



RELATIONSHIP BETWEEN IMPLICIT ASSOCIATION

TEST (IAT) AND EYE TRACKER

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IAT AND EYE TRACKER

APPROVAL FORM

This research paper attached hereto, entitled “Relationship between Implicit Association Test (IAT) and Eye Tracker” prepared and submitted by” Chong Khai Vern, Low Kah Yue and Teh Wei Theng” in partial fulfillment of the requirements for the Bachelor of Social Science (Hons) Psychology is hereby accepted.

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Abstract

In Malaysia, racism has been constantly bringing negative impacts to the societal and economic developments. Although Implicit Association Test (IAT) has been widely used to test implicit attitude, researchers still have controversies regarding the validity of IAT. A cross-sectional, experimental design was used to examine whether eye tracker is a valid tool to measure implicit racial attitudes in Malaysia. Convenience sampling was employed to recruit Chinese university students who aged between 18 to 29 years old and with normal or corrected to normal vision. Participants were instructed to complete Race IAT and to read statements that positively or negatively described Malays. After excluding 20 responses due to failure of eye tracker to trace the participants' eye movements, 50 responses were remained for correlational analyses to examine the relationship between implicit racism scores and the time spent on statements recorded by the eye tracker. Findings revealed that participants with higher implicit racism spent shorter time on reading statements that positively describes Malay, whereas another hypothesis was not supported. One possible cause was that the presence of cognitive load was not taken into considerations during development of hypotheses. This paper also discussed some methodological issues that may contribute to insignificant results such as quality of the statements and high drop-out rates due to the limitations posed by eye tracker. Current result suggested that eye tracker was yet to be validated as a tool to measure implicit racism. Future researches are recommended to improve research design and revise theory used in this study.

Keywords: Implicit racism, eye tracker, Implicit Association Test

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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List of Abbreviations

EFM	Encoding Flexibility Model
IAT	Implicit Association Test
SFM	Schematic Filter Model

Chapter I

Introduction

Background of Study

Malaysia is a multiracial and multicultural country which is built up by three main races such as Malay, Chinese and Indian that practice different religions. The mixed practice of religions has contributed to unique cultures of Malaysian. The cultural diversity in Malaysia is a strength that contributes success in socio-economic development and to overcome various difficulties. Our former prime minister has introduced 1 Malaysia concept, which promote a harmony society within Malaysian to ensure and achieve successful country status (Foong, 2010). It is suggested that 1 Malaysia concept aims to promote integration between races, which avoid prejudiced view towards other races (The Star, 2010).

Racism refers to beliefs that own race is superior than other races. Racism issues happen globally nowadays. For example, racism between black and white in US is still continuing happen. According to Horowitz, Brown, and Cox (2019), about 58% of Americans think that the relationship between different races is still in a bad condition. They also pointed out that Americans viewed Black as bad, but white as being good. There was also a news that suggested how a black man suffered from being treated unequally and discriminated since primary school (Jones, 2018). Besides, non-white natives faced serious discrimination during hiring process in France and Sweden (Collie, 2019). Racism could result in adverse effects for the race who being treated unequally. Studies suggested that African American were involved in health crisis because of long-term exposure to racism that caused serious physiological and psychological issues (Kwate, Valdimarsdottir, Guevarra, & Bovbjerg, 2003; Williams, Neighbors, & Jackson, 2003). Harrell (2000) also indicated that race-related stress tends to decrease quality of life in people who are being discriminated.

Racial discrimination continued in the “new Malaysia”, which suggested that it happened on politics, education sector, social media and so on (FMT News, 2019). According to The Star (2017), issues of racism kept trending in Malaysia in many areas like job recruitment, house-renting, running business and so on. Kaur (2018) reported racial discrimination increased continually in the year of 2017 in Malaysia, for example, a job advertisement only seeks for Chinese employees and homeowners rent for tenants based on their own races. Most people denied for being racist, but their actions had revealed their racism attitude. There was news suggested that students tend to favour and stick with their own races rather than the out-group races (Malay Mail, 2018). Besides, people would vote to politicians of their own race because they feared of losing the political advantages. In terms of economics, many localities of business are identified with certain races and people like to label everything by race (Malay Mail, 2018). News reported by Soong (2015) suggested racism issues as an obstacle that held Malaysia back from becoming a high-income society and had caused Malaysian to be divided. Thus, it is concluded that racism issues have contributed a number of problems in many aspects of society.

Past study examined racial attitudes by using traditional self-report method (Weber, Lavine, Huddy, & Federico, 2014). As racism attitude was considered as sensitive issues and it is violated with social norms, people tend to hide this attitude. Participants were not willing to agree with self-report racial attitudes because their opinions would express negative attitudes directly towards a certain group of people (Peffley, Hurwitz, & Sniderman, 1997). Therefore, numerous concerns like social desirability for self-report racial attitude had led researchers interested to examine other indirect measures of implicit attitude (Fazio & Olson, 2003; Gawronski, LeBel, & Peters, 2007). Implicit attitude often occurs without our awareness and control. It is suggested that implicit attitude would influence nonverbal behaviours like eye contact or facial expressions of individuals as well as their expressions of

prejudice behaviour unconsciously (Van Der Westhuizen, 2007). One of the measures used by past studies is IAT (IAT), which could increase accuracy for assessment of racial attitude (Greenwald, McGhee, & Schwartz, 1998). Dovidio, Kawakami, Johnson, Johnson, and Howard (1997) suggested that this implicit measure provided a more subtle form of negative racism behaviour. In Malaysia, study by Radzlan et al. (2018) revealed the importance of use of implicit measures in investigating racial attitudes between Chinese and Malay. The study emphasized that racial attitudes were unable to freely expressed by Chinese and Malay due to the cultural context in Malaysia. Thus, it can be concluded that a more accurate racial attitude result could be obtained by using implicit measure.

Problem Statement

Sensitive survey questions, such as issue about sexual behavior, substance use, political issues and cheating are more likely to result in a relatively inaccurate reporting (McNeeley, 2012; Tourangeau & Smith, 1996). As racial issues are considered sensitive topics, hence it has to be careful reported to avoid arise of conflicts (Shaari, Ngu, & Raman, 2006). Past studies indicated that participants tend not to reveal actual attitude through self-report racial attitudes, because their opinions would express negative attitudes directly towards certain group of people (Peffley et al., 1997). When participants tend to report lesser and lower scores than their actual attitudes causing inaccurate data reporting, therefore, lead to difficulty in further studying on racial attitude and intervention to baffle it. Thus, actual racial attitude is hard to be assessed by solely using self-report measure. Indeed, previous studies suggested that self-reported result restricted prediction on their behavior in various situations, as they might be influenced by social group to present a socially desirable image (Beattie & McGuire, 2012; Greenwald, 1990).

On that account, a measurement tool to measure implicit processes, which often occurs without our awareness and control is necessary to further explore the implicit attitude

that lead to human behavior. For all these years, the classic Implicit Association Test (IAT) is widely used to reveal individual's implicit attitudes in previous studies (Wittenbrink & Schwarz, 2007). However, reliability and validity of IAT are still under debate due to some controversies on its theoretical foundation and methodological approach that have not been resolved yet (Oude Maatman, 2017). Therefore, eye tracking technology which includes the use of webcam to detect and record tester's eye activities was introduced. It provides a way to access eye data, such as visual path, gazing duration and pupil dilation for experimental research. In recent, the eye tracking methodology has been increasingly important and became one of the popular tools around the world among scientific communities, from physiological-based research to psychological state indicator (Di Stasi, Catena, Cañas, Macknik, & Martinez-Conde, 2013; Di Stasi et al., 2014; Siegenthaler et al., 2014).

A great deal of studies with application of eye tracking device have been done and they found that eye tracking is a good measurement of implicit attitude (Arizpe, Kravitz, Walsh, Yovel, & Baker, 2016; Brielmann, Bülthoff, & Armann, 2014; Hidalgo Vargas, 2017; Wu, Laeng, & Magnussen, 2012). However, the psychometric qualities of eye tracking technology have not been undertaken yet, especially the application of eye tracking technology in detecting the implicit racism attitude while reading were still remain unknown. With the problems mentioned, therefore, present research is interested to find out whether this new implicit measurement, eye tracking device is a valid tool to measure the implicit racism attitude of Chinese towards Malay in Malaysia.

Research Objectives

Eye tracker, a tool used by researchers recently which examine eye movements, fixation duration or count on participants was used to measure participants' fixation duration on negative, positive and neutral statements. Past study that examined eye movements of participants during assessment of IAT have suggested that when there is something

inconsistent with ones' implicit negative attitude, their fixation duration on it would be longer, thus predicted implicit attitude (Mele, Federici, & Dennis, 2014). This result served as the basis in forming hypothesis of current study. As eye tracker is yet to be used to study the relationship between implicit racism and time spent on reading statements that reflect racism, hence current study aimed to examine whether it is a valid tool to measure implicit racial attitudes by reading statements in Malaysia.

Significance of Study

The result of study will provide information regarding the validation for applying eye tracking technology as a new behavioural measurement tool in Malaysia' psychological study. It can definitely provide a strong and trustworthy supporting evidence to form a more valid outcome for future study. In addition to the data given by this study, it also aids to provide psychological evidence for measuring people's racial attitude based on their eye movements, by which providing another option or an additional tool to obtain data for implicit processes through eye movements. Further, the inevitable issue, that is inaccurate reporting while collecting data regarding sensitive issues would be able to be overcome and no longer needed to be worry anymore. Although there might still be other factors, but the attainment in getting research outcomes that are infinitely close to the fact without being influenced by other environmental factors is also undeniably important for future researches.

Research Question

1. Does implicit racism positively correlate with the time spent on statements that positively describe Malay (statements that inconsistent with racism beliefs)?
2. Does implicit racism negatively correlate with the time spent on statements that negatively describe Malay (statement that consistent with racism beliefs)?

