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School of Transportation Sciences

Master of Transportation Sciences

Master's thesis

Hazard perception skills of children with autism in the Jakarta metropolitan area: a comparison of test performance and parents' subjective evaluation

Jeanly Syahputri

Thesis presented in fulfillment of the requirements for the degree of Master of Transportation Sciences, specialization Traffic Safety

SUPERVISOR :
Prof. dr. Kris BRIJS

MENTOR :
Mevrouw Helene DIRIX

CO-SUPERVISOR :
dr. Veerle ROSS

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ABSTRACT

Children in Indonesia are vulnerable to road injuries and fatalities. One of the reasons is children's deficiency of pedestrian safety skills. Notably, the accuracy of parents' perception of their autistic children's pedestrian skill play a pivotal role in preventing children's road injuries and fatalities. Moreover, previous studies suggested that this skill deficiency may be more concerning among autistic children. This study aimed to investigate: (1) If 20 autistic children in the Jakarta Metropolitan Area exhibited different pedestrian hazard perception (HP) skills compared to 34 non-autistic children, and (2) if parents' judgement accuracy on their autistic children is related to their children's personal and travel characteristics and HP skill. All children participants completed a simple pedestrian hazard perception skill test simulating BP, EP, DF and no hazard situation. At the same time, parents of autistic children were asked to predict their children's test performance and how it compares to the control group. The result shows that autistic children performed worse in all hazard types (BP, EP and DF) in terms of correct answers and reaction time compared to the control group. Moreover, parents of autistic children could accurately predict their children's number of correct answers and would answer less correct answer than the control group. Nonetheless, the current study demonstrated that parents had tendency to overestimate their autistic children's reaction time in identifying hazards.

Highlights:

1. The autistic children identified fewer BP, EP and DF hazards.
2. The autistic children react slower when identifying BP, EP and DF hazards.
3. Both groups rated the dangerousness of all-hazard types similarly.
4. Parents were able to accurately predict their children's total correct answers from the HP test.
5. Parents overestimated their children's reaction time in answering the HP skill test.

Keywords: Autism spectrum disorder, children, parental perception, pedestrian hazard perception skill, Jakarta Metropolitan Area

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1 INTRODUCTION

1.1 Problem statement

Road crashes in low and middle-income countries have captured global attention as it accounts of over 90% of road deaths (World Health Organization, 2015). In Indonesia, 30,000 people are killed, and 150 000 are injured annually in road crashes (Ministry of Transportation Indonesia, 2019). It is estimated that the pedestrian fatality rate reaches as high as 38% of all road users in Indonesia (The Global Road Safety Facility, 2018). Similar to data from the low and middle-income countries, Indonesia reported that 5-14 years old accounts for 30-40% of pedestrian fatalities. About half of them are children age 10-14 years old, making this group the most vulnerable pedestrian in Indonesia (Pratiwi & Siahaan, 2017; World Health Organization, 2018). One of the reasons is due to deficiency of children' hazard perception skills. For instance, they feel less fear and run without looking at both sides of the road when road crossing, even though they acknowledge the proper behaviour to safely cross the road (Rosenbloom et al., 2008; Zeedyk & Kelly, 2003).

Being a pedestrian might be more challenging for individuals with Autism Spectrum Disorder (ASD), and perhaps, to a greater extent in Indonesia. Apparently, autism is still unfamiliar to many people in Indonesia. Moreover, similarly to other studies conducted in the South-East Asia (e.g., Ha et al., 2014; Ilias et al., 2016), some people in Indonesia stigmatize autism negatively, for instance by believing that ASD is caused by karma and parents' sins. Unfortunately, not a few of Indonesian families with autistic children seem to view autism as a "sensitive matter", "quite a burden", and even a "family shame", which need to be covered up (Rachmayanti & Zulkaida, 2007; Riany et al., 2016; Tucker, 2013). Even from the point of view of active researchers in this field of study, previous studies indicates ASD as a "new phenomenon" in Indonesia (Riany et al., 2016; Tucker, 2013).

ASD is a developmental disorder (Centers for Disease Control, 2012), and individuals with ASD are categorized by problems with communicating and interacting socially and having limited or repetitive behaviour or interests. Autistic children may have specific characteristics and develop behaviours that cause them to be even more vulnerable to injuries and fatalities (Law & Anderson, 2011; Lee et al., 2008; Xiang et al., 2005). For example, previous studies conducted in the United States found autistic children were 12% more likely to experience injuries, with a higher degree of severity than non-autistic children (Lee et al., 2008; Xiang et al., 2005). Another behaviour that may put autistic children in a more hazardous situation is elopement or wandering. A previous study reported that 50% of individuals with ASD are reported to exhibit this behaviour, in which children roam around or step out from safe circumstances without supervision and permission from their caregivers (e.g., parents, teacher) (Law & Anderson, 2011). The previous research suggested the integral role of their still-developing physiological, motor, cognitive and emotional state, resulting in a lack of pedestrian hazard percep-

tion (HP) skills, which exposes them to even highly prospectus dangerous situations compared to matured adults with ASD (Rosenbloom et al., 2015). Thus, proper skills in keeping autistic children safe are essential when exposed to an unsupervised and unfamiliar environment as a pedestrian (Honsberger, 2017).

Parents of autistic children inevitably play a pivotal role in developing their children's hazard perception skills as pedestrians, as autistic children commonly rely on their parents to perform day-to-day activities (Rosenbloom & Wolf, 2002). Although parents are hopeful that their autistic children can grow up independently, they may have a pessimistic picture of their children's future due to skills limitations (Rea-Amaya et al., 2019). As individuals with ASD will become independent individuals seeking independent mobility, their parents' perception is essential. On the one hand, if they underestimate their ASD children and keep them from opportunities to experience uncertainties and learn from practice, their children might be exposed to greater risk from hesitancy to make decisions (Niehues et al., 2015). On the other hand, if parents overestimate their children, it only takes a single mistake for their children to suffer from direct consequences as road users (Honsberger, 2017). Although parents of children with Autism ASD seem to be pessimistic that their children lack more daily living skills compared to non-autistic children (Rea-Amaya et al., 2019), parents believe that their children should develop adequate safety skill as a pedestrian to mobilize independently, especially with less need of supervision (Collins et al., 1991; Ivey, 2007).

1.2 Significance of the study

As far as the authors are aware, no studies focusing on and HP while performing trips (e.g., walking) have been conducted. However, a few studies in adults with ASD were conducted with respect to HP while walking or driving. It is suggested that individuals with ASD Adults with ASD may have disadvantages as a pedestrian as some of them are found to demonstrate shorter fixation duration to subtle traffic-relevant objects (Cowan et al., 2017) and difficulties in finding pedestrian crossing. Cowan et al. (2018) linked this finding to the possible characteristics they may exhibit, which demonstrating hyper or hypo sensitivity to elements in the environment (i.e., light, sound, smell, texture) (American Psychiatric Association, 2013). Thus, they may have insufficient sensitivity to an unfamiliar situation as they visualize road layouts differently (Goldsmith, 2009; Wilmut & Purcell, 2021). For example, Earl et al. (2016) demonstrate that unlike non-autistic children, autistic children tend to focus on traffic non-relevant objects (e.g., trees, bench).

Studies related to ASD in Indonesia are rarely found, particularly, it appears that there is no published study in respect to transportation and hazard perception skill of individuals with ASD in Indonesia. However, studies related to the safety of individuals with ASD are crucial as it holds potential in providing evidence-based research to improve long-term independence and to encourage effective interventions to enhance the safety of individuals with ASD (Tekin-Iftar et al., 2021), especially as Indonesia needs to prepare for the growing presence of people with ASD. Previous research found that people with ASD often encompasses negative

implicit attitude and socially excluded, humiliated and neglected (Dickter et al., 2020). Therefore, scientific studies are also crucial to comprehensively understanding and promoting an inclusive environment for people with ASD.

1.3 Research questions

To understand the extent to which parents perceive the hazard perception skill of their ASD children, this study aims twofold. Firstly, to obtain data on comparing hazard perception skill in children with and without ASD in Indonesia. Thus, this study will therefore address the following research questions:

1. To what extent do hazard perception skills with different types of hazard (BP, EP and DF) in autistic children differ from the control group?
2. Do children with and without ASD rate of dangerousness in different types of hazards similarly?
3. Do children with and without ASD have similar reaction time in different types of hazards similarly?

The second aim of this study is to investigate the perception of parents with autistic children on their children and the potential relationship it may have to the characteristics and hazard perception skill of their children, with these following research questions:

1. Are the parents' perception towards their children's HP skills are influenced by their children's personal characteristics (age, gender, level of education, and residential area)?
2. Are the parents' perception of their children's HP skills are influenced by their children's travel frequency with different types of modes?
3. Are the parents' perception of their children's HP skills are influenced by their (age, gender, level of education, and residential area)?
4. Are the parents' perception of their children's HP skills are related to their children's HP skills?
5. To what extent do parents of autistic children perceive their children's HP skill compared to the control group?
6. To what extent can parents accurately predicts their children's HP skills?
7. How concerned are parents on their children's current and future skill as a pedestrian?

1.4 Research overview

This study is organized in six chapters. In the first chapter, vulnerability of pedestrian, particularly children are highlighted, and ASD phenomenon in Indonesia is introduced, including the pivotal role of parents on their children’s basic living skill development. Moreover, the section addresses the importance of pedestrian hazard among autistic children. Subsequently, differences of hazard perception skill of people with and without ASD are presented.

Chapter 2 address various issues and founding related to ASD children and pedestrian hazard perception skill. The section describes ASD in details, including the diagnosis, prevalence, and systematic issues regarding inclusivity in Indonesia. Moreover, the current situation of pedestrian accessibility in the Jakarta Metropolitan Area (JMA) is described. Chapter three presents the research method, including the data collection process, survey materials, and analysis process. The results of the analysis are discussed in chapter four. Chapter 5 highlights the findings and discuss the links with previous findings. Chapter 6 addresses the limitations, provides recommendation for future study, and presents practical limitation of the current study. Finally, chapter 7 provide the conclusions of the current study.

2 LITERATURE REVIEW

2.1 Autism Spectrum Disorder (ASD) and people with ASD in Indonesia

APDC (2020) refer Autism Spectrum Disorder (ASD) as an 'hidden disability' as this neuro-developmental disorder divergently affect different people. People with ASD have developmental disability, which lead them to substantial social, communication and behavioural challenges CDC (2020). For instance, social communication and interaction deficits are exhibited as individuals with ASD may manifest less or overwhelm with enthusiasm for sharing interests and interacting with people. The degree of each problem varies in different individuals with ASD, and they may experience all or only some of the mentioned indicators (American Psychiatric Association, 2013; Centers for Disease Control, 2012).

Furthermore, a longitudinal study with aged-matched participants between 3-35 years old revealed that autistic children have an atypical brain developmental process compared to non-autistic children. Interestingly, the brain development (e.g., whole brain volume, cerebellum, thalamus) of both groups is found to encounter between the age of 10-15 (Lange et al., 2014). These brain structure measurements is suggested to be correlated with perceptual and motor processes, which include decision making during hazard perception tasks (Basak et al., 2011; Gharib et al., 2020). Notably, ASD includes both individuals with intellectual disability as well as high academic and social functioning people with superior IQ (Grove et al., 2019). People, in general, might experience some issues related to ASD. However, these issues are minor and do not impact their everyday functioning, where these issues have an immense impact on the daily lives of people with ASD (Centers for Disease Control, 2012).

To this date, it is impossible to present the precise number and data of individuals with ASD in Indonesia. The data of people with ASD is presented in a rather varied way among different studies and institutions in Indonesia. The only published data were collected in 1992, which estimated 0.12% prevalence rate from infants born between 1984 to 1991 (Wignyosumarto et al., 1992).The Ministry of Woman Empowerment and Child Protection (The Ministry of Women Empowerment and Child Protection Indonesia, 2018) used the prevalence rate suggested by the British Medical Journal published in 1997 to calculate the number of ASD people in Indonesia, in which, 2.4 million people are estimated to live with ASD. According to collected data from special schools across Indonesia in 2019, The Ministry of Research, Technology, and Higher Education calculated nearly 17 thousand autistic children (Ministry of Research and Culture, 2020). With unreliable and inconsistent data, it would be difficult to understand the details how and why they and their closest people (e.g., family, caregiver) are affected, as how it impacts the society (Cameron & Suarez, 2017). On top of that, undiagnosed people with ASD are prone to suffer the loss of receiving their rights as person with disability, such as services and facilities from both government and non-governmental programs (APCD, 2020; Sidjaja et al., 2016).

These numbers are likely to be underestimated as individuals with ASD often undetected and underdiagnosed, especially in a low and middle-income country

such as Indonesia (Wallace et al., 2012). Moreover, data of autistic children is mainly recorded by governmental institutions from formal schools (e.g., Ministry of Research and Culture, 2020; Ministry of Research, 2017). Nevertheless, Cameron and Suarez (2017) reported only 65% of 5-12 years old and 54% of 13 to 17 years old children with moderate disability attend formal school in 2012. This study also mentioned two possible obstacles leading to this condition. Firstly, some families believe that children with disability will unlikely to be productive in their live, leading them to think that school is unnecessary. Secondly, lack of access also found to constraint family to find suitable education for their children, especially among low socio-economic backgrounds. Services and facilities for people ASD mainly offered by private sectors, and centralized in large cities in Java island, and only can be afforded by people from middle- and high- socio-economic background (Adioetomo & Mont, 2014; Cameron & Suarez, 2017; Hata et al., 2021; Sidjaja, 2015; Sumner, 2015; Tucker, 2013).

2.2 Pedestrian and mobility inequality in the Jakarta Metropolitan Area

In 2016, World Health Organization (2018) reported that 1 out of 500 Indonesian suffered from road accidents, with approximately 6% fatality rate and 94% survived from severe and light injuries. A previous study by Pratiwi & Siahaan (2017) which were conducted among children age 0-14 years old in five metropolitan cities in Indonesia (Bandung, Surabaya, Medan, Semarang and Makassar) that the most fatalities are among children aged 10-14 years old. This study estimated that 20% and 70% of accidents among children results in severe and slight injuries, respectively. Illegal street crossing is mentioned to caused 60-90% of the road crashes in different cities (Pratiwi & Siahaan, 2017). Despite being major factor of road crashes, road crossing without facilities is a common practice pedestrian in Indonesia. One of the main reasons is due to the pedestrian facilities itself. Whilst 11.700 million km road built for motorized vehicle users, only 1.5 million km long dedicated pedestrian path is available in Indonesia. Moreover, only 9% of these pedestrian paths have pedestrian crossing (World Health Organization, 2018).

The Jakarta Metropolitan Area (JMA) is the largest and the first and foremost metropolitan area in Indonesia. As shown in FIGURE 2.1, JMA is located in Java island, the highest populated island and the economic core of Indonesia. The JMA,

FIGURE 2.1 Map of Indonesia

comprises the Jakarta capital city and five surrounding satellite cities: Bogor, Depok, Tangerang, South Tangerang, and Bekasi. These areas can be further categorized into 10 cities and 2 districts. According to the Central Bureau of Statistics Indonesia, approximately 10% or 30 millions of Indonesian population in resides in JMA in 2020 (Statistics Indonesia, 2021). The JMA is the second largest and crowded megacity in the world (Demographia, 2020; Kang, 2016).

