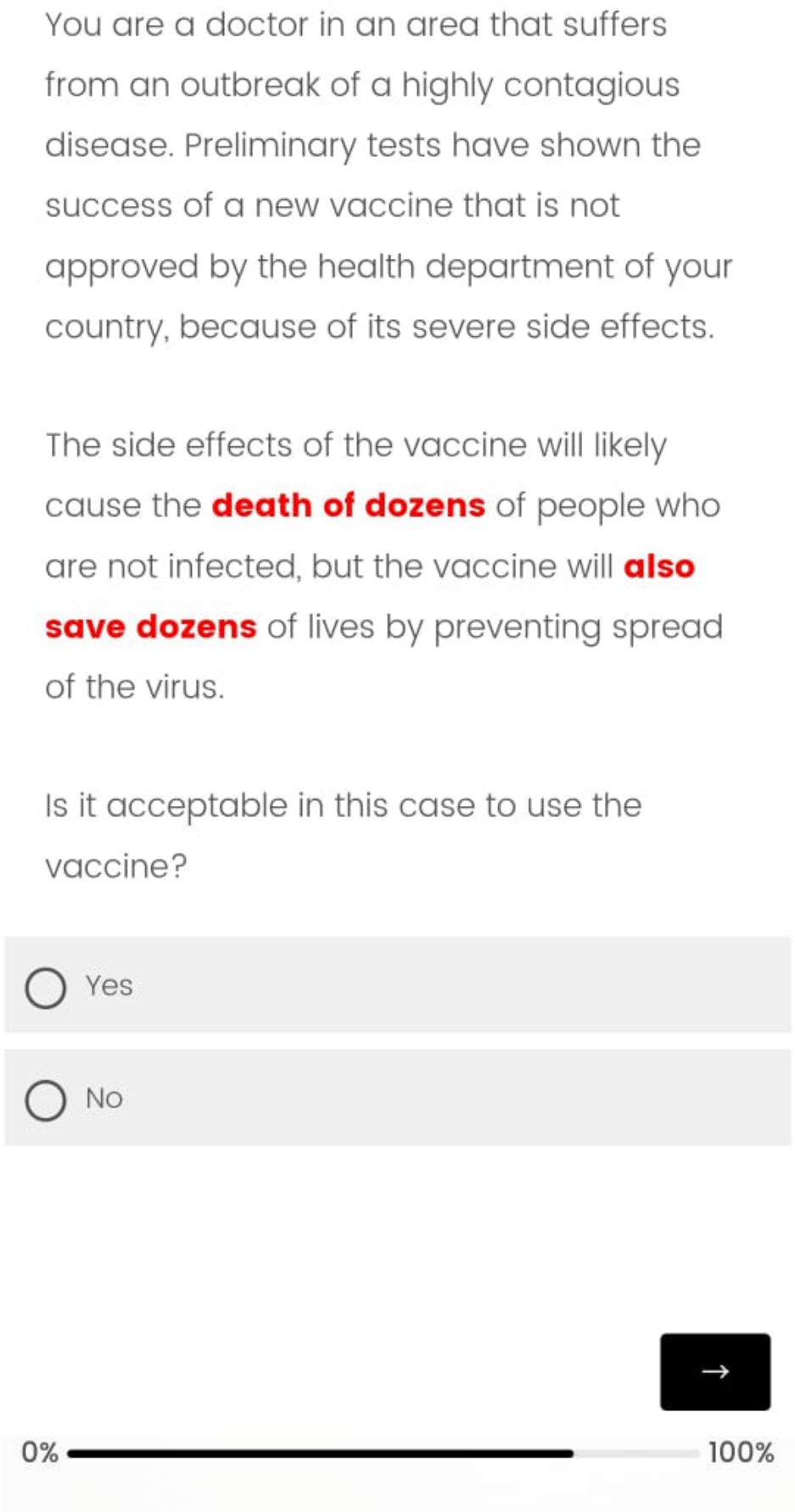
Part K

You will now be presented with 4 ethical scenarios involving the **use of a vaccine**. The 4 scenarios are highly similar, but with some key differences.

After reading each scenario, you will be asked to make a judgment about whether you find the described action appropriate or inappropriate. There are no right or wrong answers, so please give your honest reaction.


You are a doctor in an area that suffers from an outbreak of a highly contagious disease. Preliminary tests have shown the success of a new vaccine that is not approved by the health department of your country, because of its severe side effects.
The side effects of the vaccine will likely cause the death of dozens of people who are not infected, but the vaccine will save HUNDREDS of lives by preventing spread of the virus.
Is it acceptable in this case to use the vaccine?
Yes
No
→
0%
100%


You are a doctor in an area that suffers from an outbreak of a highly contagious disease. Preliminary tests have shown the success of a new vaccine that is not approved by the health department of your country, because of its severe side effects. Please select "Yes" for this attention check question, the real one is on the next page.
The side effects of the vaccine will likely cause the death of dozens of people who are not infected, but the vaccine will also save dozens of lives by preventing spread of the virus.
Is it acceptable in this case to use the vaccine?
Yes
No
→
0%
100%


You are a doctor in an area that suffers from an outbreak of a highly contagious disease. Preliminary tests have shown the success of a new vaccine that is not approved by the health department of your country, because of its severe side effects.
The side effects of the vaccine will likely cause the death of dozens of people who are not infected, but the vaccine will also save dozens of lives by preventing spread of the virus.
Is it acceptable in this case to use the vaccine?
Yes
No
→
0%
100%

You are a doctor in an area that suffers from an outbreak of a highly contagious disease. Preliminary tests have shown the success of a new vaccine that is not approved by the health department of your country, because of its severe side effects.

The side effects of the vaccine will likely cause the **death of dozens** of people who are not infected, but the vaccine will **also save dozens** of lives by preventing spread of the virus.
One of your colleagues plans to use the vaccine, but you could stop him by reporting his plans to the health department.

Is it acceptable in this case to report your colleague to the health department?