Hypotheses

H1: Implicit racism positively correlates with the time spent on statements that positively describe Malay (statements that inconsistent with racism beliefs).

H2: Implicit racism negatively correlates with the time spent on statements that negatively describe Malay (statement that consistent with racism beliefs).

Conceptual Definitions

Racism. Racism refers to a form of prejudice, which a belief claimed that all members possessed characteristics, abilities or qualities specific to that race, mainly aims to distinguish it as inferior or superior to other races (Hoyt, 2012).

Visual attention. Visual attention refers to ability to choose related information and filter out information that is irrelevant; that is organized by multiple brain centres (Das, Bennett, & Dutton, 2007).

Operational Definitions

Implicit Association Test (IAT). Implicit attitude for racism was tested by IAT in current study. There was a total of seven blocks of IAT, where the fourth and seventh blocks are critical blocks. The recorded reaction time for each response of both critical blocks was use for data analysis. As the more the two categories associated, the easier to give the same response, the shorter the reaction time of an individual would take (Maison, Greenwald, & Bruin, 2001).

Eye tracker. Eye-tracking methodology had been widely used to investigate eye movements and visual attention in various of experimental design (Pessoa, McKenna, Gutierrez, & Ungerleider, 2002). Current study used Gaze Point 3 (GP3) eye tracker to measures eye-movement of fixation duration of participants. The ideal distance for GP3 is 65cm away from participants' eyes. The GP3 should be placed at center and pointed the face of participants. The eye tracker was used when participants were reading statements that

reflected racism attitude. Longer fixation duration indicated that the statements mismatch participants' implicit racial attitude.

Chapter II

Literature Review

Racism

Racism refers to a belief claimed that all members possessed characteristics, abilities or qualities specific to that race, mainly aims to distinguish it as inferior or superior to other races (Hoyt, 2012). Racism involved three aspects, which are prejudice as emotional bias, stereotype as cognitive bias and discrimination as behavioral bias (Svetaz et al., 2018). Research had pointed out that racism issues had contributed a number of adverse effects to many aspects like education system, hiring processes, health sectors and well-being (Lee & Khalid, 2016; Svetaz et al., 2018).

As racism issues arise, researchers interested to examine the racial attitude of individuals. However, social desirability bias in respondents have become one of the concerns for researches about racism which might lead to inaccurate survey results (Krumpal, 2011). According to Paulhus (1984), social desirability issues might arise by using self-report items to assess racial attitudes. A main reason of this issue is the increased emphasize on compliance to social norms in the environment, thus inhibiting people who held negative racial stereotypes or racist attitudes to express their true belief openly (Green, Staerklé, & Sears, 2006). This explained that respondents would report a more socially acceptable response rather than report on their true beliefs. Thus, construct of racism explicit attitudes measurement would be affected.

Weber et al. (2014) found that individuals who live in the racially heterogeneous context will tailor their attitudes and behaviours in order to conform with the egalitarian social norms that against racism. This tendency is more distinct for those individuals who are sensitive to social norm. As they wished to impress others in a favourable manner, and thus underreported their racial negativity (Klein, Snyder, & Livingston, 2004; Snyder &

Gangestad, 1986). It is explained that respondents reduce willingness to report or support negative racial beliefs or attitudes is due to overt racial attitude had become unacceptable in society (Huddy & Feldman, 2009). Therefore, the importance of concerning issues of social desirability was emphasized if a study only uses explicit self-report measures on racial discrimination.

In order to reduce the drawback of social desirability bias, past studies have devoted efforts on revising methods used to obtain measures of racism (Cunningham, Preacher, & Banaji, 2001). D'Ancona (2013) suggested that self-administered survey mode can encourage declaration of prejudices towards immigrant than face-to-face interview, due to the decreased demands of social desirability in private settings. Hence, social desirability could be reduced. Krieger et al. (2011) provided an evidence by revealing the results of explicit and implicit racial discrimination measures were inequivalent; accordingly, it is suggested that a more accurate data may obtain by employing both explicit and implicit measures of racism. Another study found that the best way to measure explicit racism is by asking respondents directly in order to avoid them to change their responses to be socially acceptable. It also suggested that social desirability could be reduced by adding some irrelevant information to be more indirect self-report measure (Axt, 2017).

Implicit Measure of Attitude

As previous review found that self-report measures for racial attitudes had arisen issues of social desirability, thus it is important to examine implicit attitude rather than explicit attitude of racism. Implicit attitude refers to evaluations that automatically trigger towards an attitude object and commonly occurs without a person's conscious awareness or control (Greenwald & Banaji, 1995). Nier (2005) suggested that the effect of social desirability concern on explicit attitude measures could be reduced if implicit measure of attitude is utilised. Therefore, recent studies have examined implicit attitude with different

measures, like IAT (Greenwald et al., 1998), evaluative priming (Fazio, Sanbonmatsu, Powell, & Kardes, 1986), and Affect Misattribution Procedure (AMP; Payne, Cheng, Govorun, & Stewart, 2005).

Ditonto, Lau, and Sears (2013) examined four different measures of racial prejudice, which three of them are explicit measures of self-report scales such as negative affect towards Black, stereotype towards Black and symbolic racism, and another one implicit measure, AMP. The result revealed that AMP tend to measure implicit attitude of both White and Black respondents. Study suggested the usefulness and effectiveness by using implicit measure of racial attitude to assess their internal belief. Hence, implicit measure able to examine racial attitude more accurately. It was supported by Dovidio, Kawakami, and Gaertner (2002) which explained that implicit racism was better at predicting subtle or nonverbal behaviours compared to explicit attitudes like responding to survey questions. Another measure, evaluative priming task also had been tested by past studies. The task is almost similar with IAT, the difference is evaluative priming included a neutral baseline prime. Although it is suggested that the measure as a useful mechanism to examine underlying relations of attitude and behaviour, but it was found to be low in reliability (Gawronski & De Houwer, 2014). Besides, studies had examined implicit associations by using IAT, which revealed more accurate and negative behavioural interactions when examining implicit racism (Fazio & Olson, 2003; McConnell & Leibold, 2001).

Ziegert and Hanges (2005) found that implicit technique could be useful to assess attitudes and as a potential tool to predict discrimination of racism. It also revealed that participants unable to change or control their responses because attitudes were assessed implicitly. On the contrary, explicit measures might lead to self-presentation due to they could control on their responses. It is consistent with another study by Vanman, Saltz, Nathan, and Warren (2004) which suggested that implicit measures could assess

discrimination cognitions or beliefs. In short, although there are many implicit measures used by past study, however it is suggested IAT is the most widely use to measure implicit attitudes, also it is revealed that IAT had the ability to examine unconscious racism (Blanton & Jaccard, 2008).

Implicit Association Test (IAT)

IAT, a computer-based test was created by Greenwald and Banaji (1995) in measuring implicit attitudes to overcome the difficulties as mentioned above. IAT measures the underlying automatic association of items with evaluative attribution, specifically, the time taken for an individual to response were examined to find out the participants' ease of attributing item to the related category (Greenwald et al., 1998). It assumes that the easier to attribute item to the assumed category, indicated the stronger association between the item and categories are in the tester' belief.

IAT has been widely used to assess the implicit automatic processes about discrimination towards race, religion, and gender due to its robustness and flexibility (Aidman & Carroll, 2003; Pruett & Chan, 2006; Sekaquaptewa, 2003; Shariff, Cohen, & Norenzayan, 2008; Wittenbrink & Schwarz, 2007). A number of studies has been done to provide evidence for validity of IAT. For instances, research by Egloff and Schmukle (2002), they studied the correlation between self and others with anxiety-stimulated words using IAT and gave support to internal consistency and stability. Findings revealed that IAT is reliable tool in detecting both trait and state measure of anxiety, as it exhibited a good internal consistency result yet satisfied stability coefficients by testing IAT twice with a time lag of 7 days (Egloff & Schmukle, 2002). In addition, no effect was found even after a faking instruction, like purposely slowing down their responses while doing IAT. Further supported by Greenwald and Nosek (2001), they had reviewed more than 30 studies, and provided numerous validity and psychometric evidence for IAT. On top of that, it has shown IAT is

able to access stable attitude differences (Greenwald et al., 1998), also the familiarity of the words used will not affect the IAT score as proven by Dasgupta, McGhee, Greenwald, and Banaji (2000). Wherefore, researchers concluded IAT as a good indicator of implicit attitude with good predictive validity.

Naturally, controversies came along with the popularity of IAT. First of all, IAT had constructed a weak theoretical foundation relies on unconfirmed implicit assumptions which has yet been resolved to date (Fiedler, Messner, & Bluemke, 2006). It theoretically allows more other confounding variables to affect the eventual outcome, and weakened the position of IAT that it can predict implicit attitudes (Oswald, Mitchell, Blanton, Jaccard, & Tetlock, 2013; Oude Maatman, 2017; van Tuijl et al., 2016). Thus, it causes a few methodological critiques on IAT, such as the accuracy of result, scoring method, standardization of item used in task (Oswald et al., 2013; Oude Maatman, 2017). Yet these unresolved issues raise questions about the use of IAT as a research tool (Nagai, 2017; Oswald et al., 2013).

Nevertheless, Rezaei (2011) argued that it is reasonable for some studies reported getting unsatisfactory reliability coefficient. This is because IAT is typically used to assess an individual's stereotype or deep-seated trait instead of other variables that easily get influenced by situational manipulation (Azar, 2008; Greenwald, Banaji, & Nosek, 2015; Steffens & Buchner, 2003). As a result, both supporter and opponent reached a consensus that IAT can be a potentially powerful indicator, but only if there are more evidences were found to disentangle the unresolved problems (Carlsson & Agerström, 2016; Fiedler, et al., 2006; Oswald et al., 2013).