Likewise, since the massive construction development in 1980, the mobility in JMA tend to evolve towards car-oriented environment. The JMA is the busiest metropolitan city in Indonesia. Among 30 million population, 3.3 million people travel outside the city or district where they reside everyday (Statistics Indonesia, 2019). In 2019, only 20% of commuters use of public transportation, and only 8 out of 100 non-public transportation passenger are willing to shift towards public transportation (Statistics Indonesia, 2019). Moreover, only 1 out of 10 respondents walk for the first and last mile trip when using public transportation, and nearly none of them use bicycle (Tjahjono et al., 2020).

One of the major reasons of the low shares of public transportation passenger and active commuters is due to the poorly planned pedestrian network, spaces and facilities (Lo, 2011). Numbers of previous studies have discussed the condition of inadequate pedestrian spaces in the JMA (e.g., Hidayati et al., 2019; Lo, 2011; Zulkifli & Hino, 2009). It is commonly found that pedestrian facilities are not present throughout streets in neighbourhood and major roads, including areas surrounding public transportation hubs. For illustration, FIGURE 2.2 presents the typical pedestrian main entrance of train stations in JMA. In train stations location at outskirts of Jakarta (see FIGURE 2.2a), sidewalks often missing and *ojek* (motorcycle taxi) lines up along the main entrance searching for customers. Thus, pedestrians walk between two-ways highly congested traffic. While in train stations located in the major road of Jakarta, such as Gondangdia station shown in FIGURE 2.2b, sidewalks often incorporated, yet often occupied by informal commercial activities, parked vehicles, or crossed by motorcycles. Moreover, the overall side-

FIGURE 2.2 Train stations pedestrian entrance in JMA (Source: Google Maps, 2020, 2021)

walks are not well connected and dangerous for pedestrian. As visualized, pedestrian crossing is unavailable in front of the main pedestrian entrance and the undivided two-ways road in front of the station. Nonetheless, these overpasses often have steep and uneven stars and long ramps, and are not facilitated with elevator. Thus, it is often that pedestrian choose cross the road without any facility, even in major roads.

With the current concerning condition of being far from walkable city, similar to other metropolitan cities in Southeast Asian, the JMA experiences mobility inequality or limitation to travel due to individuals' socioeconomic attributes (Hidayati, 2021). As a consequence, there is marginalization or social exclusion among public transportation passengers, active commuters (cyclists and pedestrian), and other vulnerable population group, including elders and children (Delbosc & Currie, 2011; Hidayati, 2020; Lo, 2010; Rukmana, 2018; Winarso & Firman, 2002). Consequently, these groups are prone to suffer from road crashes and street crime, and even transport poverty (Leather et al., 2011; Zulkifli & Hino, 2009).

2.3 Pedestrian hazard perception skill among autistic children

Children with developmental disabilities are among the most vulnerable groups, experiencing a higher two to times more injury risk than typically developing children (Lee et al., 2008). Among this group, collision with motorized vehicles and bicycles is one of the leading causes of injuries among children with developmental disabilities, including autistic children (Xiang et al., 2006). Several previous studies have identified several different behaviours of autistic children that may contribute to their vulnerability as road users. Earl et al. (2018) reported that autistic children experienced more difficulties crossing the road than typically developing children. Previous research findings have revealed that autistic children struggle in choosing the safest timing. They tend to wait longer and, consequently, leave a shorter safety margin when crossing the road (Clancy et al., 2006; Stavrinos et al., 2011; Tabibi et al., 2011). Similar to empirical data by Xiang et al. (2006) and Clancy et al. (2006) estimated two times more collisions among autistic children compared to the control group based on an observation of children's behaviour in a road crossing simulation test. Cowan et al. (2017) found that autistic children have a shorter fixation duration on both traffic and non-traffic relevant objects when crossing the road. Likewise, Earl et al. (2016) demonstrate how autistic children tend to focus on traffic non-relevant objects (e.g., trees, bench) instead of traffic relevant objects (e.g., vehicles). On the contrary, non-autistic children show significantly different behaviour. However, it remains unclear whether this difference can be interpreted as unsafe behaviour in a real-world scenario (Wilmut & Purcell, 2021).

Although it is unclear what causes and to what extent autistic individuals process and react to visual information differently (American Psychiatric Association, 2013; Simmons et al., 2009), several studies provided possible factors that may explain this behaviour. It may be that this behaviour might be related to symptoms of ASD, including problems regarding the span of attention,

impulse control, motor regulation, and broad executive functions (Doyle, 2006; Martinussen et al., 2005; van der Meer et al., 2017).

2.4 Parents' role on autistic children's pedestrian safety skill

Thus far, many studies have mentioned that parents are the "gatekeeper" of the children's travel behaviour (Carver et al., 2013; Davison & Lawson, 2006; Mah et al., 2017; Pont et al., 2011). Parents' supervision style can form both support and barriers for their children. On the one hand, parents supervising and teaching their children skills to navigate themselves as a pedestrian can prevent their children from suffering from injuries or fatalities. On the other hand, extensive concerns or fears may limit children's opportunity to have adequate skills to travel independently (Barton & Schwebel, 2007; Bennetts et al., 2018; Zubrick et al., 2010). Children's pedestrian behaviour is one of the significant factors in how parents adjust their supervising styles. For instance, parents tend to be stricter when supervising younger sons due to the riskier behaviour that younger sons show relative to the older son. This inconsistency is not displayed between younger and older daughters as female children practice safer behaviour than males (Morrongiello & Barton, 2009). Parents appear to be aware that they are the primary learning source to improve their children's pedestrian safety skills (Barton & Schwebel, 2007; Muir et al., 2017). A previous study by Barton & Huston (2012) mentioned that parents believed that they have a more significant influence on their children's pedestrian capabilities than their children's cognitive development condition.

Waltz (2002) demonstrates how parents deal with pedestrian safety in case of having autistic children. They tend to promote children's safety by adjusting the environment to prevent the occurring dangerous situation and maintaining constant supervision instead of giving interventions to the children. Therefore, it limits children from practising risk management as pedestrians and improving their independence. Parents need to be able to judge their children's pedestrian ability accurately to determine the degree of supervision of their, which would enable their children to practice pedestrian risk management while at the same time preventing undesirable outcomes of road injuries and fatalities (Morrongiello & Corbett, 2015). Thus far, recent studies related to parents' judgement on autistic children's pedestrian capabilities are limited. A study published in 1992 found that parents tend to overestimate the abilities of their 5-through-8-years old children's pedestrian skills. However, the parents of 9 to 10 years old children are found to accurately predict their autistic children's pedestrian capabilities (Dunne et al., 1992). These results appear to align with a more recent similar study by Morrongiello & Corbett (2015), which also found that parents tend to overestimate their typical developing children's pedestrian skills.

3 METHOD

A quantitative approach was adopted to understand the comparison of pedestrian hazard perception (HP) skills between autistic and non-autistic children and how parents with ASD children perceived the pedestrian HP skill of their child. As shown in FIGURE 3.1, the first step of the study process was to identify the research background, problem, objective, and previous works with a similar topic and plan

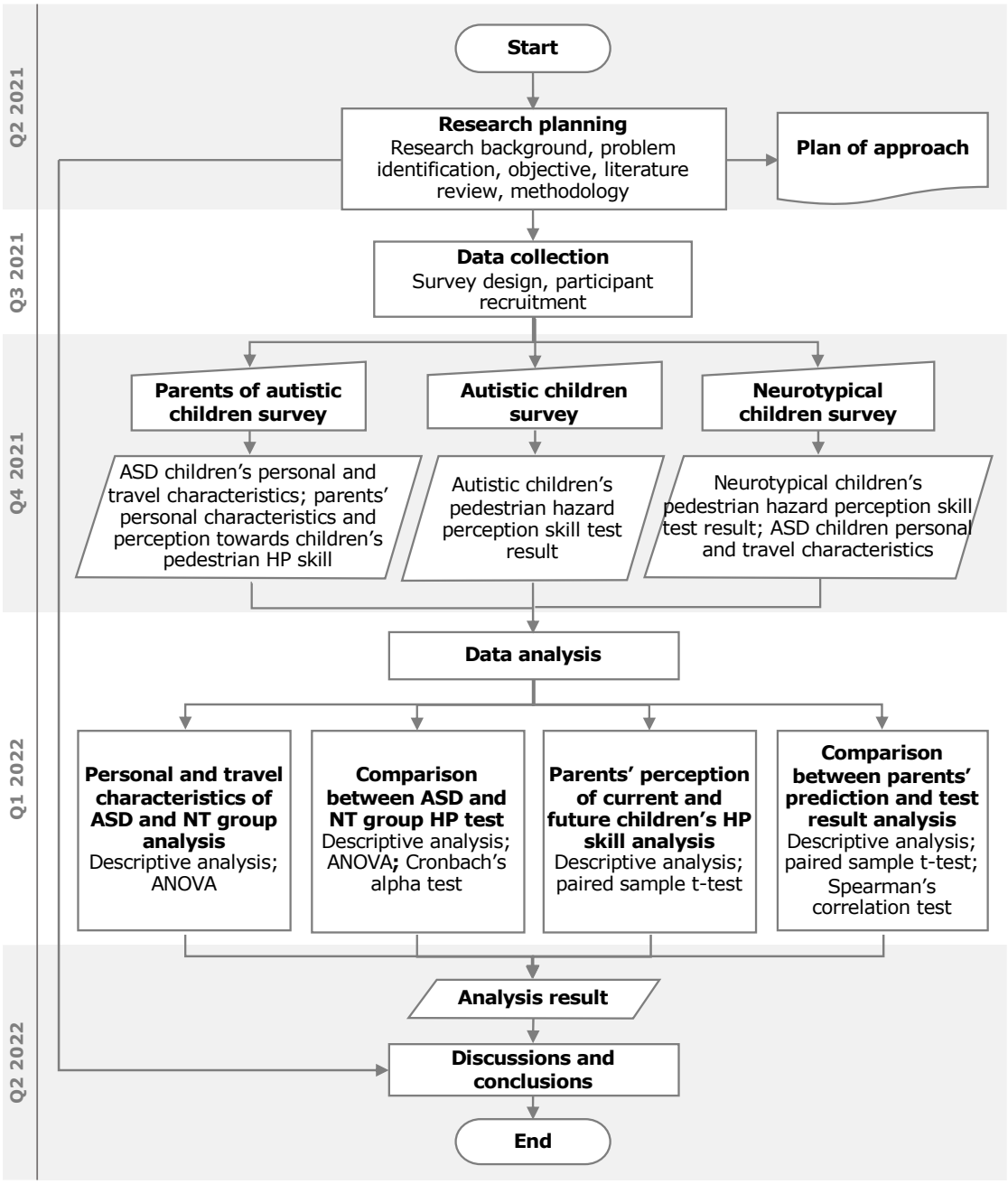


FIGURE 3.1 Research methodology flowchart

the research method. The result of the first process was a plan of approach document, which was approved in July 2021. Consequently, three primary data collection was deployed simultaneously in November and December 2021. The process and survey material will be discussed in Section 3.1 and Section 3.3 (pg. 15), respectively. The data collected is analysed and can be categorized into four analyses (further discussed in Section 3.4, pg. 18). Finally, discussions and conclusions are presented once the analysis is completed.

3.1 Participants

The first step in this process was to recruit participants. A survey proposal was delivered to an inclusive school in Bogor to recruit autistic and non-autistic children between 10–15 years old. The school agreed to arrange survey sessions with 60 non-autistic students and contacted parents with autistic children. Simultaneously, to recruit more autistic children, study proposals were delivered to other inclusive schools, therapy clinic, and foundations. After the proposal was approved, these organizations provide contact details of parents of eligible autistic children who were interested in the study. Informal approaches were done by joining virtual support group for parents of children with disability and attending events for people with disability. After introducing the current study and the participants requirements, parents who were interested to contribute in the study voluntarily offers help through the contact details given.

Subsequently, parents were given with further explanation of the study and consent form. The consent form was presented in both English and Indonesian language (see APPENDIX 1, pg. 47). During this process, the parents were informed that the study has the main focus in observing children's performance in the given test and parents' perception of their children's daily travel activities, instead of having the main objective of comparing parents' prediction and children's test performance. This was done to minimize the possibility of prior preparation that may affect the originality of parents' perception and prediction. After the parents have agreed in participating the survey, technical details were arranged which include time and either the survey will be conducted with video meeting or in-person. Some parents preferred offline meeting in their home or their children's school or therapy clinic to obtain direct assistance throughout the survey. In total, 29 parents agreed to participate the survey. All parents were represented by mother figures although there was no restriction regarding parents' representative.

3.2 Procedure

The questionnaire was designed using Qualtrics platform. After the English version of the questionnaires were approved internally, the questionnaires were translated to Bahasa Indonesia version and discussed with a teaching team from a special need school and therapist in Indonesia to ensure the feasibilities of the survey for autistic children. During the data collection period, the health measurements were frequently changing due to Covid-19 cases fluctuation in Indonesia. Students in

inclusive schools were given option to attend school only once a week during the pandemic, while students of special need school still may go to school every day, yet attending school in person is not a mandatory. Hence, the surveys were done either in-person or virtual video meeting. There are three different groups in this study: (1) Parent of autistic children, (2) autistic children, and (3) typical developing ASD. As suggested by Kwak & Kim (2017), there are 30 respondents targeted for each group. The targeted children were between 10-15 years old and live in the JMA.

As parents have received the consent form prior to the meeting, each survey began with mentioning important points from the consent form, in which parents have the rights to withdraw and cancel their participation. Subsequently, parents sign the consent form which represent the consent of both parents and children (see APPENDIX 1, pg. 47). Parents were preferably surveyed before their children since there were questions which required them to predict their children's test performance (see APPENDIX 5, pg.91). For parents who were unable to be surveyed prior to their children, they were first asked three questions regarding the prediction of their children's test performance. They were not allowed to change their prediction after observing their children. During the survey, parents were not asked to fill their answer to the Qualtrics. Instead, the survey was organized as a structured interview. Thus, parents can share their view and reasons behind their answer. After the survey was finished, parents were asked to evaluate the questions they were given to ensure that they were comfortable throughout the survey. Among 29 meetings with autistic children and their parents, only 25 autistic children completed the survey due to various reasons, including attention lost, and could not navigate laptop.

While each autistic child was surveyed in one session, the control group was surveyed in 5 sessions in school and 5 virtual sessions, consisting of 5-6 children at a time. Prior to undertaking the survey, the consent forms (see APPENDIX 2, pg. 53) were distributed to each student. Among 60 intended non-autistic students, 30 and 24 students completed the survey under direct and virtual observation, respectively.

In each survey session for children, they were given with unique identification number and informed of the language options (English and Bahasa Indonesia). Children were firstly presented with introductory parts of pedestrian HP skill test. In the introductory part, children were informed that there are 20 pictures in the test (see APPENDIX 3, pg. 59) and they were required to answer two questions for each picture: Select the object that should be paid attention to in order to avoid dangerous situation, and rank the dangerousness of the situation. Moreover, they were informed that their reaction time will be recorded for observation purpose, and there were three milestones, which given after every five scenarios in the survey if they need pauses. Furthermore, as children may be unfamiliar with the test, there are three sample pictures presented before proceeding to the actual test. They were told to position them self as the man figure with yellow highlights, and they are walking with the direction which the arrows show, towards the smaller man figure (see FIGURE 3.2, pg. 15). On the top of each picture, there is a yellow

box presented, which they can select to indicate that there is no hazard present. Children were informed that they could click on every single point in the picture. When the cursor is pointed at any part of the picture, the defined region area will be visible. FIGURE 3.3 (pg. 15) shows the example of how a scenario is divided to regions.