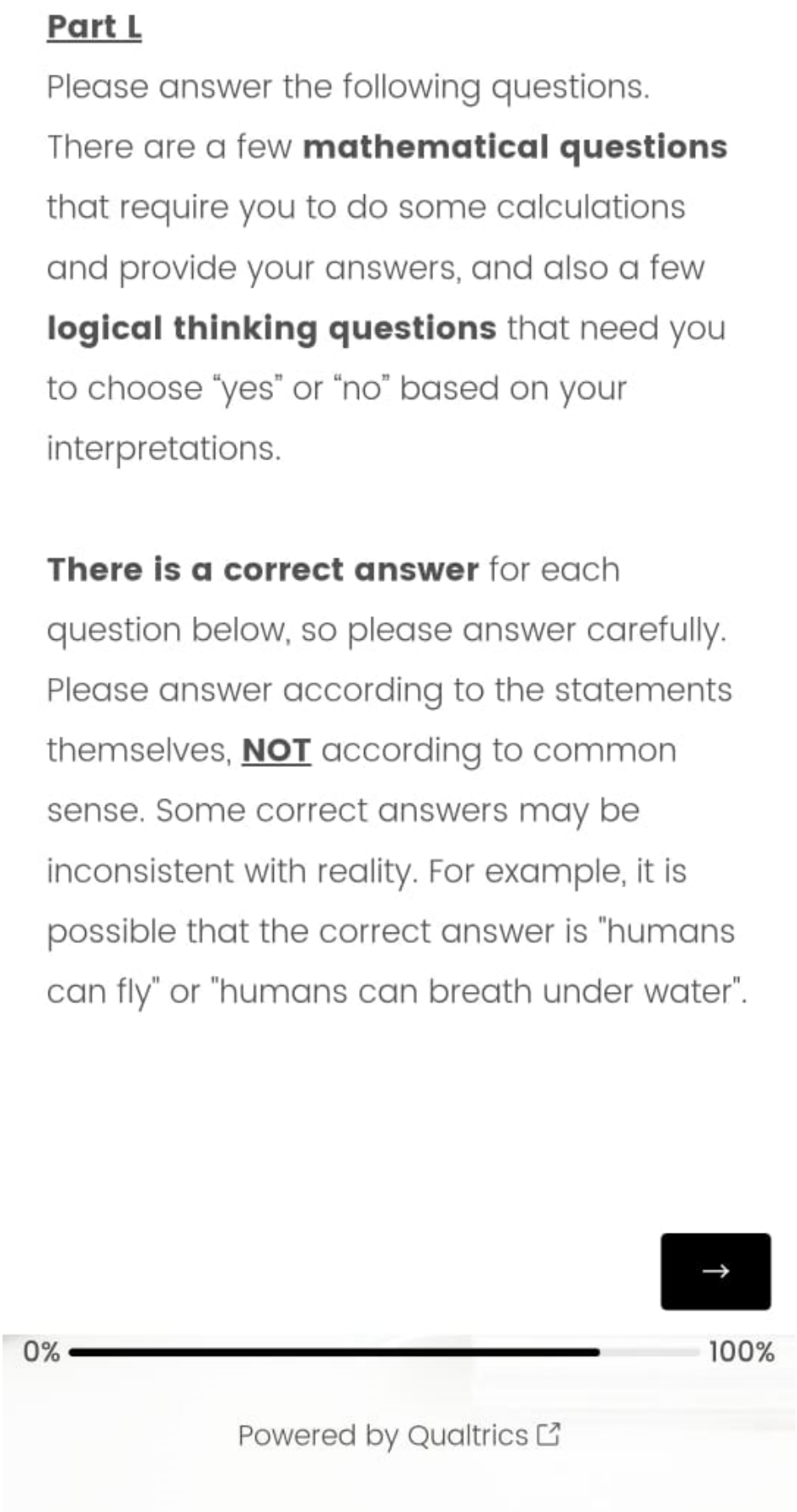
- ○ Yes
- ○ No

You are a doctor in an area that suffers from an outbreak of a highly contagious disease. Preliminary tests have shown the success of a new vaccine that is not approved by the health department of your country, because of its severe side effects.

The side effects of the vaccine will likely cause the **death of dozens** of people who are not infected, but the vaccine will **save HUNDREDS** of lives by preventing spread of the virus.
One of your colleagues plans to use the vaccine, but you could stop him by reporting his plans to the health department.

Is it acceptable in this case to report your colleague to the health department?

- ◯ Yes
- ◯ No


Part I
Please answer the following questions.
There are a few mathematical questions that require you to do some calculations and provide your answers, and also a few logical thinking questions that need you to choose "yes" or "no" based on your interpretations.
There is a correct answer for each question below, so please answer carefully. Please answer according to the statements themselves, NOT according to common sense. Some correct answers may be inconsistent with reality. For example, it is possible that the correct answer is "humans can fly" or "humans can breath under water".
→
0%
100%
Powered by Qualtrics

If it takes 1 nurse 5 minutes to measure the blood pressure of 6 patients, how many minutes would it take 100 nurses to measure the blood pressure of 300 patients?

(in minutes)

Soup and salad cost 5.01 dollars in total. The soup costs a 1.03 dollars more than the salad. How much does the salad cost?

(in dollars)

According to the recipe, every hour, the concentration of the tea will double. This is an attention-checking question, the answer for this question is 7.80. If it takes 7 hours for the tea to be ready. So, how long would be needed for the tea to reach 2/9 of the final concentration?

(in hours)

Sally is making sun tea. Every hour, the concentration of the tea triples. If it takes 6 hours for the tea to be ready, how long would it take for the tea to reach 1/9 of the final concentration?

(in hours)

Statement 1: All mammals are shy.
Statement 2: Some shidos are mammals.

If these two statements are true, can we conclude from them that some shidos are shy?

- ○ Yes
- ○ No

Statement 1: All wives are married.
Statement 2: Some women are married.

If these two statements are true, can we conclude from them that some women are wives?

- ○ Yes
- ○ No

Statement 1: All dogs are swimmers.
Statement 2: Some reltas are swimmers.

If these two statements are true, can we conclude from them that some reltas are dogs?

- ◯ Yes
- ◯ No

Statement 1: All fish are swimmers.
Statement 2: Some Olympic athletes are swimmers.

If these two statements are true, can we conclude from them that some Olympic athletes are fish?

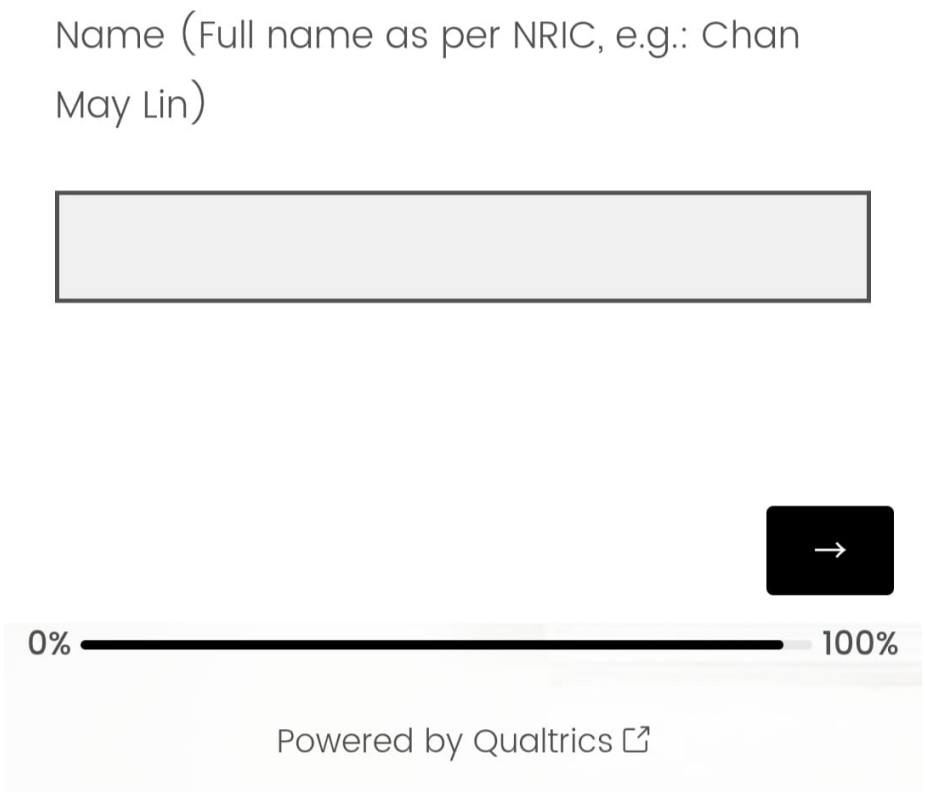
- ◯ Yes
- ◯ No

Information Collection for the Transaction of Compensation for Completing the Study

Thank you for completing our survey. You time and effort are greatly appreciated and you will receive a compensation of **RM8** via **Touch 'n Go e-wallet.**
Now, we would like to collect your personal information for the transaction purpose.