Eye Tracker

As the controversies regarding IAT remain unresolved for years, eye tracking technology was introduced and gradually become one of the popular tools among scientific community (Di Stasi, et al., 2013; Friese, Bargas-Avila, Hofmann, & Wiers, 2010;

Siegenthaler, et al., 2014). With the use of webcam as eye tracking device, it can easily identify and track people's eye movements, like gazing duration and visual path on a computer screen.

Eye tracking technology has a few advantages as compared with other methods in measuring implicit attitude. Eye movements measurement is relatively direct and normally automatic, individuals' attention will be directed to the stimuli they captured immediately (Kowler, Anderson, Doshier, & Blaser, 1995). Thus, this measurement is difficult for participants to fake their responses, since it is automatic-generated rather than giving responses. Further, many researches had proved that eye tracking technology is a sensitive tool to study attentional biases, especially when individual is under an aversive motivational state, like feeling of anxiety. (Hermans, Vansteenwegen, & Eelen, 1999; Mogg, Millar, & Bradley, 2000). Thirdly, this method also yields in a valid yet observable way to access one's visual orienting (Mogg, Bradley, Field, & De Houwer, 2003). It eases the data collection procedure, as participants' responses can be observed on the spot and researcher can easily notice if there's any unusual condition occurred during the test.

IAT examined people's reaction time in completing task, but eye tracking technology focus on their visual attention and eyes movement. The data of fixation and saccades are obtained from the eye movement parameters from prespecified spatial and temporal eyes data, which represents the displacement of viewing point and the velocity of eyes (Skinner et al., 2018). People will have heavier load in cognitive abilities when their visual attention guided towards the unpredicted content, similarly, people shall have longer gazing behavior towards the visual areas which disconfirm their prejudice or implicit negative attitudes toward other-races (Hansen & Arntzen, 2015; Mele et al., 2014).

Particularly relevant to current study, Mele et al. (2014) examined the eye fixation behavior of an individual throughout the Black-White IAT task. They found a visual pattern

in participants that they tend fixate more and longer at the unexpected category. Further, Hansen, Rakhshan, Ho, and Pannasch (2015) study people's racial prejudice through their looking behavior at different-races faces, specifically, people high in implicit prejudice toward race tend to fixate relatively longer on the area between one's eyes. They explained that those individuals might make use of an even optimized skill for face identification. Hence, the belief system which underlie people's implicit processes should integrate with their explicit behavior, the eye movements.

Visual Attention

Before the validation of eye tracker as a tool to measure racism, it is fundamental to understand how attitudes can be indicated by selective visual attention. As people could not attend to everything that enter their visual fields at one point of time, hence visual experience about the world is shaped by only a small subset of subjects that they choose to attend to (Driver, 2010). Attention is, thereby, used to reallocate mental resources towards certain specific subjects so that the stimuli of interest can be processed effectively (Duchowski, 2007). Therefore, it was said that a functional cognitive system will direct attention towards stimuli that beneficial for people to approach or to avoid. Research suggested that individuals' attentions were more likely to be attracted by objects that evoke attitudes which are highly accessible from their memories, subsequently making the attitude-evoking objects hard to be ignored and being able to interfere with cognitive functioning (Roskos-Ewoldsen & Fazio, 1992). As a result, the eyes would be fixated on attitude-evoking objects.

Past literatures have studied on the role of attitudes in attentional bias when processing social information. Sherman, Stroessner, Conrey, and Azam (2005) found that the ease to process information that are consistent with a stereotype increased as strength of the negative stereotype increased. This finding was interpreted in a cognitive miser perspective which states that people always rely on heuristic processing to achieve the minimum use of

cognitive resources (Corcoran & Mussweiler, 2010). In simpler word, they tend to devote as little effort as possible to a given task. As consistent information fitted with people's expectancies based on the stereotype, less amount of attention was needed to understand and encode that information. It was thus hypothesized that stereotypes act as a filter to direct attention towards consistent information. In addition, findings from Frey (1986) found that people tend to ignore information that challenge their existing beliefs because they do not want to spend efforts on scrutinizing those information. In addition, Wyer (2004) also discovered that prejudiced individuals would have more interests to learn about the behaviours of someone that are consistent with own stereotypes towards them. This result has indicated the biased preference of prejudiced individuals in seeking for stereotype-consistent information.

Nonetheless, an alternative account derived from Encoding Flexibility model proposed an opposite direction that most attention would be directed towards stereotype-disconfirming information as stereotype strength increases. Research by Sherman et al. (2005) found that the amount of attention being paid on a particular information was affected by prejudice, especially when the information reflects some stereotypic beliefs. In their study, participants were tested about their attention and encoding of two types of statements, which one was consistent with stereotypic behavioural descriptions about homosexuals and another one with stereotype-inconsistent descriptions. Findings revealed that participants with higher level of self-reported prejudice towards homosexuals paid more attention and better encoding on stereotype-inconsistent information, whereas such differences were not existed among low prejudice participants. Sherman et al. (2005) explained the greater attention paid by high prejudice participants was due to their efforts to find themselves a proper explanation for the occurrence of unexpected information. As suggested by literatures about person memory (Srull, Lichtenstein, & Rothbart, 1985), greater stereotype can lead to more difficulties in

comprehending information that are opposite with people's expectancies, thus attention was being shifted towards stereotype-inconsistent information from the consistent one in order to have better understanding.

Another study conducted by Allen, Sherman, Conrey, and Stroessner (2009) found that individuals paid more attention towards stereotype-consistent information when the capacity of cognitive processing is not being occupied by other task, while the attention shifted towards stereotype-inconsistent information when the capacity of cognitive processing was limited due to cognitive load. Researchers mentioned that individuals would focus on unexpected information that tax more cognitive resources to be processed rather than stereotype-consistent ones that confirming with prior knowledge when being loaded by cognitive task. Worth to be mentioned, this study provided a more direct measure for visual attention by using X-probe task which faster response time indicates greater attention being paid, compared to other studies that used recall accuracy to operationalize attention. In the similar vein, findings from Sherman, Conrey, and Groom (2004) has supported this explanation, participants that being imposed with cognitive task showed more attention towards stereotype-disconfirming statements.

Theoretical Framework

Different theoretical frameworks can lead to opposite directions of the hypotheses for present study. For instance, the Schematic Filter Model (SFM) suggests less attention being paid on information that are inconsistent with one's belief while Encoding Flexibility Model (EFM) suggests more attention spent on inconsistent information under cognitive load. One of the plausible theory that can be used was SFM (Bodenhausen, 1988; Macrae, Milne, & Bodenhausen, 1994; Sherman, Lee, Bessenoff, & Frost, 1998). Bodenhausen (1988) suggested that stereotypes were served as a filter to direct attention towards information that individuals had expected to be consistent with their existing stereotypes. Filter models agree

that inconsistent information was more difficult to comprehend, thus more capacities were needed to process and encode that information. As a result, inconsistent information seemed to be less attractive to individuals as the amount of attention used to understand this information was relatively large. One underlying assumption of this theory is that most people are cognitive miser who prefer to utilize the least cognitive resources as they could in completing a task (Fiske & Taylor, 1991). Researchers further assumed that the occurrence of attentional filter is more observable particularly when cognitive resources are depleted. If the resources were not enough for individuals to understand the inconsistent information, stereotypes would facilitate the processing of consistent information and filter out the inconsistent information away from their attention (Moskowitz, 2013). Indeed, prejudices, the mental schema that helps people to perceive their social world, have reduced effort to attend something that are already in line with schema. Prejudices thus anchor individuals' attention to remember the instances of behavior that are consistent with their negative attitudes (Nevid & Rathus, 2016). Therefore, the attention on consistent information will increase, thus result in longer time spent in reading and fixating.

Another theoretical framework, Encoding Flexibility Model (EFM; Sherman et al., 1998) proposes that information consistent with existing stereotypes should receive less attention because it is easier to be understand. As a result, individuals selectively direct attention towards stereotype-inconsistent information that provides more novel information in order to improve the effective processing. According to the model, inconsistent information is selected as a target of attention because people tend to maximize their efficiencies in gaining as much information. Increase in strength of stereotypes and cognitive load would further direct their attention towards inconsistent information as it increases the difficulty in comprehending the information, thus require more efforts to understand (Sherman et al., 2004). As a result, visual attention on inconsistent information will be increased and the time

people fixate their eye gazes on inconsistent information will be longer than on consistent information.

In present study, EFM has been chosen to guide the formation of hypothesis. A recent research conducted by Mele et al. (2014) found out that longer fixation duration on the pairing of a race and attribute that are perceived as inconsistent by participants had predicted the implicit negative attitudes towards another race which indicated by positive D score. Moreover, the hypothesis guided by EFM is in line with the mechanism of IAT, that racism can be inferred from the longer time people have taken to response for items that are inconsistent with their stereotypes (Nosek, Hawkins, & Frazier, 2011).

Table 2.1

Summary of Theories

	Without cognitive load	With cognitive load
Schematic Filter Model	Shorter fixation duration on stereotype-inconsistent statement, longer fixation duration on stereotype-consistent statement	Shorter fixation duration on stereotype-inconsistent statement, longer fixation duration on stereotype-consistent statement
Encoding Flexibility Model	No difference in fixation duration on either stereotype-consistent or stereotype-inconsistent statement	Longer fixation duration on stereotype-inconsistent statement, shorter fixation duration on stereotype-consistent statement

Conceptual Framework

The present study examined the relationship between one's level of implicit racism and the fixation duration on statements that are inconsistent with their stereotype beliefs about an ethnic out-group. It was known that people can easily understand information that they have expected compared to information that are out of their expectation. Similarly, as people who have higher level of racism held a stronger negative attitude towards an ethnic out-group member, they will more likely to expect the ethnic out-group member performed in a way that is consistent with their stereotypes. In other words, stereotype-consistent

information is more understandable for people with high racism and require less attention to process. Thus, it was hypothesized that higher racism toward a race measured by IAT would result in longer fixation duration on statements that positively describe people of that race.