After having three trial questions, children were introduced to the hazard ranking question represented by five emotions for every picture (see FIGURE 3.4 on pg. 15). Children could slide up the slider upwards to the more positive emotion, indicating there the scenario is less dangerous. Whereas negative emotions will be shown when the pointer is moved downwards, meaning that the situation is rather dangerous. During the test, children were not allowed to receive any form of help. Thus, especially for autistic children, parents were firstly ensured that the test objective was to observe their children performance instead of a form of competition with other respondents. Subsequently, the control group proceed with the personal and travel characteristic survey (see APPENDIX 4, pg. 89). While for autistic children, this survey was included in their parents' questionnaire.

Note: BP: Behavioral prediction; EP: environmental prediction; and DF: dividing and focusing hazards.

FIGURE 3.2 Hazard perception test question example

FIGURE 3.3 Selection regions in HP test

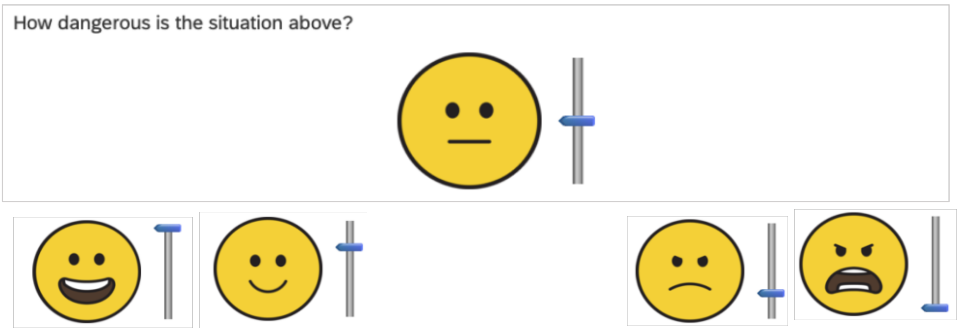


FIGURE 3.4 Hazard ranking

3.3 Materials

To measures comparison of HP skill of autistic and non-autistic children, and perception of parents of autistic children, the participants were asked to fill different types of question set. As shown in TABLE 3.1, there are 4 sets of questions on this study.

TABLE 3.1 Question set and respondents

Question set	Non-autistic Children	Autistic children	Parents of autistic
(1) Pedestrian HP skill test	√	√	
(2) Travel characteristics	√	√	
(3) Socio-demographic characteristics	√	√	√
(4) Perception towards HP skill of autistic children			√

3.3.1 Children's questionnaires

TABLE 3.2 presents list of questions and possible answers for children, both with and without ASD. The first question set aims to collect personal characteristic data

TABLE 3.2 Questions for autistic and non-autistic

Question for autistic children (ASD) and non-autistic/typical developing children (TD)	Possible answer
Personal characteristics (PC)	
(C.PC01) Age	(number)
(C.PC02) Gender	Male and female
(C.PC03) Level of education	Grade 1-grade 12
(C.PC04) Residential area	1= Jakarta 2= Bogor 3= Depok 4= Tangerang 5= South Tangerang 6= Bekasi
(C.PC05) Residential area	1= City 2= District
(C.PC06)* Type of school	1= Home-schooling 2= Integrated 3= Segregated
(C.PC07)* Shadow teacher availability	1= Yes 2= No
(C.PC08)* Number of older sibling with ASD	(number)
(C.PC09)* Number of older sibling without ASD	(number)
(C.PC10)* Number of younger sibling with ASD	(number)
(C.PC11)* Number of younger sibling without ASD	(number)
Travel characteristics (TC)	
Frequency of travelling in a week by:	0-7 days
(C.TC01) Car	
(C.TC02) Motorcycle	
(C.TC03) Bicycle around the neighbourhood	
(C.TC04) Bicycle outside the neighbourhood	
(C.TC05) Foot around the neighbourhood	
(C.TC06) Foot outside the neighbourhood	
(C.TC07) Public transportation	
Activity type based on transportation mode	1= Mandatory
(C.TC08) Car	2= Discretionary
(C.TC09) Motorcycle	3= Leisure
(C.TC10) Bicycle	4= None
(C.TC11) Walk	
(C.TC12) Public transportation	
Pedestrian hazard perception (HP)	
Each question refers to pictures that will be given for each type of hazard (BP, EP, and DF)	
(C.HP1) Identification of hazard	Identified hazard
(C.HP2) Hazardousness rating	1= Not dangerous at all, to 5= very dangerous
(C.HP3) Reaction time	Duration in second

*For autistic children only

of children. Data regarding age, gender, level of education, and residential area were asked to both groups. It is important to ask both level of educational and age since in Indonesia, children with disability are commonly have different level of education compared to children without disability with similar age. Moreover, there are several questions that are particularly given to autistic children, including availability of shadow teacher, siblings with and without disability, and type of school. The second question collects data about travel characteristics of children in terms of transportation mode and activity purpose before Covid-19.

The third question set aims to collect children's HP skill test performance. Similarly to other study which conducted hazard perception skill test studies (e.g., Castro et al., 2014; Gugliotta et al., 2017; McKenna & Crick, 1991; Ventsislavova & Crundall, 2018), this study measures children's HP skill from their reaction time and ability to identify objects in hazardous situation, as well as their judgement regarding the degree of consequences of prospectus hazard. . Similarly to pedestrian hazard perception test conducted by Meir et al., (2015), Meyer et al. (2014), and Rosenbloom et al. (2015), children are required to determine whether the situation is dangerous and to point out object which may lead to dangerous situation (see FIGURE 3.2). Moreover, the degree of dangerousness was reflected by scale rating, from the scale 1 (not dangerous at all) to 5 (very dangerous).

This study divide the hazards based on the study by Crundall et al. (2012), which classified three different hazard type based on the visibility: (1) Behavioural prediction (BP) hazard; (2) environmental prediction (EP) hazard, and (3) dividing and focusing attention (DF) hazard. On the contrary to the EP hazards, which can be unnoticed or perceived as a surprise dimension of the hazardous situation as it seems to be hidden in the environment, BP hazards provide visible cues to be spotted, which resemble the anticipation dimension of a hazardous event. Lastly, the DF hazards comprise both behavioural and environmental prediction precursors. Moreover, Crundall et al. (2012) termed DF hazards based on the complexity dimension of a hazardous situation, which refers to a complex and dynamic event that can pose a threat for road users. There were 20 randomized pictures presented in this study, which are evenly distributed among three hazard types mentioned above (HP, EP and DF), and pictures with no hazard.

3.3.2 Parents' questionnaire

The questions for parents shown in TABLE 3.3 (pg. 15). ASD children will have matched participant number with parents. Each question is provided with a notation for the following analysis section. There are two main parts of this survey: Personal characteristics and perception towards their children's HP skill. In terms of personal characteristics, data regarding parents' age, gender, and last completed level of education were asked. The second part of the survey asked parents to firstly predict the number of correct answers their children could answer from range 0-20. Furthermore, parents were asked to predict their children's' performance compared to the result from the exact similar test given to the typical developing children with approximately similar age and living in the JMA. The comparison was presented with 7 Likert scale

TABLE 3.3 Questions for parents with autistic children

Question for parents with ASD children	Possible answer
Personal characteristics (PC)	
(P.PC01) Age	(number)
(P.PC02) Gender	Male and female
(P.PC03) Level of education	1= Did not complete primary school 2= completed primary school 2= completed secondary school 3= completed diploma/university 4= completed post-graduate degree
Perception towards their children's HP skill (PHP)	
(P.PHP1) Prediction of number of correct answers identified by their children	Number of correct answers
(P.PHP2) Comparison of their children correct answers to the average score of control group	1= extremely lower, to 7= extremely higher
(P.PHP3) Comparison of their children reaction time to the average reaction time of control group	1= extremely slower, to 7= extremely faster
(P.PHP4) Thoughts on HP skill of their children:	
○ (P.PHP4a) I am very worried about of current pedestrian HP skill of my children	1= strongly disagree, to 7= strongly agree
○ (P.PHP4b) Having adequate pedestrian HP skill is very important for my children in the present time	
○ (P.PHP4c) I am very worried about of pedestrian HP skill of my children when they become an adult	
○ (P.PHP4d) Having adequate pedestrian HP skill is very important for my children when they become adult	
○ (P.PHP4e) I believe that my child can improve their HP skill	
○ (P.PHP4f) I believe that similarly to non-ASD individuals, my children can perform independent mobility when they become an adult	
○ (P.PHP4g) My children's daily living HP skill compared to the control group	1= extremely lower, to 7= extremely higher
○ (P.PHP4h) My children's overall pedestrian HP skill compared to the control group	

3.4 Data analysis

As mentioned above, 54 typical developing (TD) children and 25 autistic children (ASD) and their parents completed the survey. Before analysing the collected data, outlier respondents were omitted from the dataset. The outliers were determined using the interquartile rule based on their click counts and the number of selected regions. Subsequently, three autistic children and 13 non-autistic children were excluded. Among 22 autistic children left, two female respondents do not represent

the actual gender ratio of people with ASD, which is a suggested 1:4 ratio of female and male (McFayden et al., 2019; Towsend & Puymbroeck, 2017) or even to a larger extend, as female is suggested to be systematically underdiagnosed (Kopp & Gillberg, 2011; Lai et al., 2012). Hence, female respondents (2 autistic and 7 non-autistic children) were omitted from further analysis. In total, 54 datasets from 20 autistic children and 34 non-autistic children for further analysis.

The analyses of the current study are categorised into four focuses: (1) Children's personal and travel characteristics; (2) comparison of autistic and non-autistic children's test results; (3) parents' perception of their autistic children; and (4) comparison between parents' prediction and their autistic children's test result. Data management and analysis were computed using SPSS 25.0. All analyses start with simple descriptive analyses to introduce the data. To measure the difference in personal and travel characteristics and test performance between ASD and TD, ANOVAs were performed for the first two analyses. Fisher (1992) suggested the values for which the p=0.1, p=0.05, and p=0.01 levels are considered significant. Since the test results (number of correct answers, reaction time, hazard rank) of each hazard type were gathered from five different scenarios, Cronbach's alpha tests were used to measure the consistency of each hazard type. Values between 0.6 and 0.7, 0.7 and 0.8, and above 0.8 are considered good, respectable, and acceptable, respectively (Cronbach, 1951).

Besides descriptive analysis, paired sample t-tests were used for two purposes, which to: Compare parents' current and current and future perceptions of their autistic children's pedestrian hazard perception skills, and examine whether parents can accurately predict their children's performance in the pedestrian HP test through three measurements: (1) Number of correct answers; (2) number of correct answers relative to the control group; (3) reaction time compared to the control group. To compare autistic children's test results to the control group, the value of reaction time and the number of correct answers were standardized using z-score calculations, with the following equation:

$$dN_{h,t,ASD_i} = \frac{X_{h,t,ASD_i} - \mu_{TD,h,t}}{\sigma_{NT,h,t}} \quad (1)$$

Where dN is the result standardized value; X is the test result value; ASD refers to autistic children; TD is data from the control group; μ is an average value; σ is a standard deviation value; h is the hazard types (BP, EP, DF, or none); t is the test result item (number of correct answers or reaction time), and i is the children's unique identification number. Any score near zero indicates that autistic children have a comparable result to the control group.

During the survey, parents were asked to predict the difference between the test results of their autistic children to the control group using a 7-point Likert scale. A point of four indicates a comparable result, and a higher score indicates that parents expected their children to perform better than the control group. A higher standardized score of the number of correct answers correspondingly resembles a better result. On the contrary, a higher standardized reaction time value

means that the ASD children reacted slower than the control group or had worse performance. Thus, the results from the 7-point Likert scale of the reaction time predictions were inversed for further analysis. Given that all standardised scores and 7-point Likert scale already have similar directions yet different scales, the standardised scores were converted to a 7-point Likert scale using the statistical empirical rule. FIGURE 3.5 shows how each point is converted.

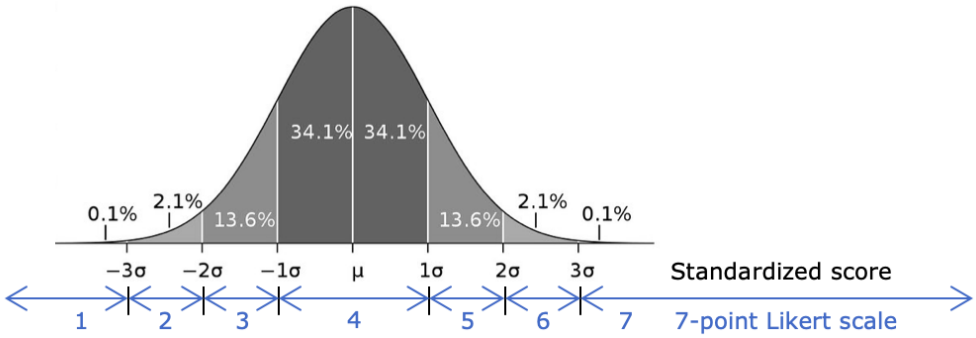


FIGURE 3.5 Standardized score to 7-point Likert scale conversion

Finally, the last analysis utilizes Spearman's' correlation test to examine the relationship of the degree of parents' prediction accuracy and parents' and children's characteristics, as well as children's test performance. There are two tests, with two accuracy measurements in which the first one uses the product of the subtraction of parents' prediction of the total correct answer by children's test result. This calculation can be written with the following equation:

$$dPA_i = PHP_i - X_i \quad (2)$$

Where dPA is the difference between parents' predictions and test results; PHP is parents' predictions of the total of correct answers ranging from 0 to 20; X is the total correct answers based on children's test result; i is the unique respondents' identification number which similarly given for the ASD children and their parents. A positive dPA value indicated that parents expected more correct answers than their children's test results or overestimating their children.

The second Spearman's correlation focuses on how vast is the difference between parents' prediction and test results. Thus, the value of absolute dPA or $|dPA|$ is utilized. Therefore, the minimum score of this value is zero, meaning that parents precisely predicted their children's correct answers. A higher value suggests a more considerable difference between prediction and test results.