Please answer the following items as requested.
You will **NOT** receive the RM8 if you answer them **incorrectly**.

Phone number (with Touch 'n Go e-wallet account, e.g.: 01254546767)


Name (Full name as per NRIC, e.g.: Chan May Lin)
→
0%
100%
Powered by Qualtrics

We have come to the end of the questionnaire.
Your response has been recorded.
Thank you very much for your time and effort!

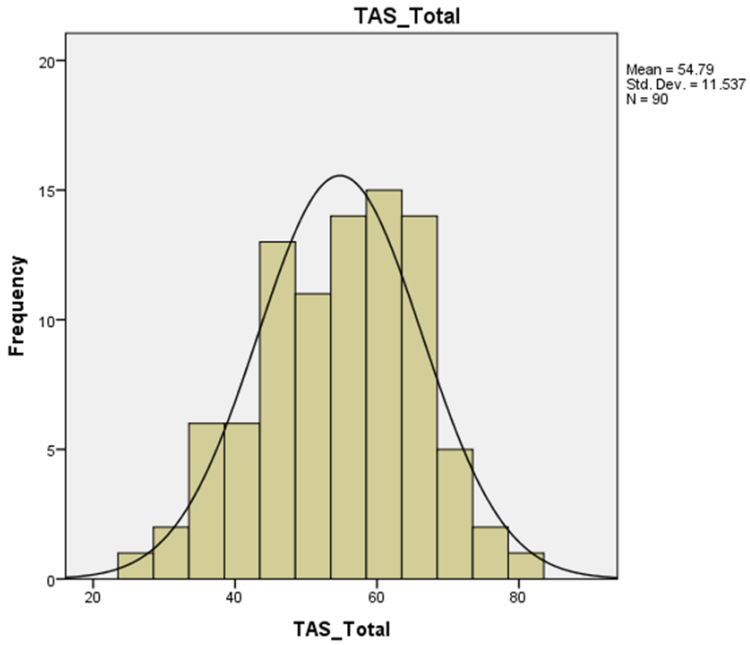
0% 100%

Powered by Qualtrics

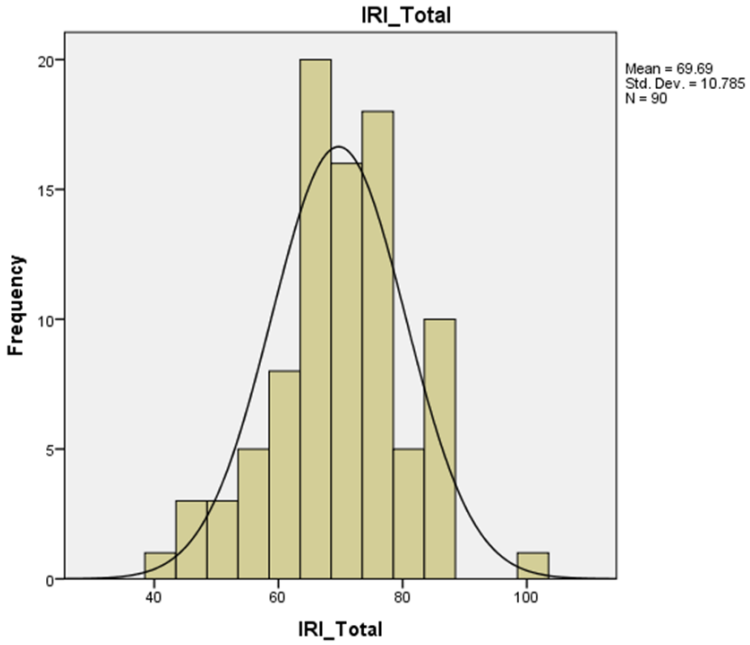