Chapter III

Methodology

Research Design

Current research employed a within-subject experimental design (Shaughnessey, Zechmeister, & Zechmeister, 2012). Participants were exposed to all three types of statements which were neutral, consistent, and inconsistent with their stereotypes towards people from another ethnicity instead of just being exposed to either one type. Quantitative research was used as numerical data such as fixation duration and IAT scores was collected and analysed in this study to explain social phenomena using statistics (Aliaga & Gunderson, 2002).

Research Location & Participants

Participants who had voluntarily participated in this study completed the whole experiment in Psychology Lab located in University Tunku Abdul Rahman, Kampar, Perak. The targeted population of this study was university students whom their ethnicities were Chinese. Participants were recruited based on several inclusion criteria. Inclusion criteria for this study were: (i) having normal or corrected to normal vision; (ii) university students aged between 18 to 29 years old; (iii) being Chinese.

Convenience sampling was used as a non-probability technique to recruit participants based on the ease of accessibility, availability and willingness to participate in this study (Etikan, Musa, & Alkassim, 2016).

According to past study conducted by Sherman et al. (2005), the sample size they used to acquire significant result was 59. Taking the participants' dropout rates and other potential risks into consideration, an additional 20% of participants was necessary to be recruited for the experiment. Therefore, the total sample size calculated for current study was 70.

A total of 70 Chinese participants were recruited in this study. However, 20 responses had been excluded as there were some lost track of eyes by eye tracker device. After the exclusion, 50 responses remained in this study.

Research Procedure

Participants were recruited through distributions of flyers within UTAR campus and e-flyers on several social media platforms (eg. Facebook, Whatsapp). Before joining the experiment, consent forms which included some basic details about the research were given to the participants, however the measurement of racism was not mentioned in the beginning. Participants were not informed about the nature of this experiment, given that the sensitive nature of racism study would raise concerns about reactivity in participants. In such, they might alter their responses either consciously or unconsciously, thus resulting in threat to internal validity.

There was only one participant for each session of the experiment. First, participant was requested to fill in demographic questionnaires shown in the computer, followed by instructions to complete IAT. The instructions delivered by three facilitators to all participants were identical in order to standardize the experimental setting. Participants were estimated to take about 10 to 15 minutes to complete the IAT. After that, participants were asked to proceed to the statement reading task. Facilitator would assist participant in completing the calibration process, which participant would be requested to look at specific points of the computer screen in order to let the eye tracker to identify the eye movement and be ready to collect data. After that, participants were requested to read through all statements words by words and to understand the meaning of those statements. Debriefing session was conducted after participants had completed the experiment. Facilitator would explain the purpose of current research and introduce participants about the counselling services provided by UTAR Community Counselling Centre if participants have encountered with

distress or psychological harms after the experiment. A souvenir was given to them as to appreciate them for joining this study.

Research Instruments

Demographics questionnaire. Demographic information about the participants was collected such as age, gender and ethnicity.

Race Implicit Association Test. Race IAT was used to measure the strengths of association between races and attributes by comparing the response time on two combined discrimination tasks. The Race IAT used in this study was created by implementing the program code developed by Iatgen into Qualtrics (Carpenter et al., 2019). The code would be converted into seven fully functional IAT blocks that counterbalance the left or right starting position of the race (i.e., Chinese, Malay) and attributes (i.e., Good, Bad) (refer to Appendix A).

Participants were instructed to make category judgements for each block. In each trial, a stimulus that was either picture or word would be presented in the center of the computer screen. Participants were required to press a left ('E') or right ('I') key to categorize the stimulus as fast as possible without compromising the accuracy. It was assumed that shorter response time would be used to complete the categorization task if the race and the attribute that were consistent with participants' belief can be categorized using a same response key. For example, participants who believed that Malay are bad would respond quickly when they need to press left key for both Malay faces and words associated with bad aspect. In contrast, they would have slower response time if they had to press the same key for stimuli showing Malay faces and words associated with good aspect.

Block 1 consisted of 20 trials. Participants were instructed to press left key when they saw a Chinese face shown in the middle of the computer screen and right key for Malay. In Block 2, participants were instructed to press left key when they saw a word associated with

good aspect and right key when they saw a word associated with bad aspect for 20 trials. Block 3 was a practice block with 20 trials, which participants were instructed to press left key for either Chinese faces or words associated with good aspects that were shown. As opposed, participants were instructed to press right key for either Malay faces or words associated with bad aspects shown in middle of the computer screen. After practicing the combined task, participants had to complete Block 4, the critical block, with the same key assignments similar with Block 3 for 40 trials. In Block 5, the placement of Chinese and Malay targets in Block 1 was switched, which participants were instructed to press right key when they saw a Chinese face and press left key if a Malay face for 20 trials. Block 6 was a practice block with 20 trials which participants were instructed to press right key for either Chinese faces or words associated with bad aspects and press left key for either Malay faces or words associated with good aspects shown in middle of the computer screen. After practicing the combined task, participants completed Block 7, another critical block, with the same key assignments similar with Block 6 for 40 trials. Results in Block 3,4,6 and 7 were used to calculate the IAT scores.

In current study, a positive value has indicated stronger association between Chinese-good or Malay-Bad, which reflects higher racism, and vice versa. The scoring of IAT was done by using the Shiny application. The data exported from Qualtrics could be imported into Shiny application to generate D score, which was the scoring for IAT. It followed an improved scoring algorithm suggested by Greenwald, Nosek, and Banaji (2003). First, if 10% of trials done by a participant was less than 300ms, data from the participant would be excluded. Data of trials that were done in more than 10000ms would be deleted. After data cleaning, the standard deviation of the sum of response times in blocks 3 and 6 is calculated, as well for blocks 4 and 7. Subsequently, the difference in mean of the response time between Block 6 and 3 is calculated, as well for Block 7 and 4. These differences are divided by the

corresponding standard deviations calculated beforehand. The final D-score was computed by the average of the two quotients obtained.

Eye tracker. Fixation duration were measured using the Gazepoint 3 (GP3) eye tracker that records gaze position via a webcam that reflects infrared light on the cornea. Following a five-point calibration, the GP3 offers reliable tracking of eye movements with an accuracy in visual angle of 0.5 to 1 degree.

Statement. Statements that describe Malays in positive, negative and neutral ways were generated for the use of current research. The statements would be read by participants and their fixation duration on those statements would be measured in order to compare with their level of implicit racism. To generate statements that reflect Chinese's negative stereotypes towards Malays, several sources such as news and journal articles have been reviewed. Twitter was referred as one of the important sources to study the stereotypes towards Malay. Malay people previously counterargue the stereotypes other had towards Malay by posting on Twitter followed by a hashtag (#notallmalay). Based on the posts, some keywords were used to generate statements that may consistent with stereotypes towards Malay such as 'poor', 'late', 'lazy', 'bad in education'. According to study by Ibrahim et al. (2010), the most common stereotypes Malaysian Chinese held towards Malays such as 'lazy', 'privilege', 'conservative' and 'Mat Rempit'. Statements that positively describe Malay were generated using the keywords that are opposite in meaning to the keywords mentioned above, such as 'hardworking', 'open-minded' and 'smart'. Neutral statements that were irrelevant to stereotypes of Chinese towards Malays were also generated to serve as control.

Pilot study was conducted in order to choose six statements that are most representative of the positive, negative and neutral descriptions about Malay. Initially, ten items were generated respectively for statements that are negative (e.g., Most Malays are habitually lazy and does less than their fair share of work), positive (e.g., Most Malays are

open to new experience and willing to accept new ideas) and neutral (e.g., Most Malays are familiar with national anthem and flag of Malaysia). The statements were listed in Appendix C.

A total of 18 Chinese university students were recruited for this pilot study, with half of them were males and half were females. They were asked to indicate to which extent each statement was discriminating Malays or positively describe Malays, from -3 (extremely bad) to +3 (extremely good). Six statements that obtained a mean value which were nearest to +3 were chosen as it indicated that those statements were inconsistent with the negative beliefs Chinese had towards Malays. Statements that were consistent with the negative beliefs Chinese had towards Malays were obtained by choosing six statements that obtained a mean value which were nearest to -3. Meanwhile, the neutral statements which served as control were chosen from the statements that obtained a mean value that were nearest to 0. The finalized statements used as materials in the actual study were listed in Appendix E.

Due to the limitation posed by eye tracker, participants could not manually proceed to next statement after they finish reading the current one. Therefore, three statements which consisted of positive, negative and neutral one were placed inside a page in order to find out which statement would have longer fixation time from participants when being listed together. Another pilot study was conducted in order to determine a suitable time length that allows participants to read through all three statements before jumping automatically to the next page. A total of 17 participants were recruited for this pilot study. Based on the feedback from participants, the time length for participants to read through each three statements in one page was set to be 15 seconds as most of the participants were able to finish reading within 15 seconds.

Data Analysis Approach

In current research, Pearson Product-Moment Correlation was conducted to study the correlation between D-score obtained from IAT and the sum of fixation duration for statements that are positive, negative and neutral respectively.

Chapter IV

Results

In this chapter, descriptive statistics were presented on demographic information of participants and frequency distributions of variables in this study. The preliminary findings like normality tests were reported before the presentation of finding of parametric tests. While inferential statistics was run to obtain statistical result between variables by using Pearson Product Moment Correlation and Partial Correlation.