4 RESULTS

4.1 Respondents' profile

To provide overview of the collected data, TABLE 4.1 shows the breakdown of each respondents' personal characteristics. In order to assess the difference of personal characteristics distribution between ASD and TD, ANOVAs were used. In this study, only male children were included and all parents were represented by mothers. With approximately a third of children of both groups, most respondents were 14 years old. Over half of parents surveyed (62%) are between 40-45 years old. While the education level of autistic children varies between third to ninth grade, none of non-autistic children is in third and fourth grade. Most of the non-autistic children were in the eighth (26%) and ninth grade (29%), the typical education level

TABLE 4.1 Personal characteristics

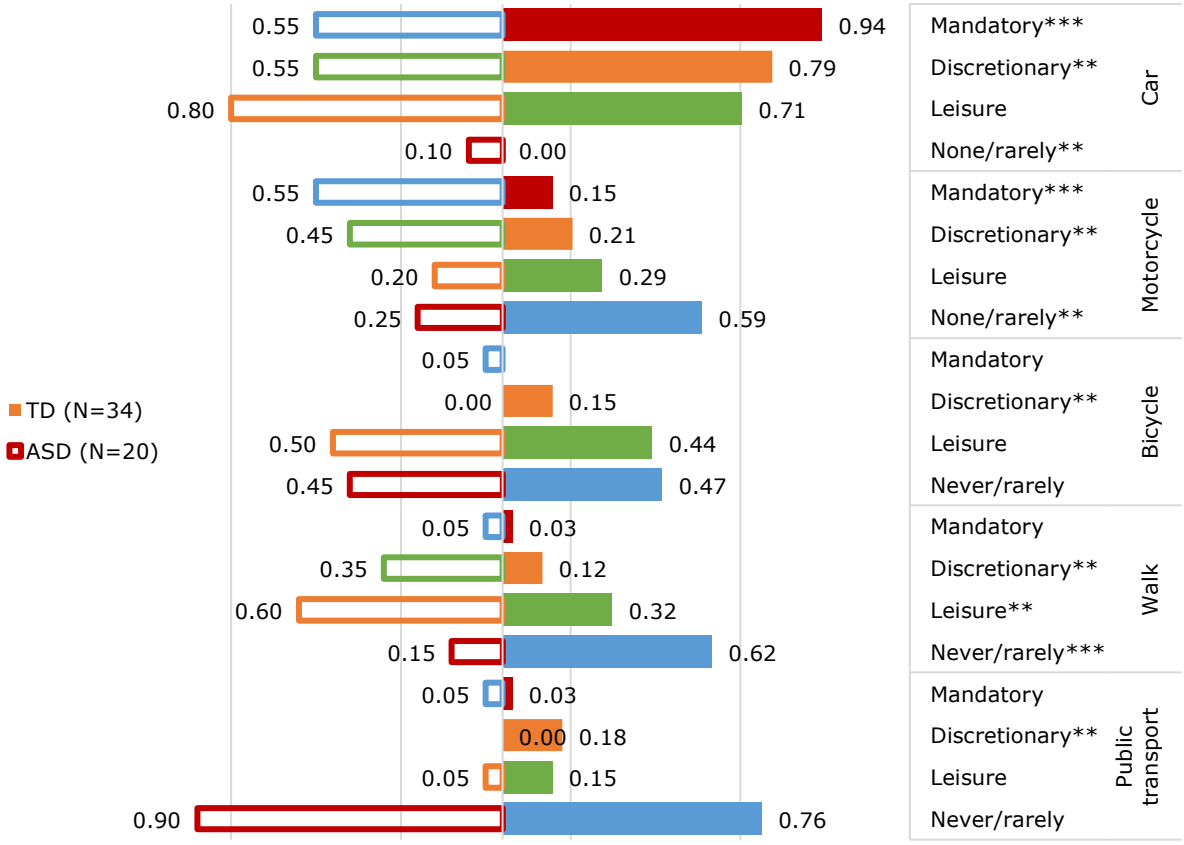
Category	Variable	ASD (N=20)	TD (N=34)	*F*
Children's age	10	20%	12%	0.002
	11	10%	12%	
	12	15%	21%	
	13	15%	24%	
	14	30%	32%	
	15	10%	0%	
Mother's age	<40	19%		
	40-45	62%		
	46-50	14%		
	>50	5%		
Children's level of education	Grade 3	15%	0%	11.136 ***
	Grade 4	15%	0%	
	Grade 5	15%	18%	
	Grade 6	20%	12%	
	Grade 7	15%	15%	
	Grade 8	5%	26%	
	Grade 9	15%	29%	
Children's level of education	Completed secondary school	10%		
	Completed diploma/university	75%		
	Completed post-graduate	15%		
Residential area	Jakarta	20%	18%	2.605
	Bogor	45%	59%	
	Depok	5%	18%	
	Tangerang	10%	0%	
	South Tangerang	15%	6%	
	Bekasi	5%	0%	
Type of residential area	City	50%	59%	0.385
	District	50%	41%	

Note: ASD: children with autism spectrum disorder; TD: typical developing children; ***p<0.01.

for 14 yeas old children. Whilst ASD group similarly has the majority of 14 years old children, only 5% and 15% of this group are eighth and ninth grade students respectively. As expected, among four compared variables, significant different distribution is found in this variable. Approximately half of the children in both groups lived in Bogor, and 20% lived in the Jakarta capital city. Lastly, there is balance proportion of children of both groups living in city and district.

4.2 Travel characteristics

FIGURE 4.1 presents the overview of children's proportion of using a particular travel mode for three different activities: Mandatory, discretionary and leisure. It appears that among five travel modes (car, motorcycle, bicycle, walking, and public transport), car was the most popular travel mode for mandatory activity for both groups. Only 10% of ASD and none of TD never/rarely travel by car as passenger. Without any significant differences, approximately 80% of both groups used car as a passenger on recreational occasions. While almost all of the TD went to school with car (94%), the ASD group appears to apportioned between using car and motorcycle for mandatory activity purpose.



Note: ASD: Children with autism spectrum disorder; TD: typical developing children; *p<0.1; **p<0.05; ***p<0.01.

FIGURE 4.1 Children's travel mode with different activity purposes

FIGURE 4.1 shows that active mobility and public transportation was not popular among children in the JMA. Nearly none of children walk and bike for mandatory activity trip. In terms of active mobility, riding bicycle was more popular than walking, whilst roughly half of them never or rarely ride bike for any kind of activity. For the other half, children rode bicycle only travel with bicycle for leisure or recreational purpose. Almost none of children reported to ride bicycle for mandatory routine activities. Moreover, it stands out how walking is significantly more common among autistic children ($p<0.01$), while 62% of the control group reported to never or rarely walk to travel. The ASD group routinely walk for discretionary and leisure purpose. Moreover, most children never or rarely use public transportation.

TABLE 4.2 provides the summary of trip frequency of using different modes. It is shown that significant differences between ASD and TD are found in the travel frequency by car and motorcycle, as well as walking outside the neighbourhood. Although the number is relatively low compared to other mode, it is apparent from TABLE 4.2 that non-autistic children were more engaged to walking outside the neighbourhood, with approximately 1-2 days per week. Lastly, there is no significant difference found in terms of traveling with bicycle, walking inside neighbourhood, and public transportation between both groups.

TABLE 4.2 Number of days per week of travelling based on travel mode

Travel mode	ASD (N=20)		TD (N=34)		*p*
	Mean	Std.dev	Mean	Std.dev	
Car	3.20	2.24	5.09	1.19	0.000***
Motorcycle	2.80	2.63	1.47	2.29	0.056**
Bicycle around the neighbourhood	2.35	2.85	1.56	1.91	0.228
Bicycle outside the neighbourhood	0.70	1.87	0.88	1.61	0.706
Walking around the neighbourhood	3.00	2.62	2.82	2.48	0.806
Walking outside the neighbourhood	0.30	0.73	1.44	2.00	0.018**
Public transportation	0.45	1.61	0.74	1.40	0.496

Note: ASD: Children with autism spectrum disorder; TD: typical developing children; **p<0.05; ***p<0.001.

4.3 Hazard perception test performance

Before proceeding to examine the HP test result based on each hazard type, it is necessary to describe each scenario and how children react in different scenarios which belong to the same type of hazard. TABLE 4.3 compares the test results for each picture. To compare the difference between ASD and TD performance for each scenario, ANOVA was performed. And in order to assess the internal consistency of each type of hazard, Cronbach's alpha was used for five different scenarios of each hazard type. In terms of number of correct answers in a similar hazard type, only DF and pictures without hazards have acceptable and very good internal consistency respectively. While there are three BP hazard scenarios with significant differences, only one of each EP (first scenario), DF (last scenario), and

TABLE 4.3 Hazard perception test result description based on question

Hazard type	Scenario (hazard)	Answer correctly			Reaction Time (sec)			Hazardous ranking		
		ASD	TD	*p*	ASD	TD	*p*	ASD	TD	*p*
BP	1. Sidewalk (1 MC)	60%	85%		21.53	5.76	***	2.60	2.88	
	2. Sidewalk (1 car	75%	91%		8.69	4.35	***	2.70	2.59	
	3. Sidewalk (1 MC)	60%	85%	**	7.54	7.74		3.15	2.74	
	4. Crossing without facility (1 MC)	80%	100%	***	6.96	2.40	***	2.40	2.03	
	5. Parking area (1 MC)	80%	100%	***	5.46	3.09	***	2.50	2.59	
	Cronbach's alpha	0.174	0.446		0.484	0.063		0.807[a]	0.792[b]	
EP	1. Sidewalk (tree)	15%	53%	*	12.29	8.09	***	4.25	3.59	
	2. Sidewalk (car entrance gate)	25%	50%		12.90	6.67	**	3.90	3.91	**
	3. Sidewalk (car entrance gate)	40%	29%		8.30	5.61	***	3.80	4.44	
	4. Sidewalk (1 car)	70%	74%		5.30	4.56		2.30	3.21	**
	5. Sidewalk (uncovered drainage)	10%	24%		5.46	4.48		4.20	4.32	
	Cronbach's alpha	0.452	0.585		0.713[b]	0.335		0.474	0.336	
DF	1. Pedestrian crossing (2 cars, 1 MC)	65%	74%		10.50	4.44	**	2.25	2.47	
	2. Pedestrian crossing (2 cars)	60%	79%		7.98	2.41	***	2.05	1.82	
	3. Sidewalk (1 cars, 1 MC)	60%	74%		10.35	4.62	**	2.05	2.41	
	4. Pedestrian crossing (2 cars)	45%	56%		6.34	2.80	***	2.55	2.15	
	5. Crossing without facility (tree, 1 car)	0%	41%	***	6.17	2.43	***	2.25	1.88	
	Cronbach's alpha	0.667[c]	0.636[c]		0.746 [b]	0.587		0.792 [b]	0.757[b]	
None	1. Sidewalk	65%	68%		3.68	3.35		4.05	4.82	***
	2. Pedestrian crossing	50%	32%		9.86	6.07		3.45	3.35	
	3. Pedestrian crossing	50%	32%		6.54	6.11		3.60	3.41	
	4. Sidewalk	55%	41%		7.21	5.69		3.65	3.82	
	5. Sidewalk	55%	29%	*	4.21	3.93		3.40	3.26	
	Cronbach's alpha	0.876[a]	0.810[a]		0.524	0.335		0.739[c]	0.803[a]	
All	Cronbach's alpha	0.657[c]	0.540		0.868[a]	0.748[b]		0.874[a]	0.874[a]	

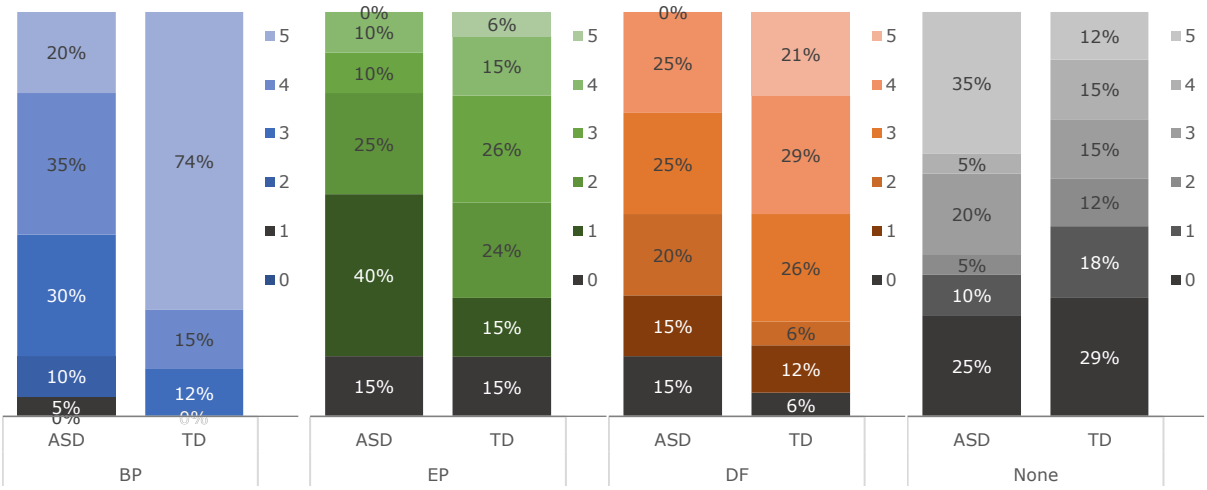
Note: BP: Behavioural prediction, EP: environmental prediction; DF: dividing and focusing; ASD: children with autism spectrum disorder; TD: typical developing children; MC= motorcycle; [a]very good internal consistency; [b]respectable internal consistency; [c]acceptable internal consistency; *p<0.1; **p<0.05; ***p<0.01.

picture with none of the hazards (last scenario) shows a similar result. What stands out in the first EP scenario and last DF scenario is the presence of a tree as the object that should be given attention to avoid a dangerous situation, and the picture simulate the condition of crossing the road without facility. Nevertheless, no significant difference is found in the scenarios where children were asked to cross the road with zebra cross. Scenario five in pictures without hazard is the only picture with more correct answer among ASD children. Regarding reaction time, the total reaction time of non-autistic children is rather respectably consistent, whilst no specific hazard type shows a similar result. It is interesting that in the case of BP, EP and DF hazards, autistic children showed a noticeable longer reaction time in every first picture of every hazard type.

Meanwhile, no significant reaction time difference is found in pictures without hazard. The photos in the survey were randomized without a specific pattern. It appears that the TD significantly reacted faster in most of the scenarios of BP and EP, and all scenarios in DF. Lastly, both ASD and TD seems to rank most of

the scenario similarly, except for two EP scenarios and one scenario with non-hazard.

To assess the differences in children's test results based on four hazard types (BP, EP, DF and none), FIGURE 4.2, FIGURE 4.3 (pg.26), and FIGURE 4.4 (pg. 26) illustrate the number of the correct answer, reaction time, and hazardous rank respectively. FIGURE 4.2 (pg. 25) shows the difference in the number of correct answers, both in the aggregate type of hazard and respondents' group. There are five pictures shown for each hazard type. the range of correct answers for every kind of hazard is zero to five. The TD appears to perform the best in the BP hazard, of which 74% received a perfect score. In comparison, 35% of the ASD group answer all pictures with no hazard correctly and, in fact, higher than the control group. Interestingly, nearly one-third of children in both groups received zero marks in images with no hazard. This percentage is the highest among all hazard types.