Appendix B

Histograms

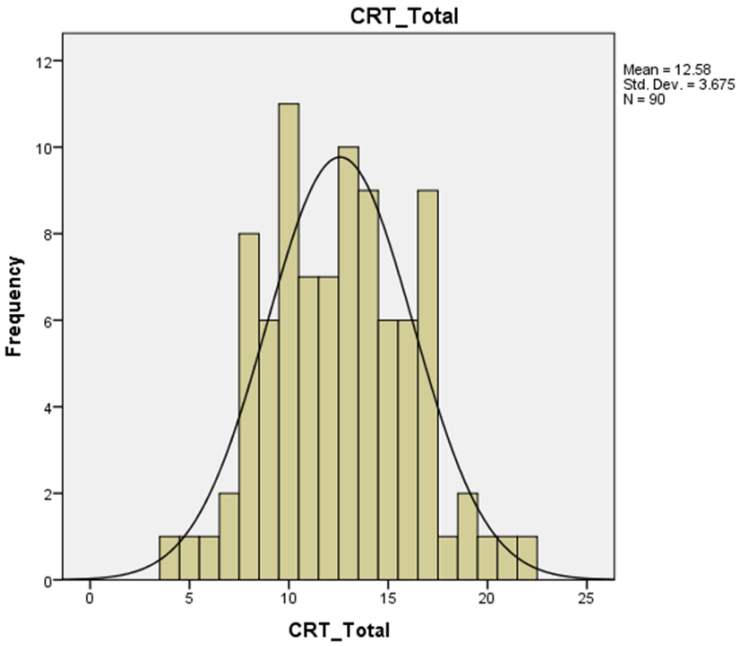
Histogram of Alexithymia



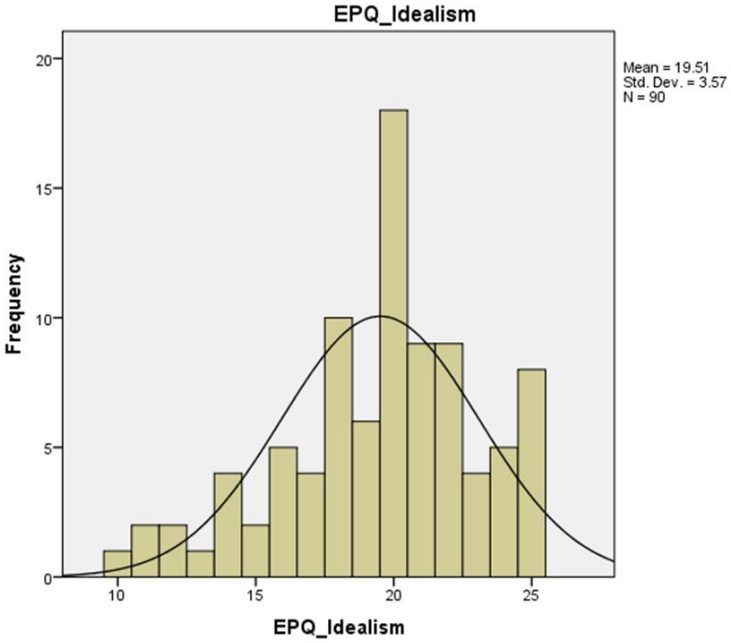
Histogram of Empathy

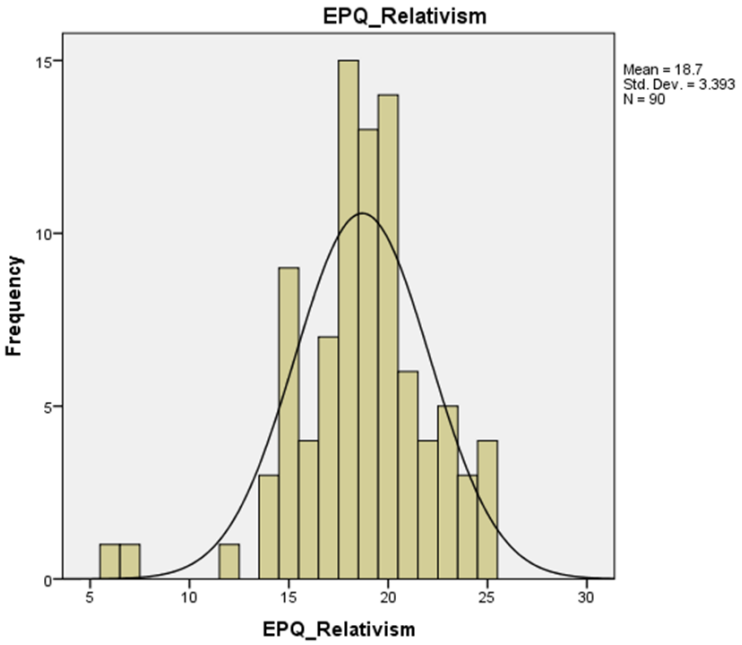


Histogram of Reasoning Style

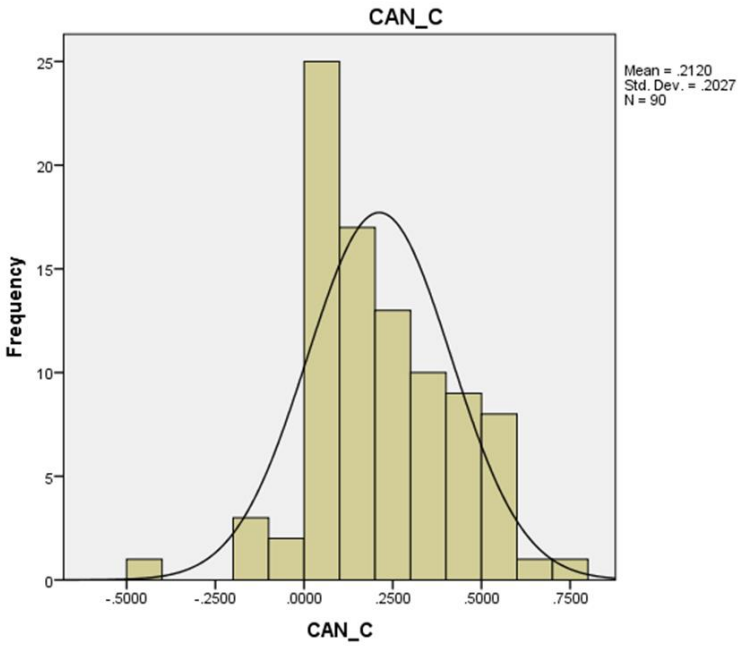


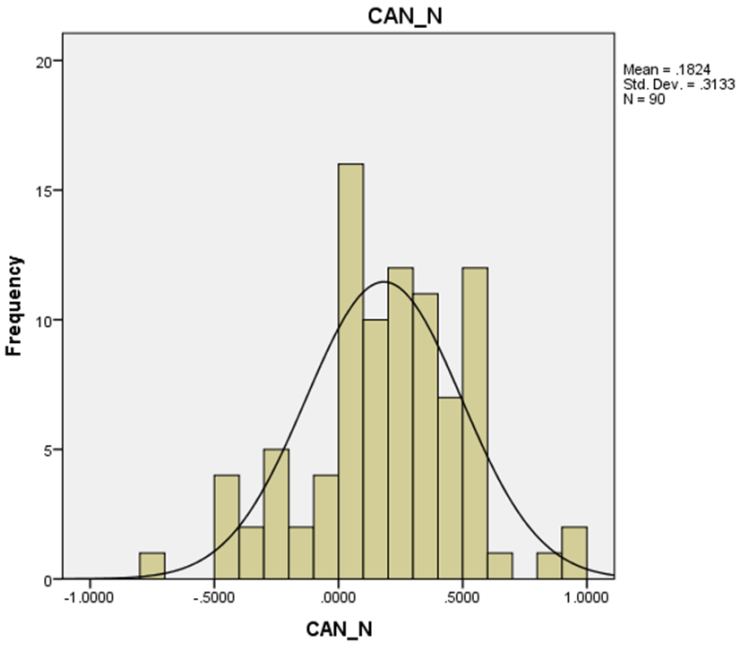
Histograms of Ethics Position (Idealism and Relativism)

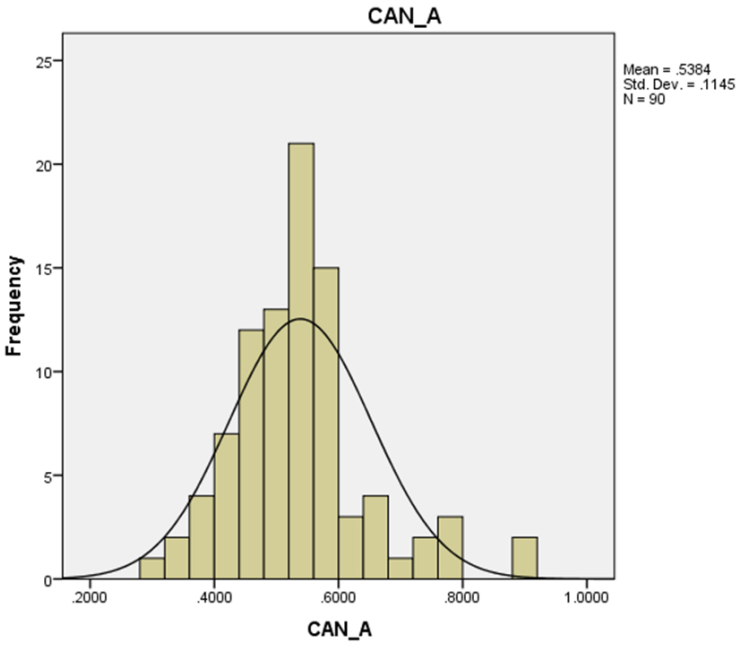




Histograms of Moral Decision-making (CAN_C, CAN_N, and CAN_A)