Descriptive Statistics

Table 4.1

Demographic Information and Descriptive Statistics of Variables

	N	%	<i>M</i>	<i>SD</i>
Age			21.420	1.486
18	1	2		
19	4	8		
20	7	14		
21	15	30		
22	12	24		
23	8	16		
24	1	2		
25	2	4		
Gender				
Male	17	34		
Female	33	66		
Implicit Racism	50		.512	.341
Time Spent on Negative Statements (Consistent with belief)	50		23.515	4.418
Time Spent on Positive Statements (Inconsistent with belief)	50		22.633	3.950

Table 4.1 showed the demographic information and descriptive statistics of variables in this study. The age range among the participants are between 18 to 25 years old ($M = 21.42$, $SD = 1.49$). The highest age group was 21 years old (30%) and followed by 22 years old (24%). The least age groups were 18 and 24 years old (2% respectively). Among the 50 participants, females (66%) were outnumbered compared to males (34%) in this study.

Preliminary Findings

Prior to conduct inferential analysis, normality data was assessed by checking the normality curves of histogram, skewness, kurtosis and P-P plot. Table 4.2 presented the skewness and kurtosis of each variables were fall in acceptable range of ± 2 . The normality curve on histogram and scatters on P-P plot also showed normal data (refer to Appendix F1 & F2).

Table 4.2

Skewness and Kurtosis of Variables

Variables	Skewness	Kurtosis
Implicit Racism	-.605	.710
Time Spent on Negative Statements (Consistent with belief)	-.205	-.478
Time Spent on Positive Statements (Inconsistent with belief)	.336	.071

Inferential Statistics

A Pearson Product moment correlation was conducted to assess the relationship between implicit racism and the time spent on positive statements. Result indicated that there was a significant negative correlation between implicit racism and the time spent on positive statements, $r(48) = -.310$, $p = .014$. Therefore, the hypothesis was failed to reject, however the direction of relationship was opposite with the hypothesis formed.

Pearson Product moment correlation also used to assess the relationship between implicit racism and the time spent on negative statements. Upon analysis, there was no

significant correlation between implicit racism and the time spent on negative statements, $r(48) = -.029, p = .422$. Thus, the hypothesis was rejected. The SPSS output for correlation among the three variables were listed in Appendix G1.

For exploratory basis, Pearson Product Moment correlation also used to analyse the relationship between implicit racism and time spent on statements among males and females. Among males, result found that there was no significant relationship between implicit racism and the time spent on both positive statements, $r(15) = -.260, p = .156$ and negative statements, $r(15) = -.051, p = .422$. While there was a significant negative correlation between implicit racism and the time spent on positive statements among females, $r(31) = -.325, p = .032$ and insignificant relationship between implicit racism and the time spent on negative statements among females, $r(31) = -.013, p = .471$ (refer to Appendix G2).

Furthermore, partial correlation was conducted to examine the relationship between two variables while control for the other variable. This is to ensure that the association between the two variables would not be affected by the other variable.

Result of Partial Correlation indicated that there was a significant correlation between implicit racism and the time spent on positive statements, $r(47) = -.304, p = .018$, when controlling for the time spent on negative and neutral statements. While result found that there was no significant correlation implicit racism and the time spent on negative statements, $r(47) = .095, p = .260$, when controlling for the time spent on positive and neutral statements (refer to Appendix G3).

Therefore, there was no difference between both results from Pearson and Partial Correlation, which the first hypothesis was significant but direction opposite and insignificant result for second hypothesis (refer to Table 4.3).

Table 4.3

Summary of Result

Hypothesis	<i>r</i> value	<i>p</i> value	Decision
1. There is a significant positive correlation between implicit racism and the time spent on statements that are inconsistent with own beliefs.	-.310	.014	Supported but the direction of relationship is opposite with the hypothesis.
2. There is a significant negative correlation between implicit racism and the time spent on statements that are consistent with own beliefs.	-.029	.422	Not supported.

Chapter V

Discussion and Conclusion

Discussion

The primary objective of this study is to examine whether Eye Tracker is a valid tool to measure implicit racial attitude in Malaysia. To achieve this, the present study had conducted a study that examined the time that people spent on both type of statements which are consistent and inconsistent with their own underlying belief.

The present research hypothesized that implicit racism positively correlates with the time spent on positive statements. By way of illustration, positive statements are the statements that positively describe people from another race, which in turn inconsistent with the stereotypes in a prejudiced person who have negative impressions about another race (e.g. “Most Malays are open to new experience and willing to accept new ideas.”). However, a significant negative correlation was found in this relationship instead. Current data demonstrated that an individual with higher implicit racism will take shorter time to read the statements which are inconsistent with one’s racist beliefs.

On the other hand, current result did not support the second hypothesis, which stated that there was a negative relationship between implicit racism and the time spent on negative statements (e.g. “Most Malays are habitually lazy and does less than their fair share of work”). This means that individuals with implicit racism would not take shorter time to read the statements although those are consistent with their own beliefs.

There are a few possibilities which might contributed to the unexpected results. In the present study, EFM (Sherman et al., 1998) had been chosen as our theoretical framework, since it is in line with the design of IAT. EFM proposed that people would spend more time on information that are inconsistent with existing stereotypes instead of consistent one, as inconsistent information requires more efforts to be understood. Similarly, the mechanism of

Race IAT implies that people would need longer time to categorize both targets that are consistent, compared to putting both targets that are consistent together into one category. However, the result obtained has seemingly contradicted the direction suggested by EFM.

A plausible explanation for the obtained result might be due to current study did not consider the role of cognitive load when developing hypothesis. EFM explained that differences between attention spent on consistent and inconsistent information will only exist when people are under cognitive load. Indeed, the methodological designs used by IAT might contribute to higher cognitive load within participants compared to eye tracker study. In the eye tracker study, participants just needed to read through different type of statements word by word within sufficient time. Expanding this line of thinking, the design of eye tracker study was rather more comfort than IAT, which demanding a quick and immediate response from participants. The time pressure induced by instructions of IAT could subsequently create cognitive load within participants. A study by Galy, Cariou, and Mélan (2012) have supported that time pressure is a source of extraneous cognitive load. Therefore, it is reasonable that the result has contradicted with the hypotheses developed based on EFM because the role of cognitive load had not been taken into considerations during the initial stage.

In the second place, the quality of the statements used in Eye Tracker test could be another possible reason. Although pilot study was done to select appropriate statements to access the implicit racial attitude in participants, while some statements did not show satisfied effect on participants. A few statements' results were nearer to neutral or were neutral response, which illustrated that some statements were perceived as neutral for certain people (see Appendix H). In other words, some statements used might not serve its initial purpose to differentiate racist and non-racist. As supported by Sciulli, Bebko, and Bhagat (2017), emotional intensity of the content would influence one's engagement in attending stimulus

thus influence one's attitude and gazing behaviour. Hence, this could be one of the possible reasons contributed to this result. As the statements might not impactful enough to evoke participants' emotion and implicit attitude toward the prejudiced statements, they might just read through the statements without spending too much time to understand the statements and scrutinize the meaning.

By looking at the result, which relationship between implicit racism and time spent on positive statements only showed significant relationship among female participants but not in male participants. It might due to the huge difference in sample size, as there are just 17 male participants which was nearly half compared to the number of female participants. While a less than enough number of participants would decrease the statistical power, then lead to an insufficient effect size which could not show its actual effect. Therefore, the result obtained could be largely attributed to the main reason of insufficient sample size, instead of making conclusion that the result was not significant for male participants.

In short, further researches are expected to identify the causes of current insignificant results by examining the two reasons aforementioned in order to further exploring the plausibility of validating eye tracker as a tool for implicit measurement.

Implications

The present research has provided few practical implications for future studies. This is the first study to validate the eye tracker as a tool to measure racism in Malaysia context. This provides a new direction to future studies on the feasibility of eye tracker to measure people's attitudes on other sensitive issues such as homophobia and sexual behaviours.

In addition, the present research also introduces the use of statements that include positive and negative descriptions about another race as a tool to differentiate people who have racism from those non-racists by examining the time they spent on different types of statements. This study provides practical implication that the results of study that apply

current design might be largely determined by the quality and content of statements used.

This can serve as a reference to future researchers to improvise their design of research when selecting stimuli that can assess the beliefs of racism.

Limitations of Study

First, this might be due to the methodological issue arose in the study. The eye tracker used in this study was not as advance as other model, hence some important features might not available for the eye tracker. For example, the gaze samples percentage is not available in the eye tracker used in the current study. This gaze samples percentage is to detect usable data that is identified correctly. This is to ensure that participants' eyes can fully detect without lost track from eyes. Participants with spectacles were more likely to show difficulty in detecting eyes because there might be some interferences of light. So, this had increased the chances of lost track results. Thus, the exclusion of invalid data due to lost track results was done manually as the eye tracker used was unable to auto-filter and evaluate the invalid data.

Besides, the dropout rate after the data exclusion could be one of the reasons that affect the result shown. The number of participants decreased from 70 to 50, which is reduced about 28% of total participants. According to Button et al. (2013), a small sample size of study can contribute to low statistical power which would increase the likelihood that a statistical result might not show a true effect. Therefore, the number of participants in current study might not sufficient to obtain a true significant result.

Recommendations for Future Research

Based on the limitations mentioned above, it is recommended that future studies can revise the statements so that the statements are able to elicit stronger emotional responses from participants. Current research had studied the positive and negative stereotypes of Chinese towards Malays solely based on online resources. Future studies are recommended to

collect opinions from Chinese population through more comprehensive methods. For example, a focus group discussion can be conducted among a small number of Chinese university students to understand the common stereotypes of them about Malays. Moreover, the statements should be reviewed by an expert to check for face validity in order to prevent any confounding variables that influence the time spent by participants on those statements.

Second, future studies should determine a reliable indicator that can be used to filter the invalid results generated by eye tracker. In current research, some of the eye-tracking records were out of the place and did not reflect accurately where the participants were looking at. The eye tracker used in this experiment, GP3, was failed to provide an indicator that help researcher to identify the problematic data with such problems. Therefore, future studies are recommended to find a solution regarding this issue before considering of using GP3.