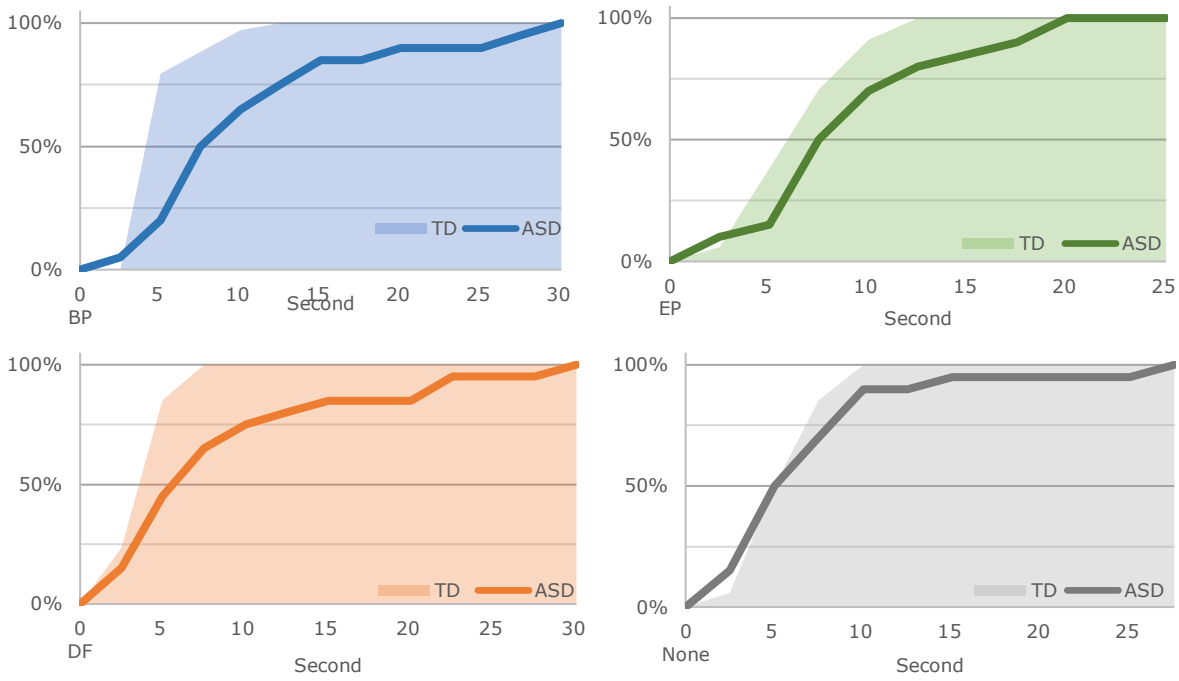


Note: BP: Behavioural prediction, EP: environmental prediction; DF: dividing and focusing; None: no hazard; ASD: children with autism spectrum disorder; TD: typical developing children.

FIGURE 4.2 Average number of correct answers based on hazard type

As shown in. FIGURE 4.3 (pg.26), autistic children seem to show recognizable slower reaction time in pictures with BP, EP and DF hazards. For instance, while the 75% of the TD needed less than five seconds in total to answer all five pictures of each hazard, only roughly 25% of the autistic children did the same. In the case of picture with no hazard, no clear differences were shown in the chart. Notably, the first quartile of the ASD children seems to react faster than the control group.

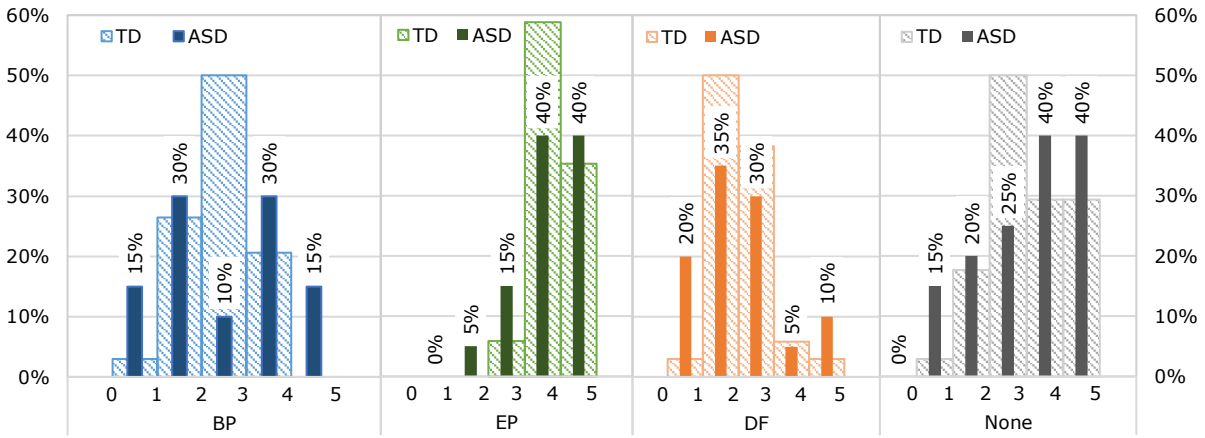
Figure 4.4 (pg. 25) presents the histogram of the average rank of five pictures shown for each hazard type to compare how children rated each hazard type. The lower the score, the less dangerous is the situation for children. From the chart, ASD children tend to give highly dangerous rank for pictures without hazard and EP hazard. This result is similarly shown among the TD. More than 90% of the TD considered the EP scenario dangerous, and more TD viewed pictures without hazard as dangerous than less or not hazardous.



Note: BP: Behavioural prediction, EP: environmental prediction; DF: dividing and focusing; None: no hazard; ASD=children with autism spectrum disorder; TD=typical developing children

FIGURE 4.3 Cumulative frequency of reaction time based on hazard type

As shown in TABLE 4.4 (pg. 26), one-way ANOVA was used to compare ASD and TD groups' average correct answers, reaction time, and hazard rate. No significant differences were found between both groups regarding hazard rate. In contrast, the ASD group has significantly lower correct answers and slower reactions for BP, EP, and DF hazards and the overall test. Regarding correct answers, a higher significant level is found with the BP hazard at the p=0.01 level, while the others are significant at the p=0.05 level.



Note: BP: Behavioural prediction, EP: environmental prediction; DF: dividing and focusing; None: no hazard; ASD=children with autism spectrum disorder; TD=typical developing children

FIGURE 4.4 Average hazard rating based on hazard type

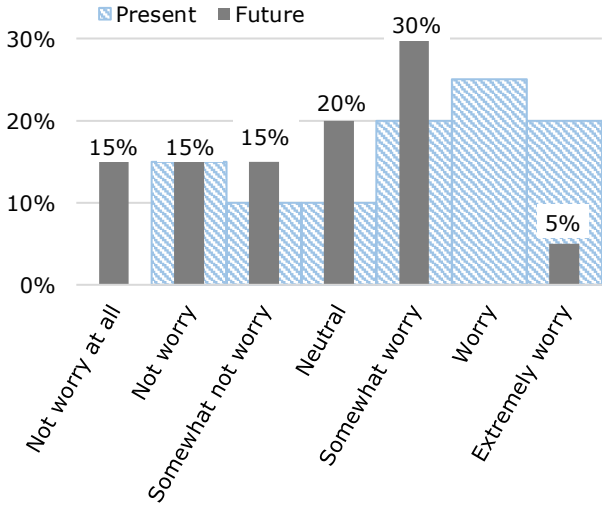
TABLE 4.4 Test performance comparison between ASD and TD

		ASD (N=20)		TD (N=34)		F	
		Mean	Std. dev	Mean	Std. dev		
BP	Right answer	3.55	1.10	4.62	0.70	19.149	***
	Reaction time (second)	10.04	7.37	4.67	1.98	16.279	***
	Hazard rate	2.67	1.29	2.56	0.74	0.147	
EP	Right answer	1.60	1.19	2.29	1.45	3.291	**
	Reaction time (second)	8.85	5.04	5.88	2.42	8.552	***
	Hazard rate	3.69	0.80	3.89	0.51	1.313	
DF	Right answer	2.30	1.42	3.24	1.48	5.192	**
	Reaction time (second)	8.27	7.24	3.34	1.30	15.126	***
	Hazard rate	2.23	1.12	2.15	0.68	0.115	
NO	Right answer	2.75	2.07	2.03	1.80	1.802	
	Reaction time (second)	6.30	5.58	5.03	2.03	1.449	
	Hazard rate	3.63	1.09	3.74	0.79	0.168	
Total	Right answer	10.20	3.35	12.18	2.74	5.559	**
	Reaction time (second)	8.36	5.25	4.73	1.47	14.558	***
	Hazard rate	3.06	0.84	3.09	0.54	0.026	

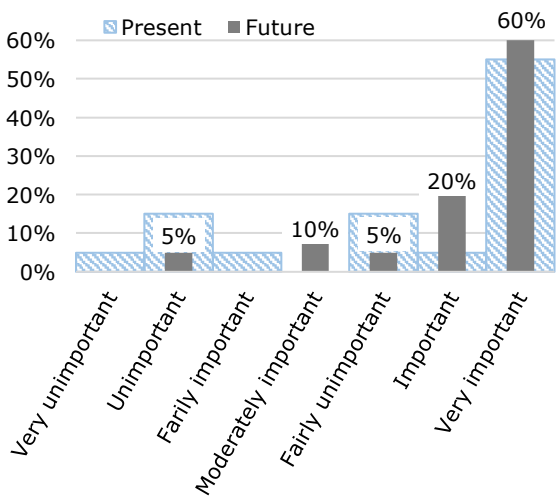
Note: BP: Behavioural prediction, EP: environmental prediction; DF: dividing and focusing; ASD: children with autism spectrum disorder; TD: typical developing children; *p<0.1; **p<0.05; ***p<0.01.

4.4 Parents' current and future perception on their children's HP skill

A more detailed account of parents' perceptions of their children is given in the following section. The first set of analyses presented the distribution of parents' current and future perceptions. As shown in FIGURE 4.5a, nearly half of the parents were either worried or extremely worried about their children's current pedestrian HP skills. Most parents (30%) mentioned that they would be somewhat worrying, and even 15% stated that they might not be worrying. Moreover, in terms of HP skill importance, more than 50% of the parents considered it very important in the present and future time. One-fourth of the parents mentioned that this skill is currently not important.



(a) Wariness of pedestrian HP skill



(b) Pedestrian HP skill importance

FIGURE 4.5 Parents' perception of current and future children's pedestrian hazard perception skill

The first paired sample t-test was used to analyse the relationship between current and future perceptions of autistic children's parents towards their child's pedestrian hazard perception skills. As can be seen from TABLE 4.5, there are two pairs tested. First, regarding how worried are parents about their child's future and present pedestrian HP skills, and second, questioning parents' perception of the future and current importance of pedestrian HP skills. On a scale of 1 (very not important) to 7 (very important), there was significant differences found in both pairs. This suggest that although parents were still worry of their child's pedestrian HP skill in the future, it will be less than in the present time. And parents perceived that the importance of children having pedestrian HP skill will significantly increase in the future.

TABLE 4.5 Paired samples test between parents' future and present perception of their children's hazard perception skill

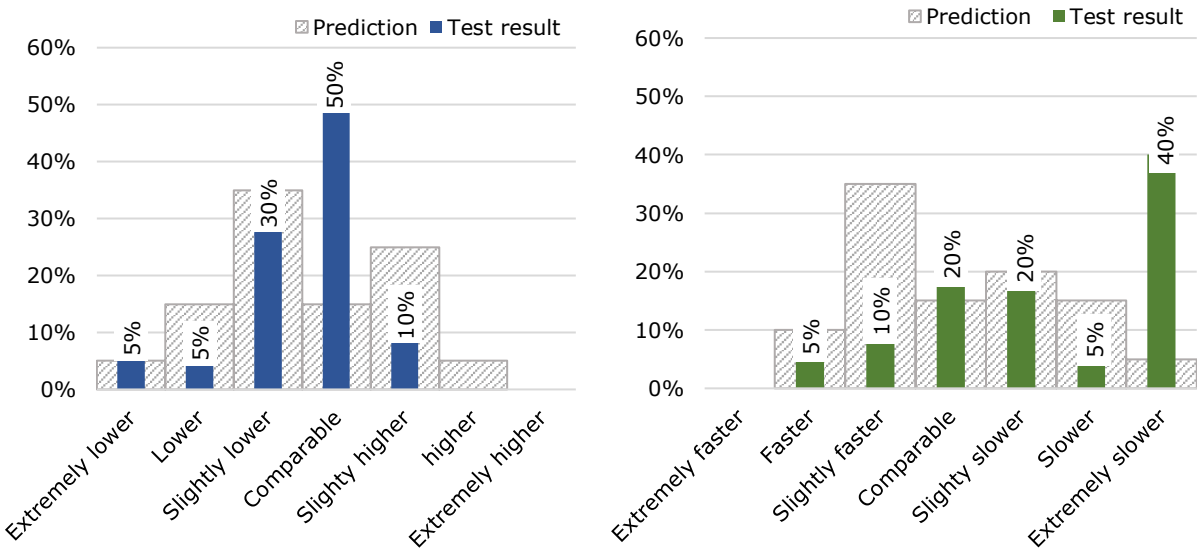
Variable	Mean	Std. Deviation	Paired Samples Test (future–present)				
			Mean	Std. Deviation	t	df	Sig. (2-tailed)
Pair 1: Worry of children's pedestrian hazard perception skill							
Future	3.55	1.669	−1.35	2.084	−2.896	19	0.009**
Present	4.9	1.744					
Pair 2: Importance of children's pedestrian hazard perception skill							
Future	6.15	1.387	0.75	1.333	2.517	19	0.021*
Present	5.4	2.162					

Note: *p<0.1; **p<0.05

4.5 Comparison between parents' prediction and test performance

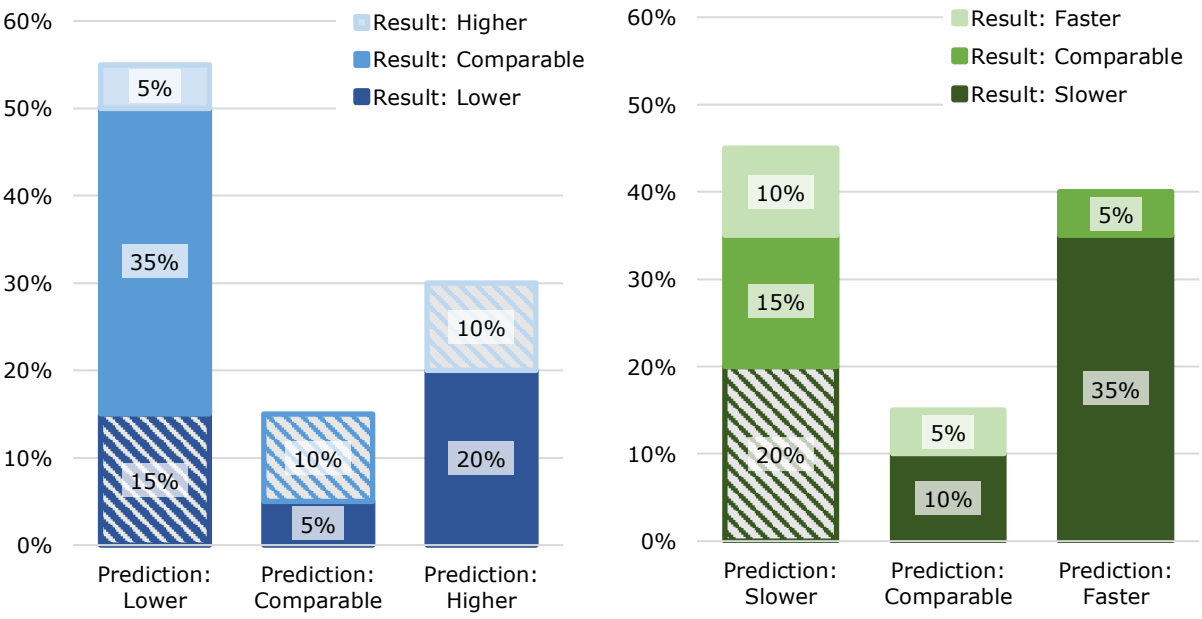
This section aims to compare the test results of ASD children based on their parents' predictions and test performance. FIGURE 4.6 (pg. 29) provides the overview of the comparison regarding the total correct answers and reaction time. As shown in FIGURE 4.6a (pg. 29), 50% autistic children have a comparable result relative to the control group. However, most of the parents assumed their children to have slightly less correct answers. In terms of reaction time, more parents predicted that their children would react faster, while the result showed the contrary. The result shows that 40% of ASD children were remarkably slower when answering the questions.