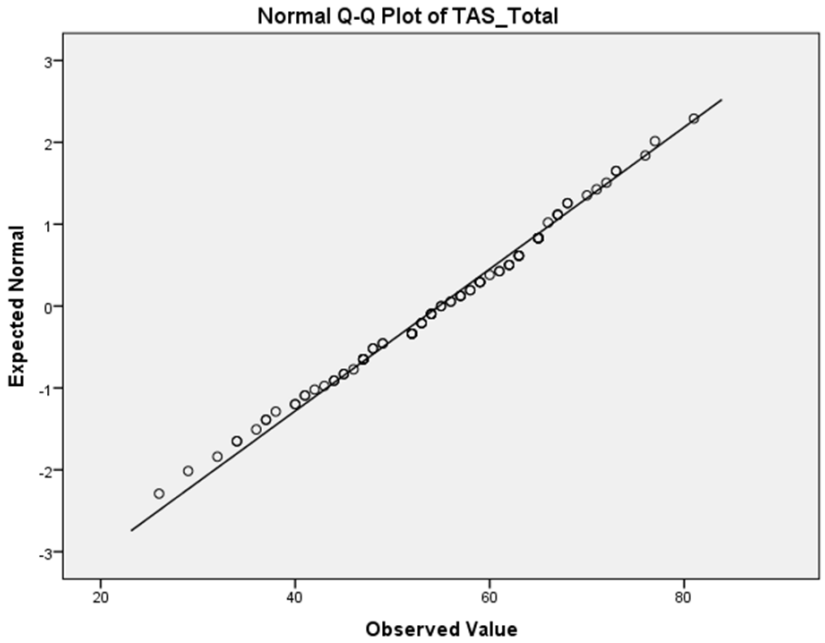

CAN_N
Mean = .1824
Std. Dev. = .3133
N = 90
Frequency
20
15
10
5
0
-1.0000
-.5000
.0000
.5000
1.0000
CAN_N


CAN_A
Mean = .5384
Std. Dev. = .1145
N = 90
Frequency
25
20
15
10
5
0
.2000
.4000
.6000
.8000
1.0000
CAN_A