Besides, future studies are recommended to replicate current study with other sensitive topics like sexual behavior. As there are numerous methodological limitations in current study, it is suggested that researchers can explore more on other topics in order to ensure the use of eye tracker in assessing implicit attitude.

Another recommendation for future studies to validate the use of eye tracker is by the differentiation or comparison between known groups. Future studies can recruit people who are potential to be high in racism such as always make racists comment on social media and replicate this experiment with them. This practice can be used to provide knowledge for the fixation pattern of people who are already known to have racism.

Conclusion

In summary, this study provides an exploratory basis for the validation of eye tracker to measure implicit racism in future use. Although current results suggest that eye tracker is not consistent enough to serve as a tool for measuring racism in this study, it is believed that

with the improvement in methodological issues and revision of the theoretical framework, the use of eye tracker is viable to provide biopsychological evidence for implicit processing.

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Appendix A

IAT Blocks

Block	No.of trials	Response key assignment	
		Left key	Right key
1	20	Chinese	Malay
2	20	Good	Bad
3	20	Chinese, Good	Malay, Bad
4	40	Chinese, Good	Malay, Bad
5	20	Bad	Good
6	20	Chinese, Bad	Malay, Good
7	40	Chinese, Bad	Malay, Good

*The sequences of blocks were randomised.

Appendix B

IAT

Demographic Information

User No.

Age

Gender



- Male
- Female

Race

- Malay
- Chinese
- Indian
- Other

Implicit Association Test (IAT) Instruction

You will use the 'E' and 'I' computer keys to categorize items into groups as fast as you can. These are the four groups and the items that belong to each:

Category	Items
Good	Cheer, Beautiful, Fantastic, Love, Celebrate, Appealing, Adore, Spectacular
Bad	Poison, Despise, Pain, Selfish, Evil, Hatred, Sadness, Horrible
Malay	
Chinese	

Here are seven parts. The instructions change for each part. Pay attention!



Appendix C

Statements

Negative Statements

1. Most Malays are habitually lazy and does less than their fair share of work.
2. Most Malays are unproductive and inefficiently missing out of progress.
3. Most Malays are dumb and always mess up with the works assigned to them.
4. Most Malays are uneducated and behave in uncivilized manner in public.
5. Most Malays are poor and unable to maintain their standard of living.
6. Most Malays are unappreciative and taking their privilege for granted.
7. Most Malays are irresponsible and do not make commitment to promise.
8. Most Malays are passive and unwilling to take risk for uncertain events.
9. Most Malays are easily get influenced and believe everything on social media.
10. Most Malays are close-minded and do not appreciate values against their belief.

Positive Statements

1. Most Malays are hardworking and always do more works than others.
2. Most Malays are competent and able to complete multiple tasks effectively.
3. Most Malays are smart and show outstanding performance to get work done.
4. Most Malays are well-educated and good at logical reasoning.
5. Most Malays are good at business planning and make huge amount of profit.
6. Most Malays are good at mathematics and plan wisely in spending budget.
7. Most Malays are punctual and always show up in meeting on time.
8. Most Malays are proactive and always ready to deal with unexpected change.
9. Most Malays are open to new experience and willing to accept new ideas.
10. Most Malays are managed to stay discipline in order to achieve their goals.
11. Most Malays are able to recognize their own weakness and dedicated to change it.

Neutral Statements

1. Most Malays are enjoyed to buy things online for their own convenience.
2. Most Malays are enjoyed watching drama during their own leisure time.
3. Most Malays are enjoyed taking photos during some memorable events.
4. Most Malays are bilingual and able to speak at least two languages.
5. Most Malays are food lovers and proud of the diversity of local food.
6. Most Malays are more aware of the importance of health management.
7. Most Malays are more likely to take Grab car rather than traditional taxi.
8. Most Malays are having their own indigenous culture and heritage.
9. Most Malays are celebrating festivals for traditional delicacy and fellowship.
10. Most Malays are familiar with national anthem and flag of Malaysia.

Appendix D

Pilot Study for Statements

UNIVERSITI TUNKU ABDUL RAHMAN
FACULTY OF ARTS AND SOCIAL SCIENCE
BACHELOR OF SOCIAL SCIENCE (HONS) PSYCHOLOGY

Pilot Study for Final Year Project**Purpose of the Research**

This pilot study is done to fulfill the requirements of subject Final Year Project. In order to collect the required information, your participation in this research study is highly appreciated.

Procedure

This questionnaire consists of 2 sections and 34 questions including the demographic data. The duration to answer this survey are estimated between 10-15 minutes only. Please note that you are unable to return to the previous page during the survey.

Voluntary Participation

Your participation in this study is voluntary. If you choose not to participate or to withdraw from the study at any point of the time, there will be no penalty and it will not affect the relationship with the researchers in the future.

Confidentiality

All information and responses given by you will be kept confidential and will not made available to the public unless disclosure is required by law. The data of the research will neither be revealed to the third party nor used for any other purposes other than the study.

Contact Information

If you have any questions concerning the research, kindly contact Low Kah Yue, at hastaforg@lutar.my.

Herewith, I confirm that I have read and understood the information given. I voluntarily agree to take part in this survey.

Yes, I agree to participate this study voluntarily.

No, I disagree to participate this study voluntarily.

Age

Gender

Male

Female

Race

Malay

Chinese

Indian

Other



Instruction:

Please indicate that to what extent do you think the statements below are discriminating Malays or positively describe Malays.

Bad -3 -2 -1 Neutral 0 1 2 Good 3

Most Malays are smart and show outstanding performance to get work done.

Most Malays are enjoyed watching drama during their own leisure time.

Most Malays are well-educated and good at logical reasoning.

Most Malays are easily get influenced and believe everything on social media

Most Malays are passive and unwilling to take risk for uncertain events.

Most Malays are punctual and always show up in meeting on time.

Most Malays are competent and able to complete multiple tasks effectively.

Most Malays are more aware of the importance of health management.

Most Malays are enjoyed to buy things online for their own convenience.

Most Malays are hardworking and always do more works than others.

- Most Malays are open to new experience and willing to accept new ideas.
- Most Malays are unappreciative and taking their privilege for granted
- Most Malays are bilingual and able to speak at least two languages.
- Most Malays are good at business planning and make huge amount of profit.
- Most Malays are habitually lazy and does less than their fair share of work
- Most Malays are close-minded and do not appreciate values against their beliefs.
- Most Malays are able to recognize their own weakness and dedicated to change it.
- Most Malays are food lovers and proud of the diversity of local food.
- Most Malays are uneducated and behave in uncivilized manner in public.
- Most Malays are irresponsible and do not make commitment to promise.
- Most Malays are enjoyed taking photos during some memorable events.
- Most Malays are good at mathematics and plan wisely in spending budget.
- Most Malays are uneducated and behave in uncivilized manner in public.
- Most Malays are irresponsible and do not make commitment to promise.
- Most Malays are enjoyed taking photos during some memorable events.
- Most Malays are good at mathematics and plan wisely in spending budget.
- Most Malays are managed to stay discipline in order to achieve their goals.
- Most Malays are unproductive and inefficiently missing out of progress
- Most Malays are dumb and always mess up with the works assigned to them.
- Most Malays are proactive and always ready to deal with unexpected change.
- Most Malays are poor and unable to maintain their standard of living.



Appendix E

Results of Finalized Statements

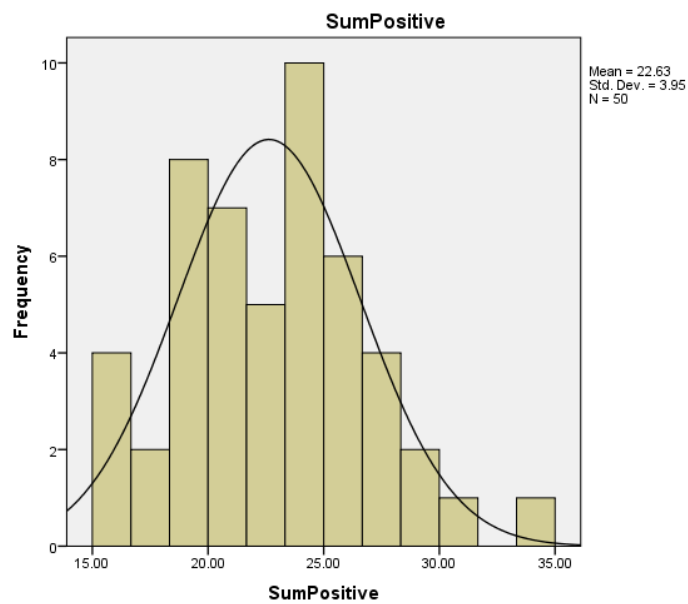
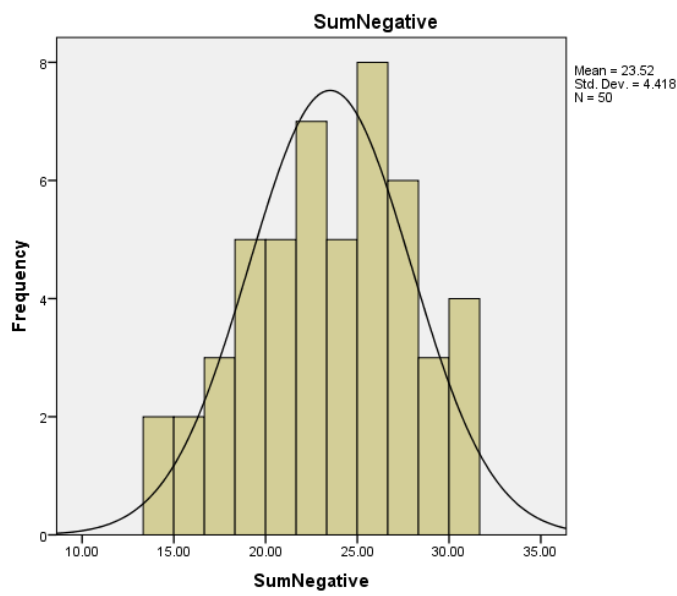
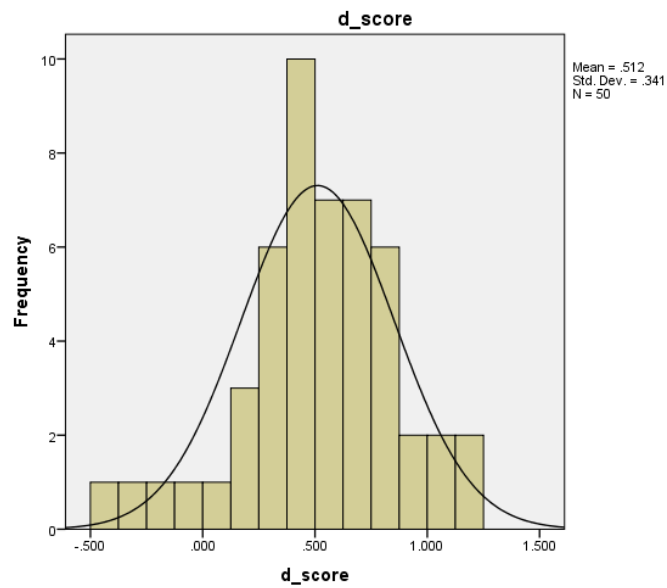
	Negative Statement	Mean
1	Most Malays are habitually lazy and does less than their fair share of work.	-1.389
2	Most Malays are unproductive and inefficiently missing out of progress.	-1.167
3	Most Malays are dumb and always mess up with the works assigned to them.	-1.722
4	Most Malays are uneducated and behave in uncivilized manner in public.	-1.778
5	Most Malays are poor and unable to maintain their standard of living.	-0.611
6	Most Malays are unappreciative and taking their privilege for granted	-1.056
7	Most Malays are irresponsible and do not make commitment to promise.	-1
8	Most Malays are passive and unwilling to take risk for uncertain events.	-1.056
9	Most Malays are easily get influenced and believe everything on social media	-0.556
10	Most Malays are close-minded and do not appreciate values against their beliefs.	-1