There are three main possibilities of autistic children's test performance compared to the control group: Worse, comparable, and better. FIGURE 4.7 (pg. 29) shows the distribution based on parents' predictions and test results. The shaded area indicates the share of which parents correctly predicted their children's test results. Some parents predicted their children accurately. Two-thirds of parents who expected their children to have comparable correct answers had an accurate prediction. Similarly, roughly one-third of parents who predicted their children to have lower and higher correct answers also had precise predictions. Whereas only parents who expected their child to react slower than the control group had accurate predictions.



(a) Correct answers (b) Reaction time

FIGURE 4.6 Comparison between ASD and TD test performance based on parents' perception and test result



(a) Number of correct answer **(b) Reaction time**

FIGURE 4.7 Parents' prediction accuracy description

Subsequently, to compare the difference between parents' prediction and children's test performance result in regards to pedestrian hazard perception skill, paired sample t-tests were performed (see TABLE 4.6, pg. 30). The first pair compared the number of correct answers based on parents' prediction and children's performance. At the same time, the second and third pairs compare parents' predictions and children's test results if their children competed with the TD. The comparison ranged from 1 to 7, on which a scale of four indicates a comparable

result. There was a significant difference in the third pair only. In which the score of parents' prediction (M=4.1, SD=5.3) and test performance (M=5.3, SD=1.657), with t(19)=–4.1888, at the p=0.01 level. Hence, parents tend to overestimate the reaction times of their children.

TABLE 4.6 Paired samples t-test between parents' prediction and children's test performance

Variable	Mean	Std. Deviation	Paired Samples Test (prediction-performance)				
			Mean	Std. Deviation	t	df	Sig. (2-tailed)
Pair 1: Number of correct answer							
Prediction	10.5	4.594	0.3	5.823	0.230	19	0.820
Test performance	10.2	3.35					
Pair 2: Number of ASD children's correct answer compared to NT							
Prediction	3.55	1.317	0	1.80642	0.000	19	1.000
Test performance	3.55	0.944					
Pair 3: ASD children's reaction time compared to NT							
Prediction	4.1	1.447	-1.2	1.28145	-4.188	19	0.000*
Test performance	5.3	1.657					

Note: ASD: children with autism spectrum disorder; TD: typical developing children; ***p<0.01

Finally, two Spearman's correlation tests were performed to examine the relationship between the accuracy of parents' prediction and personal characteristics, travel characteristics, and children's test results. As shown in TABLE 4.7, there are two tests conducted: dPA and |dPA|. A positive correlation of the first

TABLE 4.7 Spearman's correlation test result

dPA			|dPA|		
Variable	Coef	Sig	Variable	Coef	Sig
Personal characteristics					
-			Number of older sibling without ASD	.610	0.004**
Travel characteristics					
Number of days per week of using car in a week	-.464	0.039*	Number of days per week of walking around the neighbourhood	-.580	0.007**
Use car for discretionary activity	.481	0.032*	Use car for leisure activity	-.547	0.302*
Never/rarely use car	-.522	0.018*	Never/rarely use car	.496	0.026*
Use motorcycle for discretionary purpose	-.463	0.040*			
Test result compared to the control group					
Total correct answer	-.539	0.014*	-		
Reaction time	-.544	0.013*			

Note: Only significant variables are shown; dPA: parents' prediction minus test result; |dPA|:absolute value of dPA; ** Correlation is significant at the 0.01 level; *Correlation is significant at the 0.05 level.

test indicates that the particular variable leads to parents overestimating their children. While the positive correlation of |dPA| means a greater difference between parents' predictions and test results. Regarding the first test, positive correlations are found among children who use cars ($\rho(19)=-0.464$, $p<0.05$) and motorcycles ($\rho(19)=-0.463$, $p<0.05$) more frequently, and children with higher correct answers ($\rho(19)=-0.539$, $p<0.05$) and slower reaction time ($\rho(19)=-0.544$, $p<0.05$). Parents tend to overestimate and predict less precisely when it comes to children that never or rarely travel by car (dPA:$\rho(19)=-0.522$, $p<0.05$; |dPA|:$\rho(19)=0.496$, $p<0.05$). Moreover, the second test shows that having older siblings without ASD increases the gap between parents' prediction and the test result ($\rho(19)=$).610, $p<0.01$). On the contrary, better accuracy is found among children who use a car for leisure ($\rho(19)=-0.547$, $p<0.05$) and often walk around the neighbourhood ($\rho(19)=-0.580$, $p<0.01$).

5 DISCUSSION

5.1 General discussion

The current study aims to examined pedestrian HP skill differences among autistic children and also relative to the neurotypical children, and how parents with autistic children perceived their children's HP skill as a pedestrian.

5.1.1 Group differences on the pedestrian HP skill test

The current study found that autistic children significantly performed worse on the pedestrian HP skill, although they walk and cycle more frequently than the control group. They have fewer correct answers and react slower for all pictures with the presence of hazards, regardless of the hazard type (BP, EP and DF). These results corroborate the findings of previous works (e.g., Clancy et al., 2010; Josman et al., 2008; Stavrinos et al., 2011; Tabibi et al., 2011), which demonstrate how autistic children and adolescents demonstrates poorer skill at a crosswalk—for instance, having more waiting time which shortens the duration to cross the road safely. This finding of reaction differences also seems to be consistent with other research which observed HP skills of drivers with ASD by Chee et al. (2017), Cowan et al. (2018), Ross et al. (2019), and Xiao et al. (2012). Notably, no significant difference is found when it comes to pictures with no hazard.

One unanticipated finding was that when the 20 scenarios (5 of each BP, EP, DF, no hazard) were examined separately, only six scenarios (3 BP, 1 EP, 1 DF, and one none) showed significant differences between both groups in terms of answer accuracy. Interestingly, the particular EP and DF scenarios have the similarity of targeting a tree as a correct answer. The reason for this is not apparent, as the differences in how individuals with and without ASD gazed at traffic and non-traffic relevant objects have not been found in studies by Cowan et al. (2017) and Earl et al. (2016). Both groups seem to judge the situation similarly for all hazard types in terms of hazard rank.

5.1.2 Parents' prediction on autistic children's pedestrian HP skills

Demographic characteristics such as parents' and children's age, education level, and residential area were not significantly related to parents' perception on their children's HP skill. These results support previous research by Morrongiello & Corbett (2015), which found no evidence of the contribution of children's and parents' age in how parents estimate their own children's behaviour when crossing a road. This study found a negative association between having an older sibling without ASD and the prediction accuracy. Moreover, parents tend to overestimate children who could identify fewer hazards and react faster on the given HP skill test relative to the control group. The study found a significant correlation between autistic children's travel frequency and trip purpose with the precision of parents' prediction, in which parents had more accurate judgment regarding autistic children who often walk around the neighbourhood. As autistic children are found to

walk and cycle more frequently than the control group, this may also explain the result of this study in which parents could accurately predict their children's total correct answers and to what extent they performed compared to the control group. Parents' accuracy is also found in a previous study by Dunne et al. (1992). Another possible explanation for this is that children are allowed to walk around the neighbourhood due to their parents' close observation of their pedestrian ability (Gielen et al., 2004). Parents who closely observe their children tend to adjust their strictness in supervising their children and give greater trust to children who perform safer practice as a pedestrian (Barton & Schwebel, 2007; Morrongiello & Barton, 2009) which may improve children's pedestrian skill.

Secondly, this study reported that parents of autistic children overestimated their children's reaction time and erroneously assumed that their children would respond faster than non-autistic children. Parents expected their children to react slightly slower, while from the test result, their children reacted slower to a more distinguishable extent. .Despite having different age group, the present result seems to support the study by Morrongiello & Corbett (2015), which also found that parents overestimate their children by expecting them to take a safer time when crossing the road.

Finally, the current study highlights the changes in parents' perception of their children's current and future pedestrian HP skills. Although parents would be still slightly worried about their children's pedestrian HP skills in the future, they believe that they will be less worried compared to the present time. According to this result, it seems that parents believe that their children's pedestrian capability may improve in the future. It is noteworthy that this may be true for children's pedestrian safety skills if given proper training (Meir et al., 2015). Similarly, Josman et al. (2008) also reported this remarkable finding among autistic children and adolescents. Likewise, whilst pedestrian HP skill is currently important for their children, it will be significantly more crucial when their children are adults. One of the possible reasons may be related to how most parents in this study believed that similar to many non-autistic individuals, their children will likely be able to travel independently once they are adults. In addition, parents believed that it is not cognitive developmental that play pivotal role in their children's pedestrian capabilities. Parents believe that it is them and their practice in giving proper education could improve their children's pedestrian capability (Barton & Huston, 2012).

5.2 Limitations and future research

For the current study, four sources of limitations should be taken into consideration in this study. Similarly to other studies in Indonesia which involve autistic children (e.g., Sidjaja, 2015), the first limitations of this current study are primarily due to the limited number of participants. It was challenging to find and recruit participants, particularly parents and autistic children. Consequently, among autistic children who had begun the survey, four children could not complete the study due to poor internet connections, incompatible devices, and loss of concentration. Moreover, for several ASD children, surveys were set when children can attend

school to get direct assistance from their shadow teacher. However, parents chose to cancel the survey because the Covid-19 cases in the JMA had been continuously increasing and other health reasons. In other instances, some schools that had already scheduled the survey cancelled their participation as some inclusive educators experienced health problems and they experienced a deficit of available educators.

Secondly, the small sample did not allow statistical analysis of interesting variables. For instance, gender variable may be substantial as an earlier study found that the interaction between age and gender may significantly influence parents' perception of autistic children's pedestrian safety skills (Morrongiello & Barton, 2009). However, this study unintentionally underrepresents females with ASD as there are only two females with ASD who completed the survey, or 1 out of 10 respondents, although several studies suggested a 1:4 ratio of female and male ASD diagnoses (MacFadden & Train, 1978; Townsend & Van Puymbroeck, 2017). Moreover, similarly to a previous study with a large sample size (Cameron & Suarez, 2017), this study has different education level distribution despite having somewhat similar age distribution of both groups. Thus, due to this lack of heterogeneity, it was impossible to further explore how gender, age, and education level could have affected the children's performance and parents' perception. If it is possible to recruit more participants with more heterogeneous characteristics, this would be a fruitful area for further work.

Thirdly, this study relies on teachers' and parents' reports on their children's condition. There is no medical record validated ascertaining details of ASD diagnosis of children, and no data related to the ASD-related characteristics is asked. This decision was made to prevent inconvenience among parents. Even though this was ensured during participants' recruitment, some parents refused the survey invitation. Some of them experienced trauma after contributing as a respondent to a prior study about their ASD children. However, since the symptoms in every autistic child are somewhat vague, these factors may have a significant influence on parents' perception and children's performance. As an illustration, one of the reasons parents are stricter in supervising a particular group of young sons is how young sons pose more risky behaviour when crossing the road (Morrongiello & Barton, 2009). Therefore, future studies could be carried out to understand the implication of parents' observation of children's pedestrian behaviour as an influencing factor on children's performance and parents' perception. Considering different situation and condition each autistic children and parents may have, it is highly recommended to include qualitative approach to obtain more in-depth analysis of parents’ perception.

The last limitations address how using Qualtrics platform for the HP tests tool may be over simplistic. This tool was utilized due to unavailability of more advance tool and to accommodate the necessities of virtual survey. Some ASD children were not accustomed to using laptops compared to the control group, which may influence their reaction time. Since, children were shown photos of real road scenes, which required the assumption of object movements. The result also shows striking difference of longer reaction time in the first pictures of different

hazard types. However, as it is impossible to randomize the pictures order for different children, it remains unclear whether this significant longer reaction time was related to the pictures' order. Moreover, it remains unclear why both groups only have comparable performance in pictures without hazard. Furthermore, due to this simplistic tool, the study restricted the autistic children to those who could communicate verbally. Large shares of contacted institutions decided to not contribute in this study as their autistic students had difficulties in verbal communication and believed that the test instruction may be over complicated for autistic children in their schools. Thus, as Parsons & Carlew (2015) and Bishop et al. (2017) suggested, utilizing a better survey tool may offer better resemble real-world situations. Thus, it is highly recommended to explore more tool options that can better include more participants, represent more heterogeneity of autistic children, and better simulate the children's actual reactions (e.g., eye-tracking).

5.3 Practical implications

The findings of this study may offer several implications for future practice, including with respect to parents of autistic children, educational institutions, government and researchers. The current results imply that parents could accurately predict their children's ability to identify which objects should be given attention when walking on the sidewalk and crossing the street. And the accuracy of this judgement improves in the case of children who often walk around the neighbourhood. However, parents tend to overestimate their children's reaction time when encountering dangerous situations as a pedestrian. This judgement may cause risk as parents provide less supervision than they should, putting children in a high-risk position (Morrongiello & Barton, 2009). Therefore, it is highly recommended that parents focus on children's ability to examine the situation when walking and their intention and reaction to managing the condition. It is noteworthy that although parents faced constraints when starting the process, intervention is important to improve their autistic children's capabilities, (Marsack-Topolewski & Graves, 2019). Therefore, beside parents, it is recommended that schools systematically educate pedestrian skill to autistic children. The result demonstrates that autistic children have different HP skill compared to the control group. Thus, greater effort by government are needed to ensure appropriate inclusive pedestrian facilities and support for autistic children.

Lastly, to improve the validity of the HP test result, further research to determine a more suitable tool for the hazard perception skill test which can better reflect the real-world situation while still considering the condition of having limited resources. Considering that unlike the studies conducted in other countries (e.g., Clancy et al., 2006; Cowan et al., 2017; Meir et al., 2015; Ross et al., 2019), Indonesia is not yet accustomed to utilizing advanced technology such as eye trackers, simulators, or the combination of both, to predict actual road users behaviour, and still heavily relies on self-reported data.

6 CONCLUSIONS

The present study was designed to investigate the pedestrian hazard perception among autistic children and how it may correlate with their parents' perception. Although this study is based on a small sample of participants having multiple limitations, the finding offers valuable insights into how parents with autistic children can accurately predict their children's capability in identifying relevant objects to avoid risky situations, yet overestimating their children's reaction time. The current study suggests that autistic children have worse pedestrian BP, EP, and DF HP skills than the non-autistic children. Importantly, due to the small sample number and survey resources, it was impossible to further asses the factors that may influence these results. For instance, data related to the symptoms and pedestrian behaviour of autistic children and given pedestrian training. Therefore, it is highly recommended for future study to expand the type of data collected and consider a better data collection approach. For instance, by utilizing better simulator tool or incorporating qualitative approach in the future research.

REFERENCES

Adioetomo, S. M., & Mont, D. (2014). *Persons with Disability in Indonesia: Empirical Facts and Implications for Social Protection Policies*. www.tnp2k.go.id

American Psychiatric Association. (2013). Diagnostic and statistical manual of mental disorders. 5th ed. In *American Psychiatric Association*. https://doi.org/10.3917/sh.marmi.2016.01.0038

APCD. (2020). *Autism at a Glance in ASEAN*.