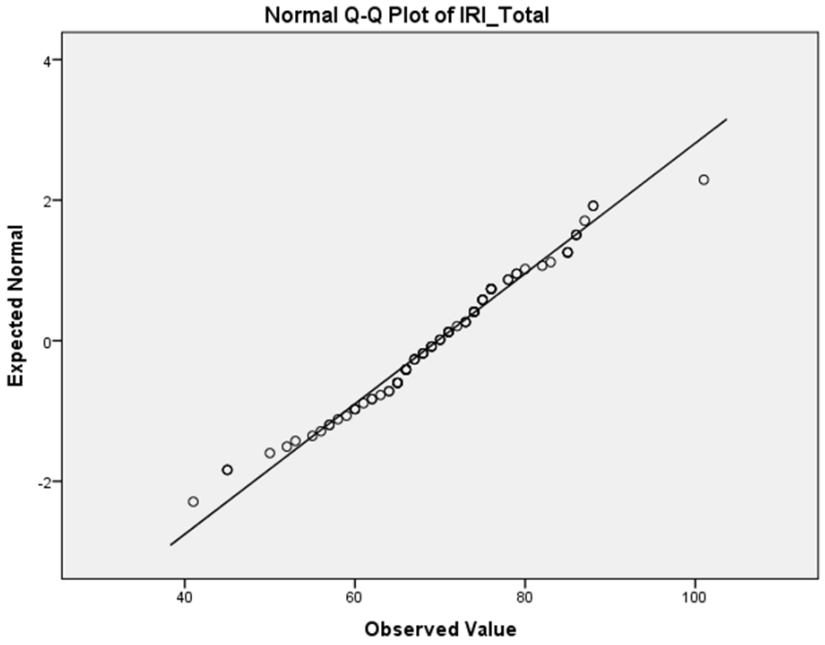
Appendix C

Quantile-Quantile (Q-Q) Plots

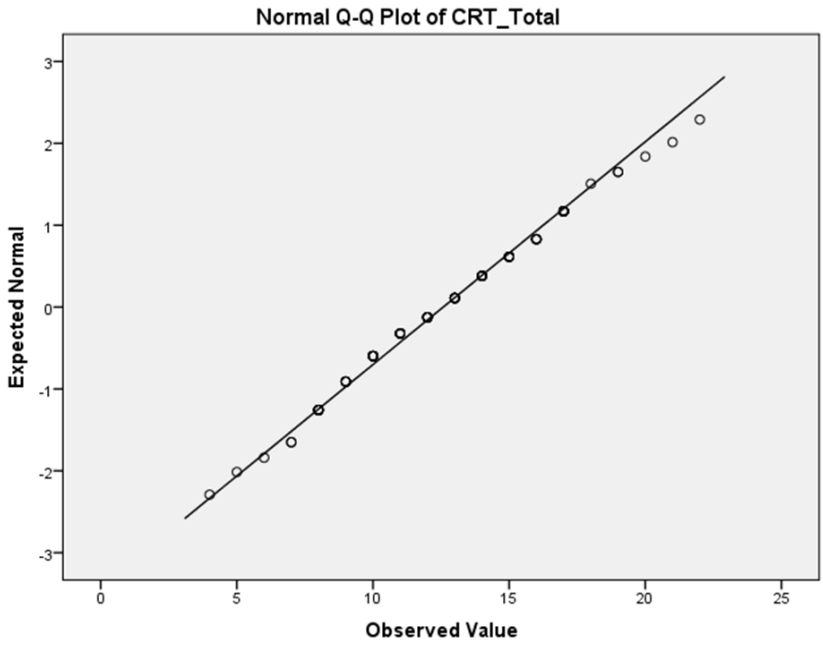
Q-Q Plot of Alexithymia



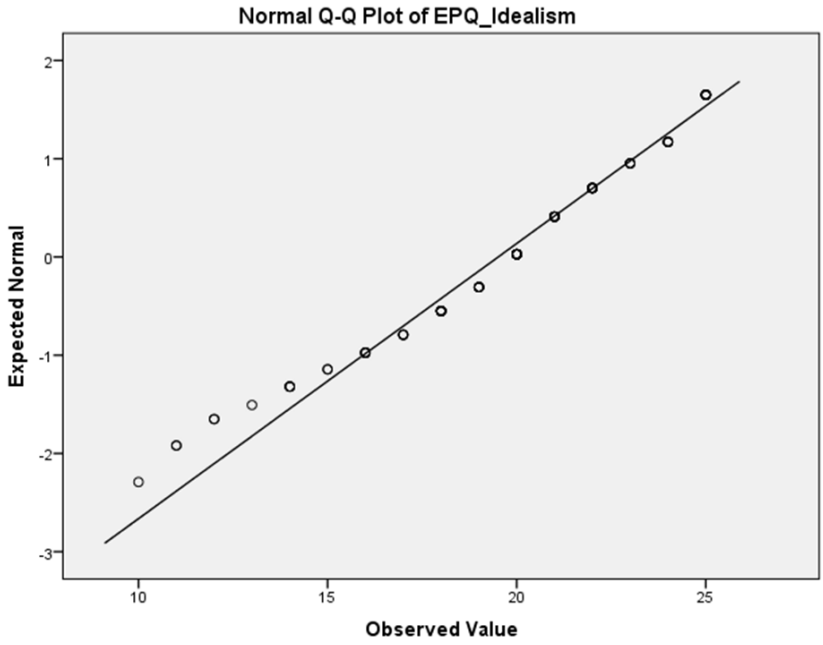
Q-Q Plot of Empathy

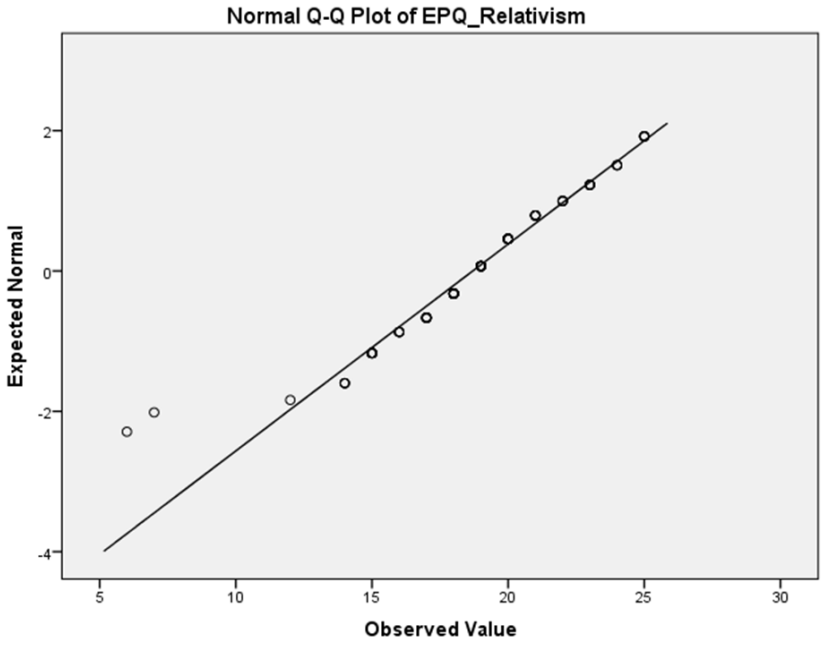


Q-Q Plot of Reasoning Style

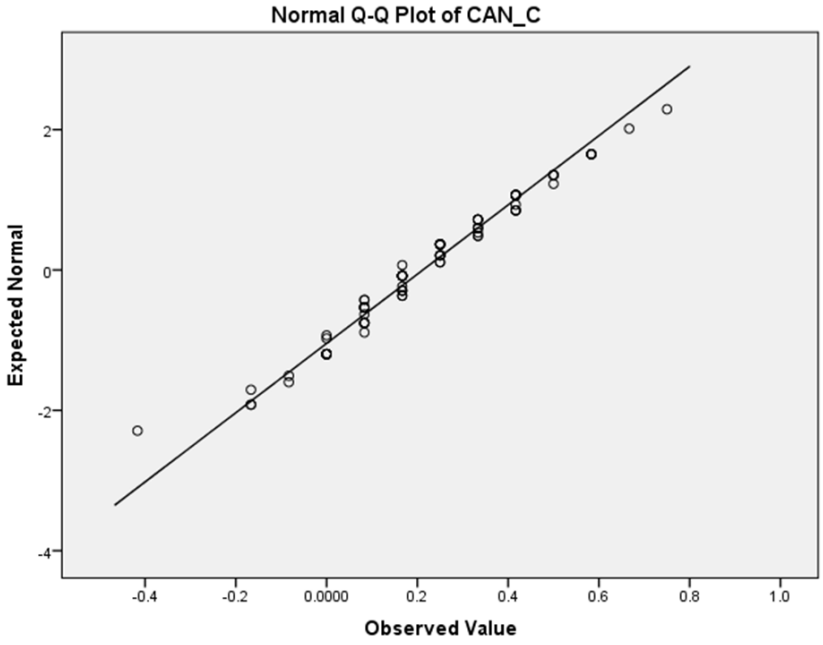


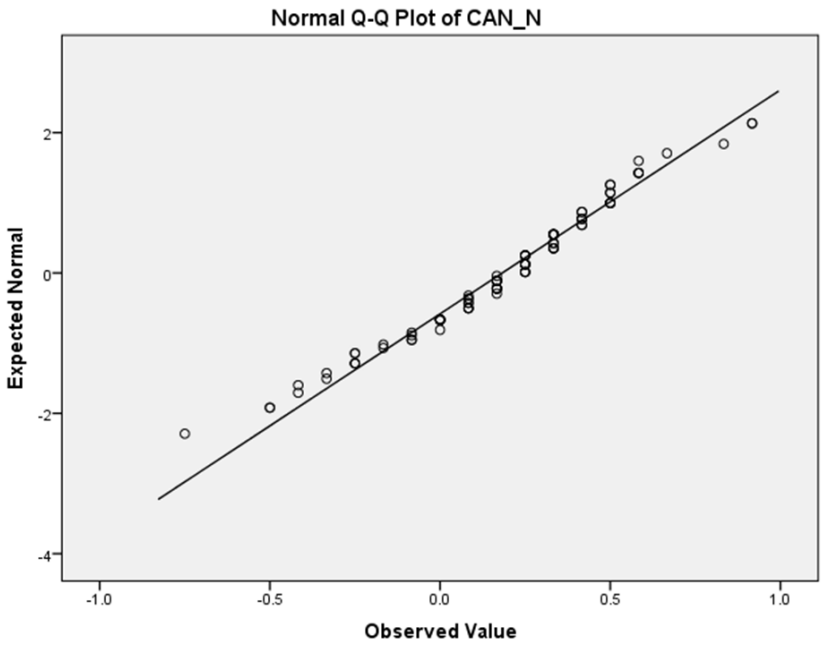
Q-Q Plot of Ethics Position (Idealism and Relativism)