	Neutral Statement	Mean
1	Most Malays are enjoyed to buy things online for their own convenience.	1
2	Most Malays are enjoyed watching drama during their own leisure time.	0.625
3	Most Malays are enjoyed taking photos during some memorable events.	0.9375
4	Most Malays are bilingual and able to speak at least two languages.	0.375
5	Most Malays are food lovers and proud of the diversity of local food.	1.125
6	Most Malays are more aware of the importance of health management.	0.25
7	Most Malays are more likely to take Grab car rather than traditional taxi.	0.625
8	Most Malays are having their own indigenous culture and heritage.	0.6875
9	Most Malays are celebrating festivals for traditional delicacy and fellowship.	1
10	Most Malays are familiar with national anthem and flag of Malaysia.	1.375

	Positive Statement	Mean
1	Most Malays are hardworking and always do more works than others.	1
2	Most Malays are competent and able to complete multiple tasks effectively.	0.9444
3	Most Malays are smart and show outstanding performance to get work done.	1
4	Most Malays are well-educated and good at logical reasoning.	1.1667
5	Most Malays are good at business planning and make huge amount of profit.	0.8889
6	Most Malays are good at mathematics and plan wisely in spending budget.	0.6667
7	Most Malays are punctual and always show up in meeting on time.	1.4444
8	Most Malays are proactive and always ready to deal with unexpected change.	0.8889
9	Most Malays are open to new experience and willing to accept new ideas.	1.2222
10	Most Malays are managed to stay discipline in order to achieve their goals.	1.2778
11	Most Malays are able to recognize their own weakness and dedicated to change it.	0.5556

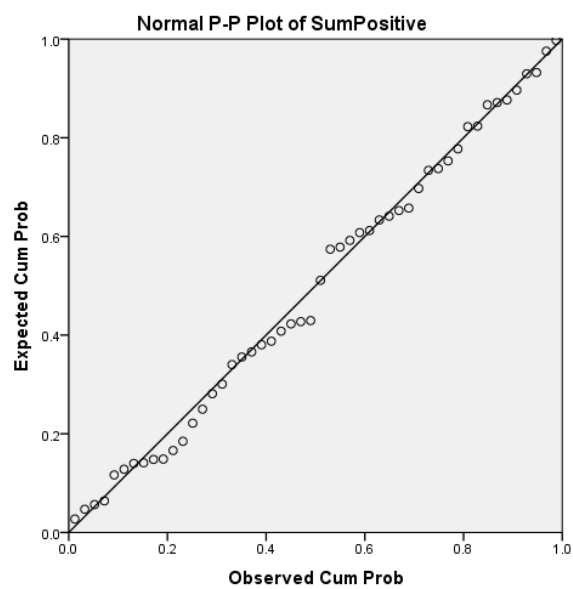
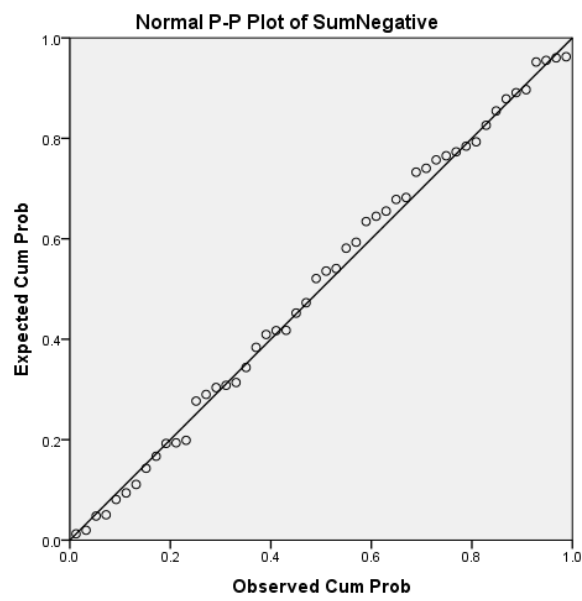
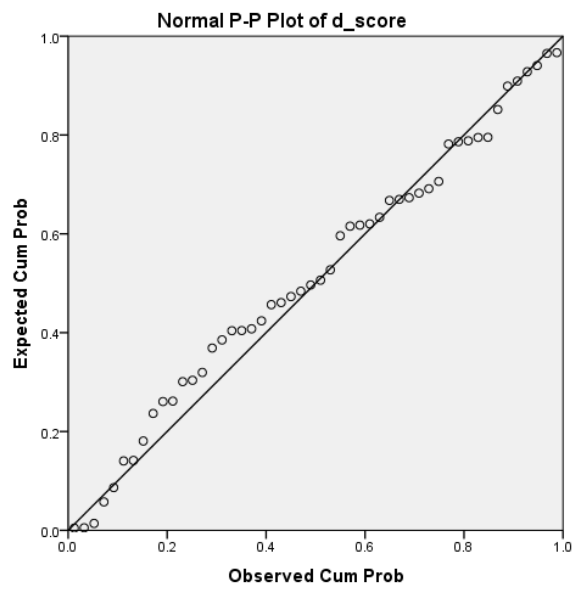
Appendix F1

Histogram of Each Variables



Appendix F2

P-P Plot of Each Variables



Appendix G1

SPSS output

Correlations

		d_score	SumNegative	SumPositive	SumNeutral
d_score	Pearson Correlation	1	-.029	-.310 [*]	-.111
	Sig. (1-tailed)		.422	.014	.222
	N	50	50	50	50
SumNegative	Pearson Correlation	-.029	1	.333 ^{**}	.436 ^{**}
	Sig. (1-tailed)	.422		.009	.001
	N	50	50	50	50
SumPositive	Pearson Correlation	-.310 [*]	.333 ^{**}	1	.316 [*]
	Sig. (1-tailed)	.014	.009		.013
	N	50	50	50	50
SumNeutral	Pearson Correlation	-.111	.436 ^{**}	.316 [*]	1
	Sig. (1-tailed)	.222	.001	.013	
	N	50	50	50	50

*. Correlation is significant at the 0.05 level (1-tailed).

**.. Correlation is significant at the 0.01 level (1-tailed).

Appendix G2

SPSS Output - Correlations among Males & Females

Correlations^a

		d_score	SumNegative	SumPositive	SumNeutral
d_score	Pearson Correlation	1	-.051	-.260	.029
	Sig. (1-tailed)		.422	.156	.457
	N	17	17	17	17
SumNegative	Pearson Correlation	-.051	1	.496*	.581**
	Sig. (1-tailed)	.422		.021	.007
	N	17	17	17	17
SumPositive	Pearson Correlation	-.260	.496*	1	.280
	Sig. (1-tailed)	.156	.021		.138
	N	17	17	17	17
SumNeutral	Pearson Correlation	.029	.581**	.280	1
	Sig. (1-tailed)	.457	.007	.138	
	N	17	17	17	17

*. Correlation is significant at the 0.05 level (1-tailed).