Barton, B. K., & Huston, J. (2012). The roles of child, parent and environmental factors in pedestrian supervision. *International Journal of Injury Control and Safety Promotion*, *19*(2), 153–162. https://doi.org/10.1080/17457300.2011.635210

Barton, B. K., & Schwebel, D. C. (2007). The roles of age, gender, inhibitory control, and parental supervision in children's pedestrian safety. *Journal of Pediatric Psychology*, *32*(5), 517–526. https://doi.org/10.1093/jpepsy/jsm014

Basak, C., Voss, M. W., Erickson, K. I., Boot, W. R., & Kramer, A. F. (2011). Regional differences in brain volume predict the acquisition of skill in a complex real-time strategy videogame. *Brain and Cognition*, *76*(3), 407–414. https://doi.org/10.1016/j.bandc.2011.03.017

Bennetts, S. K., Cooklin, A. R., Crawford, S., D'Esposito, F., Hackworth, N. J., Green, J., Matthews, J., Strazdins, L., Zubrick, S. R., & Nicholson, J. M. (2018). What Influences Parents' Fear about Children's Independent Mobility? Evidence from a State-Wide Survey of Australian Parents. *American Journal of Health Promotion*, *32*(3), 667–676. https://doi.org/10.1177/0890117117740442

Bishop, H. J., Biasini, F. J., & Stavrinos, D. (2017). Social and Non-social Hazard Response in Drivers with Autism Spectrum Disorder. *Journal of Autism and Developmental Disorders 2017 47:4*, *47*(4), 905–917. https://doi.org/10.1007/S10803-016-2992-1

Cameron, L., & Suarez, D. C. (2017). *Disability in Indonesia: What can we learn from the data? Australia Indonesia Partnership for Economic Governance MONASH BUSINESS SCHOOL*.

Carver, A., Watson, B., Shaw, B., & Hillman, M. (2013). A comparison study of children's independent mobility in England and Australia. *Children's Geographies*, *11*(4), 461–475. https://doi.org/10.1080/14733285.2013.812303

Castro, C., Padilla, J. L., Roca, J., Benítez, I., García-Fernández, P., Estévez, B., López-Ramón, M. F., & Crundall, D. (2014). Development and Validation of the Spanish Hazard Perception Test. *Traffic Injury Prevention*, *15*(8), 817–826. https://doi.org/10.1080/15389588.2013.879125

CDC. (2020). *What is Autism Spectrum Disorder?* https://www.cdc.gov/ncbddd/autism/facts.html

Centers for Disease Control. (2012). Prevalence of Autism spectrum disorders - Autism and Developmental Disabilities Monitoring Network, 14 Sites, United States, 2008. *Morbidity and Mortality Weekly Report*, *61*(SS-3), 1–19.

Chee, D. Y., Hoe, ·, Lee, C., Patomella, A.-H., & Falkmer, · Torbjörn. (2017). Driving Behaviour Profile of Drivers with Autism Spectrum Disorder (ASD). *Journal of Autism and Developmental Disorders*, *47*, 2658–2670. https://doi.org/10.1007/s10803-017-3178-1

Clancy, T. A., Rucklidge, J. J., & Owen, D. (2006). Road-crossing safety in virtual reality: A comparison of adolescents with and without ADHD. *Journal of Clinical Child and Adolescent Psychology*, *35*(2), 203–215. https://doi.org/10.1207/s15374424jccp3502_4

Collins, B. C., Wolery, M., & Gast, D. L. (1991). *A Survey of Safety Concerns for Students with Special Needs Author (s): Belva C . Collins , Mark Wolery and David L . Gast Source : Education and Training in Mental Retardation , September 1991 , Vol . 26 , No . 3 Published by : Division on Autism and D*. *26*(3), 305–318.

Cowan, G., Earl, R., Falkmer, T., Girdler, S., Morris, S. L., & Falkmer, M. (2017). Fixation patterns of individuals with and without Autism Spectrum disorder: Do they differ in shared zones and in zebra crossings? *Journal of Transport and Health*, *8*(December 2017), 112–122. https://doi.org/10.1016/j.jth.2017.12.001

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika 1951 16:3*, *16*(3), 297–334. https://doi.org/10.1007/BF02310555

Crundall, D., Chapman, P., Trawley, S., Collins, L., Van Loon, E., Andrews, B., & Underwood, G. (2012). Some hazards are more attractive than others: Drivers of varying experience respond differently to different types of hazard. *Accident Analysis and Prevention*, *45*, 600–609. https://doi.org/10.1016/j.aap.2011.09.049

Davison, K. K., & Lawson, C. T. (2006). Do attributes in the physical environment influence children's physical activity? A review of the literature. *International Journal of Behavioral Nutrition and Physical Activity*, *3*(1), 1–17. https://doi.org/10.1186/1479-5868-3-19/TABLES/2

Delbosc, A., & Currie, G. (2011). The spatial context of transport disadvantage, social exclusion and well-being. *Journal of Transport Geography*, *19*(6), 1130–1137. https://doi.org/10.1016/J.JTRANGEO.2011.04.005

Demographia. (2020). Demographia World Urban Areas. *Demographia*, 132. http://www.demographia.com/db-worldua.pdf

Dickter, C. L., Burk, J. A., Zeman, J. L., & Taylor, S. C. (2020). Implicit and Explicit Attitudes Toward Autistic Adults. *Autism in Adulthood*, *2*(2), 144–151. https://doi.org/10.1089/aut.2019.0023

Doyle, A. (2006). Executive function in attention deficit/hyperactivity disorder. *J Clin Psychiatry*, *67*(Suppl 8), 21–26.

Dunne, R. G., Asher, K. N., & Rivara, F. P. (1992). Behavior and parental expectations of child pedestrians. *Pediatrics*, *89*(3), 486–490. https://pubmed.ncbi.nlm.nih.gov/1741225/

Earl, R., Falkmer, T., Girdler, S., Dahlman, J., Rehnberg, A., & Falkmer, M. (2016). Visual search strategies of pedestrians with and without visual and cognitive impairments in a shared zone: A proof of concept study. *Land Use Policy*, *57*, 327–334. https://doi.org/10.1016/j.landusepol.2016.06.009

Earl, R., Falkmer, T., Girdler, S., Morris, S. L., & Falkmer, M. (2018). Viewpoints of pedestrians with and without cognitive impairment on shared zones and zebra crossings. *PLoS ONE*, *13*(9). https://doi.org/10.1371/JOURNAL.PONE.0203765

Fisher, R. A. (1992). *Statistical Methods for Research Workers BT - Breakthroughs in Statistics: Methodology and Distribution* (S. Kotz & N. L. Johnson (eds.); pp. 66–70). Springer New York. https://doi.org/10.1007/978-1-4612-4380-9_6

Gharib, S., Zare-Sadeghi, A., Abolfazl Zakerian, S., & Reza Haidari, M. (2020). The

neural basis of hazard perception differences between novice and experienced drivers- an FMRI study. *EXCLI Journal*, *19*, 547–566. https://doi.org/10.17179/excli2020-1098

Gielen, A. C., DeFrancesco, S., Bishai, D., Mahoney, P., Ho, S., & Guyer, B. (2004). Child pedestrians: The role of parental beliefs and practices in promoting safe walking in urban neighborhoods. *Journal of Urban Health*, *81*(4), 545–555. https://doi.org/10.1093/jurban/jth139

Goldsmith, T. R. (2009). Using virtual reality enhanced behavioral skills training to teach street-crossing skills to children and adolescents with autism sectrum disorders. *Dissertation Abstracts International: Section B: The Sciences and Engineering*, *69*(7-B), 4421. http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=psyc6&NEWS=N&AN=2009-99020-529

Google Maps. (2020). *Gondangdia Station*. Street View. https://www.google.be/maps/@-6.1850931,106.832609,3a,75y,233.46h,92.38t/data=!3m6!1e1!3m4!1sm2LvKjdg1x_t8yyPxHyhuA!2e0!7i16384!8i8192

Google Maps. (2021). *Bojong Gede Station*. Street View. https://goo.gl/maps/AcF47i7HPyBgrUkn8

Grove, J., Ripke, S., Als, T. D., Mattheisen, M., Walters, R. K., Won, H., Pallesen, J., Agerbo, E., Andreassen, O. A., Anney, R., Awashti, S., Belliveau, R., Bettella, F., Buxbaum, J. D., Bybjerg-Grauholm, J., Bækvad-Hansen, M., Cerrato, F., Chambert, K., Christensen, J. H., … Børglum, A. D. (2019). *Identification of common genetic risk variants for autism spectrum disorder*. *51*(3), 431–444. https://www.nature.com/articles/s41588-019-0344-8

Gugliotta, A., Ventsislavova, P., Garcia-Fernandez, P., Peña-Suarez, E., Eisman, E., Crundall, D., & Castro, C. (2017). Are situation awareness and decision-making in driving totally conscious processes? Results of a hazard prediction task. *Transportation Research Part F: Traffic Psychology and Behaviour*, *44*, 168–179. https://doi.org/10.1016/j.trf.2016.11.005

Ha, V. S., Whittaker, A., Whittaker, M., & Rodger, S. (2014). Living with autism spectrum disorder in Hanoi, Vietnam. *Social Science and Medicine*, *120*, 278–285. https://doi.org/10.1016/J.SOCSCIMED.2014.09.038

Hata, A., Yuwono, J., Purwana, R., & Nomura, S. (2021). *Embracing Diversity and Inclusion in Indonesian Schools-Challenges and Policy Options for the Future of Inclusive Education Rights and Permissions*. https://documents1.worldbank.org/curated/en/535361634052935364/pdf/Embracing-Diversity-and-Inclusion-in-Indonesian-Schools-Challenges-and-Policy-Options-for-the-Future-of-Inclusive-Education.pdf

Hidayati, I. (2021). *Understanding mobility inequality: A socio-spatial approach to analyse transport and land use in Southeast Asian metropolitan cities*. https://doi.org/10.33612/diss.146785021

Hidayati, I., Yamu, C., Tan, W., Winarso, H., & Firman, T. (2019). Residential land development in Jabotabek, Indonesia: Triggering economic crisis? *Habitat International*, *26*(18), 487–506. https://doi.org/10.1016/S0197-3975(02)00023-1

Honsberger, T. (2017). Teaching individuals with Autism Spectrum Disorder safe pedestrian skills using video modeling with in situ video prompting. *Dissertation Abstracts International Section A: Humanities and Social Sciences*, *77*(8-A(E)), No-Specified. http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=psyc14&NEWS=N&AN=2016-47716-040

Ilias, K., Hui, J., Liaw, J., Cornish, K., Park, M. S.-A., Golden, K. J., & Jennifer, K. (2016). *Wellbeing of mothers of children with "A-U-T-I-S-M" in Malaysia: An interpretative phenomenological analysis study*. https://doi.org/10.3109/13668250.2016.1196657

Ivey, J. K. . (2007). Division on Autism and Developmental Disabilities Outcomes for Students with Autism Spectrum Disorders : What is Important and Likely According to Teachers. *Education and Training in Developmental Disabilities*, *42*(1), 3–13.

Josman, N., Tamar Weiss, N., Ben-Chaim, H. M., & Friedrich, S. (2008). Effectiveness of virtual reality for teaching street-crossing skills to children and adolescents with autism. *International Journal on Disability and Human Development*, *7*(1), 49–56. https://doi.org/10.1515/IJDHD.2008.7.1.49

Kang, H. L. (2016). *Indonesia's Summary Transport Assesment*. https://www.adb.org/sites/default/files/publication/217196/ino-paper-15-2016.pdf

Kopp, S., & Gillberg, C. (2011). The Autism Spectrum Screening Questionnaire (ASSQ)-Revised Extended Version (ASSQ-REV): An instrument for better capturing the autism phenotype in girls? A preliminary study involving 191 clinical cases and community controls. *Research in Developmental Disabilities*, *32*(6), 2875–2888. https://doi.org/10.1016/J.RIDD.2011.05.017

Kwak, S. G., & Kim, J. H. (2017). Cornerstone of Modern Statistics. *Korean Journal of Anesthesiology*, *70*(2), 144–156.

Lai, M. C., Lombardo, M. V., Ruigrok, A. N. V., Chakrabarti, B., Wheelwright, S. J., Auyeung, B., Allison, C., Bailey, A. J., Baron-Cohen, S., Bolton, P. F., Bullmore, E. T., Carrington, S., Catani, M., Craig, M. C., Daly, E. M., Deoni, S. C., Ecker, C., Happé, F., Henty, J., … Williams, S. C. (2012). Cognition in Males and Females with Autism: Similarities and Differences. *PLOS ONE*, *7*(10), e47198. https://doi.org/10.1371/JOURNAL.PONE.0047198

Lange, N., Travers, B. G., Bigler, E. D., Prigge, M. B. D., Froehlich, A. L., Nielsen, J. A., Cariello, A. N., Zielinski, B. A., Anderson, J. S., Fletcher, P. T., Alexander, A. A., & Lainhart, J. E. (2014). Longitudinal Volumetric Brain Changes in Autism Spectrum Disorder Ages 6-35 Years. *Autism Research*, *8*(1), 82–93. https://doi.org/10.1002/aur.1427

Law, P., & Anderson, C. (2011). *IAN Research Report: Elopement and Wandering | Interactive Autism Network*. https://iancommunity.org/cs/ian_research_reports/ian_research_report_elopement

Leather, J., Fabian, H., Gota, S., & Mejia, A. (2011). *Walkability and Pedestrian Facilities in Asian Cities State and Issues ADB Sustainable Development Working Paper Series*. www.adb.org/poverty

Lee, L. C., Harrington, R. A., Chang, J. J., & Connors, S. L. (2008). Increased risk of injury in children with developmental disabilities. *Research in Developmental Disabilities*, *29*(3), 247–255. https://pubmed.ncbi.nlm.nih.gov/17582739/

Lo, R. H. (2010). The city as a mirror: Transport, land use and social change in Jakarta. *Urban Studies*, *47*(3), 529–555. https://doi.org/10.1177/0042098009348557

Lo, R. S. H. (2011). Walkability Planning in Jakarta. In *UC Berkeley: University of California Transportation Center*. https://escholarship.org/uc/item/05p5r596

MacFadden, D., & Train, K. (1978). *Goods-Leisure Framework*.

Mah, S. K., Nettlefold, L., Macdonald, H. M., Winters, M., Race, D., Voss, C., & McKay, H. A. (2017). Does parental support influence children's active school

travel? *Preventive Medicine Reports*, *6*, 346–351. https://doi.org/10.1016/j.pmedr.2017.04.008

Marsack-Topolewski, C. N., & Graves, J. M. (2019). "I worry about his future!" Challenges to future planning for adult children with ASD. *Https://Doi.Org/10.1080/10522158.2019.1578714*, *23*(1), 71–85. https://doi.org/10.1080/10522158.2019.1578714

Martinussen, R., Hayden, J., Hogg-Johnson, S., & Tannock, R. (2005). A meta-analysis of working memory impairments in children with attention-deficit/hyperactivity disorder. *Journal of the American Academy of Child and Adolescent Psychiatry*, *44*(4), 377–384. https://doi.org/10.1097/01.chi.0000153228.72591.73

McKenna, F., & Crick, J. (1991). *Experience and expertise in hazard perception*. *PA 2038/91*.