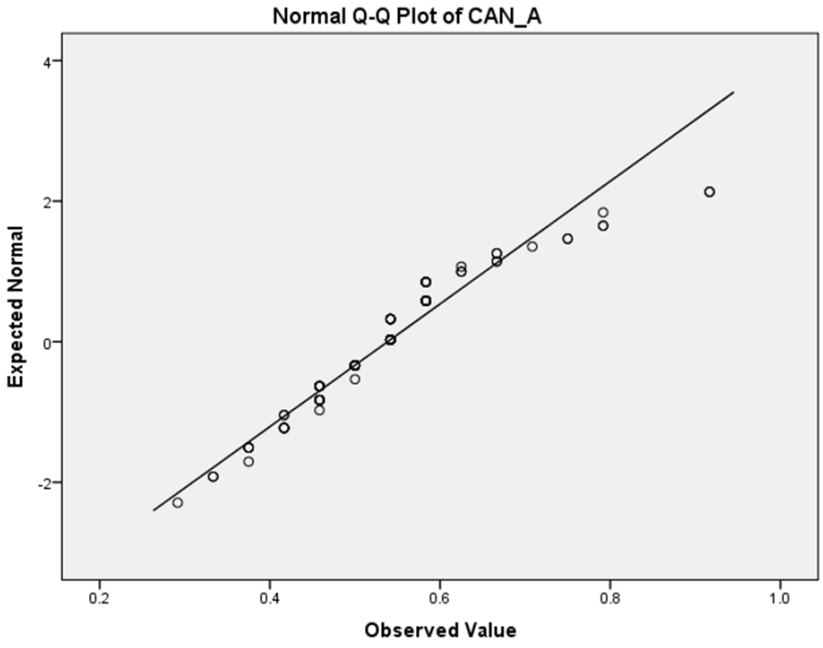




Q-Q Plot of Moral Decision-making (CAN_C, CAN_N, and CAN_A)




Normal Q-Q Plot of CAN_N
Expected Normal
Observed Value
2
0
-2
-4
-1.0
-0.5
0.0
0.5
1.0


Normal Q-Q Plot of CAN_A
Expected Normal
Observed Value
4
2
0
-2
0.2
0.4
0.6
0.8
1.0

Appendix D

Skewness and Kurtosis

Statistics

		TAS_SUM	IRI_SUM	CRT_SUM	EPQ_Idea	EPQ_Rela	CAN_C	CAN_N	CAN_A
N	Valid	90	90	90	90	90	90	90	90
	Missing	0	0	0	0	0	0	0	0
Mean		54.79	69.69	12.58	19.51	18.700	.212037	.182407	.538426
Std. Error of Mean		1.216	1.137	.387	.376	.3577	.0213613	.0330222	.0120727
Median		55.00	70.00	13.00	20.00	19.000	.166667	.250000	.541667
Mode		65	66[a]	10	20	18.0	.1667	.0000	.5417
Std. Deviation		11.537	10.785	3.675	3.570	3.3935	.2026514	.3132764	.1145317
Variance		133.112	116.307	13.505	12.747	11.516	.041	.098	.013
Skewness		-.225	-.174	.163	-.573	-.807	.074	-.353	.943
Std. Error of Skewness		.254	.254	.254	.254	.254	.254	.254	.254
Kurtosis		-.335	.577	-.318	.048	2.448	.499	.453	1.897
Std. Error of Kurtosis		.503	.503	.503	.503	.503	.503	.503	.503
Range		55	60	18	15	19.0	1.1667	1.6667	.6250
Minimum		26	41	4	10	6.0	-.4167	-.7500	.2917
Maximum		81	101	22	25	25.0	.7500	.9167	.9167
Percentiles	25	47.00	64.75	10.00	18.00	17.000	.083333	.000000	.458333
	50	55.00	70.00	13.00	20.00	19.000	.166667	.250000	.541667
	75	63.50	76.00	15.00	22.00	20.250	.333333	.416667	.583333

a. Multiple modes exist. The smallest value is shown

Appendix E

Kolmogorov-Smirnov Tests

Kolmogorov-Smirnov Test of Alexithymia

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
TAS_Total	.071	90	.200*	.990	90	.732

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Kolmogorov-Smirnov Test of Empathy

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
IRI_Total	.087	90	.086	.982	90	.231

a. Lilliefors Significance Correction

Kolmogorov-Smirnov Test of Reasoning Style

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
CRT_Total	.092	90	.059	.986	90	.426

a. Lilliefors Significance Correction

Kolmogorov-Smirnov Test of Ethics Position

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
EPQ_Idealism	.143	90	.000	.954	90	.003
EPQ_Relativism	.129	90	.001	.939	90	.000

a. Lilliefors Significance Correction

Kolmogorov-Smirnov Test of Moral Decision-making

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
CAN_C	.122	90	.002	.976	90	.100
CAN_N	.102	90	.021	.978	90	.129
CAN_A	.181	90	.000	.928	90	.000

a. Lilliefors Significance Correction

Appendix F

Pearson Correlation Analysis

Correlations for study variables

	1	2	3	4	5	6	7	8
1. Alexithymia	1							
2. Empathy	.267*	1						
3. Reasoning style	-.206	-.005	1					
4. EPQ_Idealism	-.013	.275**	-.086	1				
5. EPQ_Relativism	.166	.182	-.075	-.00	1			
6. CAN_C	-.112	-.098	.181	-.079	-.011	1		
7. CAN_N	-.134	-.106	.181	.214*	-.255*	-.057	1	
8. CAN_A	.207*	.127	-.107	.162	.246*	-.007	-.009	1
Mean	54.79	69.69	12.58	19.51	18.70	.2120	.1824	.5384
Standard Deviation	11.54	10.79	3.68	3.57	3.39	.2027	.3133	.1145

**. Correlation is significant at the .01 level (2-tailed).
*. Correlation is significant at the .05 level (2-tailed).

Appendix G

Mediation Analysis

Appendix G1

Mediation Result of Alexithymia, Empathy, Reasoning Styles and EPQ_Idealism

```
************************** TOTAL EFFECT MODEL ****************************
OUTCOME VARIABLE:
 EPQ_Idea

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      .0132      .0002    12.8897      .0153     1.0000    88.0000      .9019

Model
             coeff         se          t          p       LLCI       ULCI
constant   19.7344     1.8464    10.6880      .0000    16.0651    23.4038
TAS_SUM     -.0041      .0330     -.1236      .9019     -.0696      .0615

Standardized coefficients
             coeff
TAS_SUM     -.0132
```

```
************** TOTAL, DIRECT, AND INDIRECT EFFECTS OF X ON Y **************

Total effect of X on Y
     Effect         se          t          p       LLCI       ULCI       c_cs
     -.0041      .0330     -.1236      .9019     -.0696      .0615     -.0132

Direct effect of X on Y
     Effect         se          t          p       LLCI       ULCI      c'_cs
     -.0363      .0337    -1.0755      .2852     -.1033      .0308     -.1172

Indirect effect(s) of X on Y:
            Effect     BootSE   BootLLCI   BootULCI
TOTAL        .0322      .0193      .0008      .0755
IRI_SUM      .0252      .0154      .0014      .0612
CRT_SUM      .0069      .0082     -.0065      .0259

Completely standardized indirect effect(s) of X on Y:
            Effect     BootSE   BootLLCI   BootULCI
TOTAL        .1040      .0596      .0028      .2322
IRI_SUM      .0816      .0477      .0048      .1900
CRT_SUM      .0224      .0260     -.0214      .0809
```