**. Correlation is significant at the 0.01 level (1-tailed).

a. Gender = 1

Correlations^a

		d_score	SumNegative	SumPositive	SumNeutral
d_score	Pearson Correlation	1	-.013	-.325*	-.193
	Sig. (1-tailed)		.471	.032	.140
	N	33	33	33	33
SumNegative	Pearson Correlation	-.013	1	.244	.317*
	Sig. (1-tailed)	.471		.086	.036
	N	33	33	33	33
SumPositive	Pearson Correlation	-.325*	.244	1	.341*
	Sig. (1-tailed)	.032	.086		.026
	N	33	33	33	33
SumNeutral	Pearson Correlation	-.193	.317*	.341*	1
	Sig. (1-tailed)	.140	.036	.026	
	N	33	33	33	33

*. Correlation is significant at the 0.05 level (1-tailed).

a. Gender = 2

Appendix G3

SPSS Output - Partial Correlation

Correlations

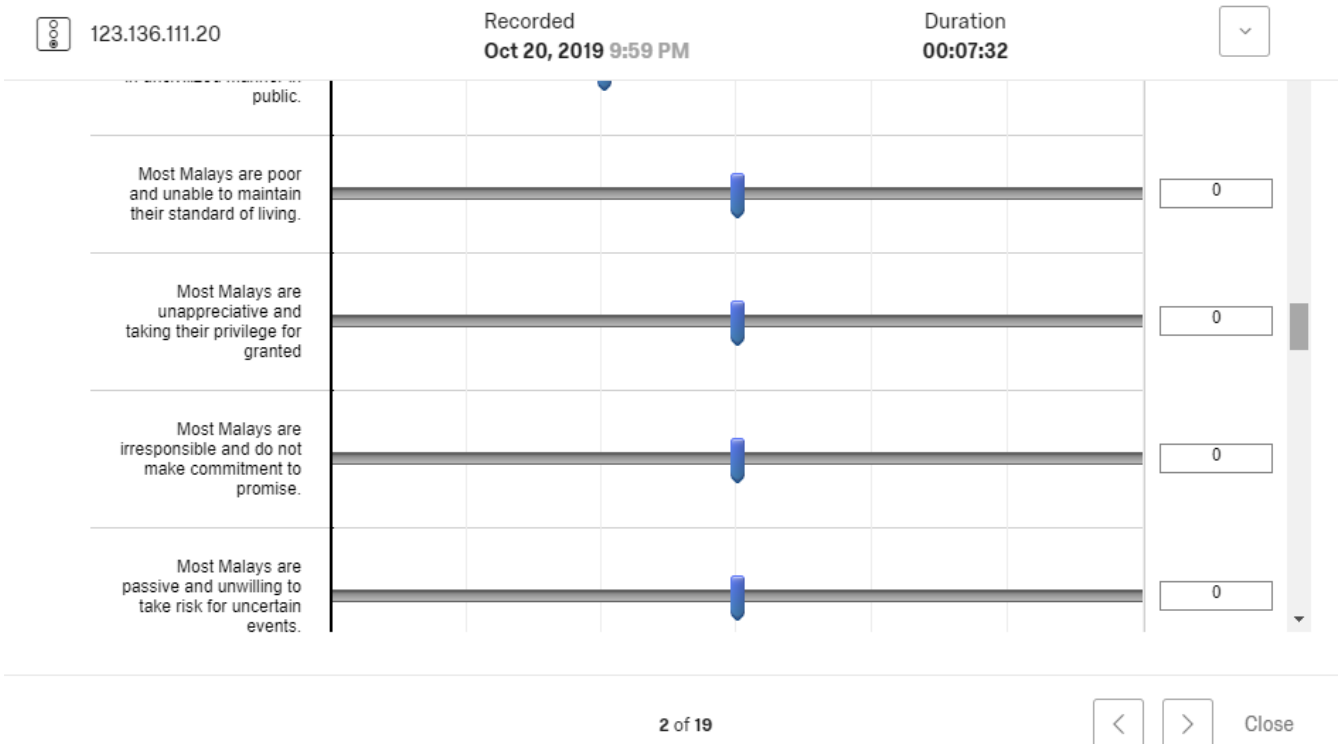
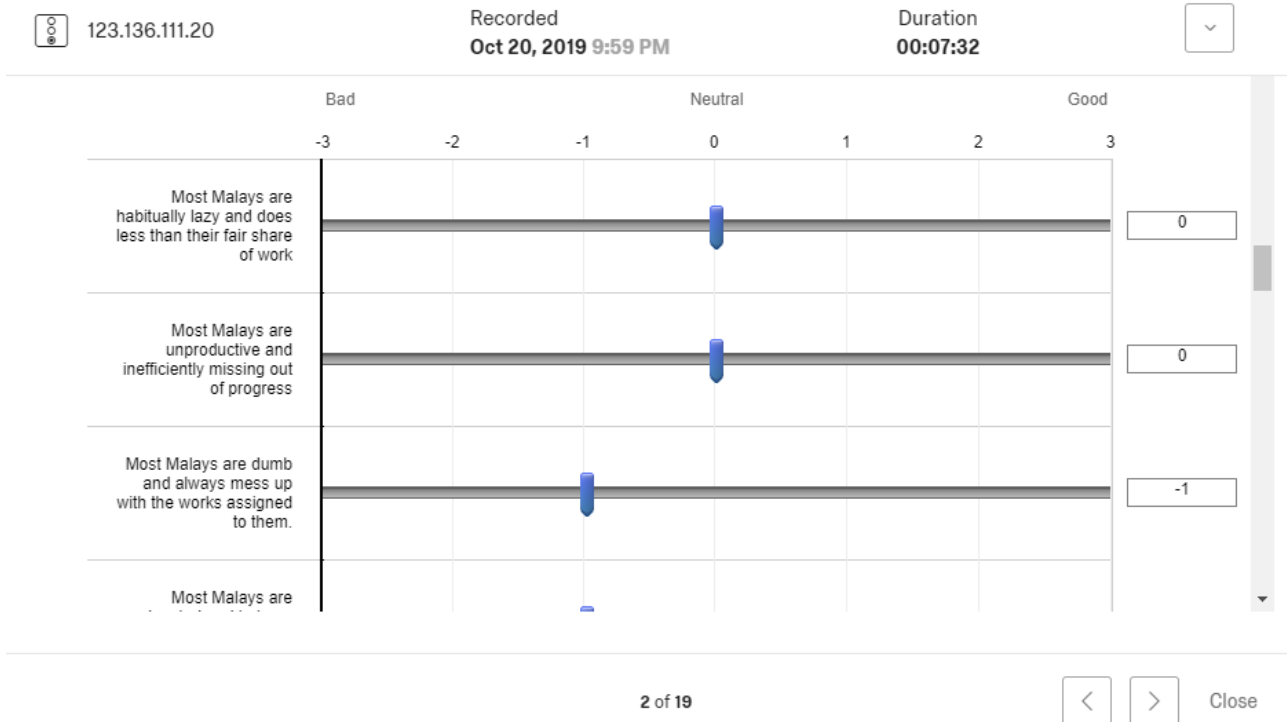
Control Variables			d_score	SumNegative
SumPositive & SumNeutral	d_score	Correlation	1.000	.095
		Significance (1-tailed)	.	.260
		df	0	46
	SumNegative	Correlation	.095	1.000
		Significance (1-tailed)	.260	.
		df	46	0

Correlations

Control Variables			d_score	SumPositive
SumNeutral & SumNegative	d_score	Correlation	1.000	-.304
		Significance (1-tailed)	.	.018
		df	0	46
	SumPositive	Correlation	-.304	1.000
		Significance (1-tailed)	.018	.
		df	46	0

Appendix H

Examples for Result that Nearer to Neutral or Neutral Responses



Appendix I

Ethical Approval for Research Project



UNIVERSITI TUNKU ABDUL RAHMAN
Wholly Owned by UTAR Education Foundation (Company No. 578227-M)

Re: U/SERC/168/2019

29 August 2019

Dr Chie Qiu Ting
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 Chie,

Ethical Approval For Research Project/Protocol

We refer to the application for ethical approval for your students' research project from Bachelor of Social Science (Hons) Psychology programme enrolled in course UAPZ3013. We are pleased to inform you that the application has been approved under expedited review.

The details of the research projects are as follows:

	Research Title	Student's Name	Supervisor's Name	Approval Validity
1.	Relationship between Implicit Association Test and Eye-Tracker	1. Cheng Khai Vern 2. Low Kah Yue 3. Teh Wei Theng	Dr Tan Chee Seng	29 August 2019 – 28 August 2020

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.

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 Faiz 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

Kampar Campus : Jalan Universiti, Bandar Baru, 31900 Kampar, Perak Darul Ridzuan, Malaysia
Tel: (605) 468 8888 Fax: (605) 466 1313
Sungai Long Campus : Jalan Sungai Long, Bandar Sungai Long, Cheras, 43000 Kajang, Selangor Darul Ehsan, Malaysia
Tel: (603) 9086 0288 Fax: (603) 9019 8868
Website: www.utar.edu.my



Appendix J

Flyer for Recruitment of Participants

CONDUCT BY UTAR STUDENTS

Participants Needed!

For a study on Reading Comprehension in Non-native English Speakers

WHAT WILL YOU HAVE TO DO ?
Complete a *Mental Speed Test & Word Reading Task* on a computer. You will get a **mystery gift** for participation !


WHERE IS THE STUDY ?
Block P102 (UCCC)

CAN I JOIN ?

- Malaysian **Chinese** aged between **18-29 years**
- Normal / Corrected-to-Normal Vision

INTERESTED ?

Kindly contact **Ms. Low** :
hastaforg@1utar.my or
010-5612580 for enquiry



scan to register & choose timeslot

Appendix K

Turnitin Originality Report

FYP 2

ORIGINALITY REPORT

3%	0%	1%	2%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Submitted to South Bank University Student Paper	1%
2	Submitted to Navitas Professional Institute Pty Ltd Student Paper	1%
3	Submitted to University of Nottingham Student Paper	1%
4	Takafumi Sawaumi, Tsutomu Inagaki, Atsushi Aikawa. "Does Conventional Implicit Association Test of Shyness Measure "Self-Shyness" or "Others-Shyness"?", Japanese Psychological Research, 2018 Publication	1%

Exclude quotes On
Exclude bibliography On

Exclude matches < 1%