Appendix G2

Mediation Result of Alexithymia, Empathy, Reasoning Styles, and EPQ_Relativism

```
************************** TOTAL EFFECT MODEL ****************************
UTCOME VARIABLE:
 EPQ_Rela

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      .1660      .0275    11.3258     2.4925     1.0000    88.0000      .1180

Model
              coeff         se          t          p       LLCI       ULCI
onstant    16.0255     1.7308     9.2591      .0000    12.5860    19.4651
AS_SUM       .0488      .0309     1.5788      .1180     -.0126      .1103

Standardized coefficients
             coeff
AS_SUM       .1660

************** TOTAL, DIRECT, AND INDIRECT EFFECTS OF X ON Y **************

Total effect of X on Y
     Effect         se          t          p       LLCI       ULCI       c_cs
      .0488      .0309     1.5788      .1180     -.0126      .1103      .1660

Direct effect of X on Y
     Effect         se          t          p       LLCI       ULCI      c'_cs
      .0339      .0328     1.0332      .3044     -.0313      .0992      .1153

Indirect effect(s) of X on Y:
            Effect     BootSE   BootLLCI   BootULCI
OTAL         .0149      .0138     -.0111      .0446
RI_SUM       .0118      .0110     -.0056      .0381
RT_SUM       .0031      .0069     -.0139      .0150

Completely standardized indirect effect(s) of X on Y:
            Effect     BootSE   BootLLCI   BootULCI
OTAL         .0507      .0460     -.0397      .1461
RI_SUM       .0402      .0365     -.0191      .1264
RT_SUM       .0104      .0232     -.0476      .0507
```

Appendix G3

Mediation Result of Alexithymia, Empathy, Reasoning Styles, and CAN_C

```
************************** TOTAL EFFECT MODEL ****************************
)UTCOME VARIABLE:
 CAN_C

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      .1120      .0125      .0410     1.1178     1.0000    88.0000      .2933

Model
              coeff         se          t          p       LLCI       ULCI
Constant      .3198      .1042     3.0706      .0028      .1128      .5268
'AS_SUM      -.0020      .0019    -1.0572      .2933     -.0057      .0017

Standardized coefficients
              coeff
'AS_SUM      -.1120

************** TOTAL, DIRECT, AND INDIRECT EFFECTS OF X ON Y **************

Total effect of X on Y
     Effect         se          t          p       LLCI       ULCI       c_cs
     -.0020      .0019    -1.0572      .2933     -.0057      .0017     -.1120

Direct effect of X on Y
     Effect         se          t          p       LLCI       ULCI      c'_cs
     -.0010      .0020     -.4939      .6227     -.0049      .0029     -.0553

Indirect effect(s) of X on Y:
            Effect     BootSE   BootLLCI   BootULCI
TOTAL       -.0010      .0009     -.0031      .0006
IRI_SUM     -.0004      .0007     -.0019      .0010
ERT_SUM     -.0006      .0006     -.0020      .0001

Completely standardized indirect effect(s) of X on Y:
            Effect     BootSE   BootLLCI   BootULCI
TOTAL       -.0567      .0504     -.1701      .0354
IRI_SUM     -.0219      .0388     -.1080      .0549
ERT_SUM     -.0348      .0312     -.1095      .0082
```

Appendix G4

Mediation Result of Alexithymia, Empathy, Reasoning Styles, and CAN_N

```
************************** TOTAL EFFECT MODEL ****************************
)UTCOME VARIABLE:
 CAN_N

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      .1338      .0179      .0975     1.6036     1.0000    88.0000      .2087

Model
              coeff         se          t          p       LLCI       ULCI
Constant      .3814      .1606     2.3754      .0197      .0623      .7005
TAS_SUM      -.0036      .0029    -1.2663      .2087     -.0093      .0021

Standardized coefficients
              coeff
TAS_SUM      -.1338


************** TOTAL, DIRECT, AND INDIRECT EFFECTS OF X ON Y **************

Total effect of X on Y
     Effect         se          t          p       LLCI       ULCI       c_cs
     -.0036      .0029    -1.2663      .2087     -.0093      .0021     -.1338

Direct effect of X on Y
     Effect         se          t          p       LLCI       ULCI      c'_cs
     -.0021      .0030     -.6928      .4903     -.0081      .0039     -.0774

Indirect effect(s) of X on Y:
            Effect     BootSE   BootLLCI   BootULCI
TOTAL       -.0015      .0011     -.0041      .0003
TRI_SUM     -.0006      .0009     -.0027      .0009
TRT_SUM     -.0009      .0007     -.0025      .0002

Completely standardized indirect effect(s) of X on Y:
            Effect     BootSE   BootLLCI   BootULCI
TOTAL       -.0564      .0407     -.1459      .0136
TRI_SUM     -.0225      .0328     -.0982      .0329
TRT_SUM     -.0339      .0249     -.0890      .0056
```

Re: U/SERC/78-436/2025

10 January 2025

Dr Lee Wan Ying
Head, Department of Psychology and Counselling
Faculty of Arts and Social Science
Universiti Tunku Abdul Rahman
Jalan Universiti, Bandar Baru Barat
31900 Kampar, Perak.

Dear Dr Lee,

Ethical Approval For Research Project/Protocol

We refer to the application for ethical approval for your students' research project from Bachelor of Social Science (Honours) Psychology programme enrolled in course UAPZ3023. We are pleased to inform you that the application has been approved under Expedited Review.

The details of the research projects are as follows:

No	Research Title	Student's Name	Supervisor's Name	Approval Validity
1.	Factors Affecting the Relationship Between Alexithymia and Moral Decision-making Among Undergraduate Students in Malaysia	1. Ng Yi Hui 2. Tan Yan Er 3. Yeoh Kai Suan	Dr Au Zher Wen	10 January 2025 – 9 January 2026
2.	Exploring the Lived Experiences of Psychological Distress Among the Queer Community in Malaysia	1. Yuvaraj a/l Thangarajan 2. Noraiman Bin Norizan 3. Harssiny a/p Kani		
3.	Predictors of Test Anxiety: Time Management, Self Efficacy and Academic Stress	1. Aishwini a/p Suresh 2. Vaishnavee a/p Selvaraj		

The conduct of this research is subject to the following:

(1) The participants' informed consent be obtained prior to the commencement of the research;

(2) Confidentiality of participants' personal data must be maintained; and

(3) Compliance with procedures set out in related policies of UTAR such as the UTAR Research Ethics and Code of Conduct, Code of Practice for Research Involving Humans and other related policies/guidelines.

(4) Written consent be obtained from the institution(s)/company(ies) in which the physical or/and online survey will be carried out, prior to the commencement of the research.

Should the students collect personal data of participants in their studies, please have the participants sign the attached Personal Data Protection Statement for records.

Thank you.

Yours sincerely,

Professor Ts Dr Faidz bin Abd Rahman
Chairman
UTAR Scientific and Ethical Review Committee

c.c Dean, Faculty of Arts and Social Science
Director, Institute of Postgraduate Studies and Research