Meir, A., Oron-Gilad, T., & Parmet, Y. (2015). Are child-pedestrians able to identify hazardous traffic situations? Measuring their abilities in a virtual reality environment. *Safety Science*, *80*, 33–40. https://doi.org/10.1016/j.ssci.2015.07.007

Meyer, S., Sagberg, F., & Torquato, R. (2014). Traffic hazard perception among children. *Transportation Research Part F: Traffic Psychology and Behaviour*, *26*(PART A), 190–198. https://doi.org/10.1016/j.trf.2014.07.007

Ministry of Research and Culture. (2020). *Statistik Pendidikan Luar Biasa*. http://publikasi.data.kemdikbud.go.id/uploadDir/isi_E12EDA77-6E58-4660-A29C-CFBDAB029B3D_.pdf

Ministry of Research, T. and H. E. I. (2017). *Sekolah Inklusi dan Pembangunan SLB Dukung Pendidikan Inklusi*. https://www.kemdikbud.go.id/main/blog/2017/02/sekolah-inklusi-dan-pembangunan-slb-dukung-pendidikan-inklusi

Ministry of Transportation Indonesia. (2019). *Statistik Transportasi Darat*.

Morrongiello, B. A., & Barton, B. K. (2009). Child pedestrian safety: Parental supervision, modeling behaviors, and beliefs about child pedestrian competence. *Accident Analysis and Prevention*, *41*(5), 1040–1046. https://doi.org/10.1016/j.aap.2009.06.017

Morrongiello, B. A., & Corbett, M. (2015). Using a virtual environment to study child pedestrian behaviours: A comparison of parents' expectations and children's street crossing behaviour. *Injury Prevention*, *21*(5), 291–295. https://doi.org/10.1136/injuryprev-2014-041508

Muir, C., O'Hern, S., Oxley, J., Devlin, A., Koppel, S., & Charlton, J. L. (2017). Parental role in children's road safety experiences. *Transportation Research Part F: Traffic Psychology and Behaviour*, *46*, 195–204. https://doi.org/10.1016/j.trf.2017.01.014

Niehues, A. N., Bundy, A., Broom, A., & Tranter, P. (2015). Parents' Perceptions of Risk and the Influence on Children's Everyday Activities. *Journal of Child and Family Studies*, *24*(3), 809–820. https://doi.org/10.1007/s10826-013-9891-2

Parsons, T. D., & Carlew, A. R. (2015). Bimodal Virtual Reality Stroop for Assessing Distractor Inhibition in Autism Spectrum Disorders. *Journal of Autism and Developmental Disorders*, *46*. https://doi.org/10.1007/s10803-015-2663-7

Pont, K., Ziviani, J., Wadley, D., & Abbott, R. (2011). The Model of Children's Active Travel (M-CAT): A conceptual framework for examining factors influencing children's active travel. *Australian Occupational Therapy Journal*, *58*(3), 138–144. https://doi.org/10.1111/j.1440-1630.2010.00865.x

Pratiwi, Y. Y., & Siahaan, F. C. (2017). Accident Among Children in Indonesia Urban

Areas. *Accident Among Children in Indonesia Urban Areas*, *3*(2), 79–92.
Rachmayanti, S., & Zulkaida, A. (2007). Penerimaan Diri Orangtua terhadap Anak Autisme dan Peranannya dalam Terapi Autisme. *Jurnal Psikologi*, *1*(1). https://www.ejournal.gunadarma.ac.id/index.php/psiko/article/view/277
Rea-Amaya, A. C., Acle-Tomasini, G., & Ordaz-Villegas, G. (2019). Parental Perception of Skills in Children with Autism Spectrum Disorders and the Relationship to Transition Processes. *Psychology*, *10*(09), 1333–1351. https://doi.org/10.4236/psych.2019.109085
Riany, Y. E., Cuskelly, M., & Meredith, P. (2016). Cultural Beliefs about Autism in Indonesia. *International Journal of Disability, Development and Education*, *63*(6), 623–640. https://doi.org/10.1080/1034912X.2016.1142069
Rosenbloom, T., Mandel, R., Rosner, Y., & Eldror, E. (2015). Hazard perception test for pedestrians. *Accident Analysis and Prevention*, *79*, 160–169. https://doi.org/10.1016/j.aap.2015.03.019
Rosenbloom, T., Shahar, A., Elharar, A., & Danino, O. (2008). Risk perception of driving as a function of advanced training aimed at recognizing and handling risks in demanding driving situations. *Accident Analysis and Prevention*, *40*(2), 697–703. https://doi.org/10.1016/j.aap.2007.09.007
Rosenbloom, T., & Wolf, Y. (2002). Sensation seeking and detection of risky road signals: A developmental perspective. *Accident Analysis and Prevention*, *34*(5), 569–580. https://doi.org/10.1016/S0001-4575(01)00054-9
Ross, V., Jongen, E. M. M., Brijs, K., Vanroelen, G., Beelen, C., Maltagliati, I., van Beers, M., Ruiter, R. A. C., Brijs, T., Alhajyaseen, W., Soliman, A., Wets, G., & Vanvuchelen, M. (2019). The relation between driving errors and executive functioning in intellectually able young novice drivers with autism. *Transportation Research Part F: Traffic Psychology and Behaviour*, *63*, 38–54. https://doi.org/10.1016/j.trf.2019.03.003
Rukmana, D. (2018). Rapid urbanization and the need for sustainable transportation policies in Jakarta. *IOP Conference Series: Earth and Environmental Science*, *124*(1). https://doi.org/10.1088/1755-1315/124/1/012017
S. Wignyosumarto, M. Mukhlas, & S. Shirataki. (1992). *Epidemiological and clinical study of autistic children in Yogyakarta, Indonesia*. *38*(1), 1–19. https://pubmed.ncbi.nlm.nih.gov/1495268/
Sidjaja, F. F. (2015). *Assessment and Diagnosis of Autism in Developing Countries : The Indonesian Adaptation of Autism Detection in Early Childhood (ADEC) Assessment and Diagnosis of Autism in Developing Countries : The Indonesian Adaptation of Autism Detection in Early Chil*. https://doi.org/10.14264/uql.2015.903
Sidjaja, F. F., Newcombe, P. A., & Sofronoff, K. (2016). The Diagnosis of Autism Spectrum Disorder in Urban Indonesia: A Brief Report. *International Journal of Disability, Development and Education*, *64*(1), 33–44. https://doi.org/http://dx.doi.org/10.1080/1034912X.2016.1162768
Simmons, D. R., Robertson, A. E., McKay, L. S., Toal, E., McAleer, P., & Pollick, F. E. (2009). Vision in autism spectrum disorders. *Vision Research*, *49*(22), 2705–2739. https://doi.org/10.1016/j.visres.2009.08.005
Statistics Indonesia. (2019). *Statistik Komuter Jabodetabek*.
Statistics Indonesia. (2021). *Hasil Sensus Penduduk 2020*. https://www.bps.go.id/pressrelease/2021/01/21/1854/hasil-sensus-penduduk-2020.html
Stavrinos, D., Biasini, F. J., Fine, P. R., Hodgens, J. B., Khatri, S., Mrug, S., & Schwebel, D. C. (2011). Mediating factors associated with pedestrian injury in

children with attention-deficit/hyperactivity disorder. *Pediatrics*, *128*(2), 296–302. https://doi.org/10.1542/PEDS.2010-3829

Sumner, C. (2015). *Indonesia's Missing Millions: Erasing Discrimination in Birth Certification in Indonesia*. www.cgdev.org

Tabibi, Z., David, ·, Schwebel, C., & Zolfaghari, · Hamid. (2011). Road-Crossing Behavior in Complex Traffic Situations: A Comparison of Children With and Without ADHD. *Child Psychiatry & Human Development*. https://doi.org/10.1007/s10578-021-01200-y

Tekin-Iftar, E., Olcay, S., Sirin, N., Bilmez, H., Degirmenci, H. D., & Collins, B. C. (2021). Systematic Review of Safety Skill Interventions for Individuals With Autism Spectrum Disorder. *Journal of Special Education*, *54*(4), 239–250. https://doi.org/10.1177/0022466920918247

The Global Road Safety Facility. (2018). *Indonesia's Road Safety Country Profile*.

The Ministry of Women Empowerment and Child Protection Indonesia. (2018). *Hari Peduli Autisme Sedunia: Kenali Gejalanya, Pahami Keadaannya*. https://www.kemenpppa.go.id/index.php/page/read/31/1682/hari-peduli-autisme-sedunia-kenali-gejalanya-pahami-keadaannya

Tjahjono, T., Kusuma, A., & Septiawan, A. (2020). The Greater Jakarta Area Commuters Travelling Pattern. *Transportation Research Procedia*, *47*, 585–592. https://doi.org/10.1016/J.TRPRO.2020.03.135

Townsend, J. A., & Van Puymbroeck, M. (2017). Parental Perceptions of Changes in Family Well-Being Following Participation in a Camp: Experiences of Families With a Child With ASD Qualitative Paper. *Therapeutic Recreation Journal*, *51*(2), 143–163. https://doi.org/10.18666/trj-2017-v51-i2-8359

Tucker, A. C. (2013). *Interpreting and treating autism in Javanese Indonesia*. University of California.

van der Meer, J. M. J., Hartman, C. A., Thissen, A. J. A. M., Oerlemans, A. M., Luman, M., Buitelaar, J. K., & Rommelse, N. (2017). How "core" are motor timing difficulties in ADHD? A latent class comparison of pure and comorbid ADHD classes. *Eur Child Adolesc Psychiatry.*, 1–11. https://doi.org/https://doi.org/10.1007/s00787-015-0734-0

Ventsislavova, P., & Crundall, D. (2018). The hazard prediction test: A comparison of free-response and multiple-choice formats. *Safety Science*, *109*, 246–255. https://doi.org/10.1016/j.ssci.2018.06.004

Wallace, S., Fein, D., Rosanoff, M., Dawson, G., Hossain, S., Brennan, L., Como, A., & Shih, A. (2012). A Global Public Health Strategy for Autism Spectrum Disorders. In *Autism Research* (Vol. 5, Issue 3, pp. 211–217). Autism Res. https://doi.org/10.1002/aur.1236

Waltz, M. (2002). *Autistic Spectrum Disorders: Finding a Diagnosis and Getting Help*. O'Reilly & Associates.

Wilmut, K., & Purcell, C. (2021). The nature of the risk faced by pedestrians with neurodevelopmental disorders: A systematic review. *Accident Analysis and Prevention*, *149*(September 2020), 105886. https://doi.org/10.1016/j.aap.2020.105886

Winarso, H., & Firman, T. (2002). Residential land development in Jabotabek, Indonesia: Triggering economic crisis? *Habitat International*, *26*(4), 487–506. https://doi.org/10.1016/S0197-3975(02)00023-1

World Health Organization. (2015). *Regional strategy for road safety in South-East Asia*. https://apps.who.int/iris/bitstream/handle/10665/177997/SEA-Injuries-24.pdf;jsessionid=3F5297168AE683FF3FBCEC32F2C1602A?sequence=1

World Health Organization. (2018). *Global Status Report on Road Safety:*

Summary (No. WHO/NMH/NVI/18.20). https://doi.org/10.3109/08830185.2014.902452

Xiang, H., Stallones, L., Chen, G., Hostetler, S. G., & Kelleher, K. (2005). Nonfatal injuries among US children with disabling conditions. In *American Journal of Public Health* (Vol. 95, Issue 11, pp. 1970–1975). American Public Health Association. https://doi.org/10.2105/AJPH.2004.057505

Xiang, H., Zhu, M., Sinclair, S. A., Stallones, L., Wilkins, J. R., & Smith, G. A. (2006). Risk of vehicle–pedestrian and vehicle–bicyclist collisions among children with disabilities. *Accident Analysis & Prevention*, *38*(6), 1064–1070. https://doi.org/10.1016/J.AAP.2006.04.010

Xiao, T., Xiao, Z., Ke, X., Hong, S., Yang, H., Su, Y., Chu, K., Xiao, X., Shen, J., & Liu, Y. (2012). Response Inhibition Impairment in High Functioning Autism and Attention Deficit Hyperactivity Disorder: Evidence from Near-Infrared Spectroscopy Data. *PLoS ONE*, *7*(10). https://doi.org/10.1371/journal.pone.0046569

Zeedyk, M. S., & Kelly, L. (2003). Behavioural observations of adult-child pairs at pedestrian crossings. *Accident Analysis and Prevention*, *35*(5), 771–776. https://doi.org/10.1016/S0001-4575(02)00086-6

Zubrick, S. R., Wood, L. J., Villanueva, K., Trapp, G., Giles-Corti, B., & Christian, H. E. (2010). *Nothing but fear itself: Parental fear as a determinant of child physical activity and independent mobility.*

Zulkifli, M., & Hino, Y. (2009). Limitation of Walking Facilities in Jakarta; A Visual Analysis on Actual Condition and User's Perception. *Proceedings of the Eastern Asia Society for Transportation Studies*, *7*.

APPENDIX 1. Consent form for parents and ASD children

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imob INSTITUUT VOOR MOBILITEIT
UHASSELT

INFORMASI LEMBAR PERSETUJUAN-INFORMASI PESERTA
INFORMED CONSENT – PARTICIPANT INFORMATION

Based on this information and consent form, we request your consent to participate described research below. This form contains all information about the research.

Title research:
Hazard perception skills of children with autism in Jakarta Metropolitan Area: A comparison of test performance

Name & contact details researchers:
Jeanly Syahputri (graduate student): jeanly.syahputri@student.uhasselt.be +62 818 07 40 89 33

Dr. Veerle Ross (occupational therapist & health psychologist): veerle.ross@uhasselt.be --+32 11 26 91 08

Dra. Hélène Dirix (occupational therapist): helene.dirix@uhasselt.be – +32 11 26 91 11

Type of study:
A cognitive task and supplemented with questionnaires.

Dear participant,

You were invited to participate voluntarily in a thesis data collection. Before you agree to this study to participate to this study, it is important that you read this form. In this document the information and consent form study will be presented. The alternatives available to you and the right to withdraw from the study at any time are also described below. You have the right to ask questions at any time to the researchers about the study

We are looking for children and parents who meet the following characteristics criteria to fulfil:
- Children age: 10-14 years
- Parents with children age: 10-14 years
- Diagnosed with ASD

Berdasarkan informasi dan formulir persetujuan ini, kami meminta persetujuan Anda untuk berpartisipasi dalam penelitian yang dijelaskan di bawah ini. Formulir ini berisi semua informasi tentang penelitian..

Judul penelitian:
Komparasi Kemampuan Anak dengan dan tanpa Sindrom Autisme dalam Mengenali Bahaya di Jalan

Nama & Detail Kontak Peneliti:
Jeanly Syahputri (mahasiswa pascasarjana): jeanly.syahputri@student.uhasselt.be +62 818 07 40 89 33

Dr. Veerle Ross (terapis okupasi & psikolog kesehatan): veerle.ross@uhasselt.be -+32 11 26 91 08

Dra. Hélène Dirix (terapis okupasi): helene.dirix@uhasselt.be – +32 11 26 91 11

Jenis Penelitian:
Sebuah tugas kognitif dan ditambah dengan kuesioner.

Peserta yang terhormat,

Anda diundang untuk berpartisipasi secara sukarela dalam pengumpulan data tesis. Sebelum Anda menyetujui penelitian ini untuk berpartisipasi dalam penelitian ini, penting bagi Anda untuk membaca formulir ini. Dalam dokumen ini, informasi dan formulir persetujuan studi akan disajikan. Anda berhak setiap saat mengajukan pertanyaan kepada peneliti.

Studi ini membutuhkan anak-anak dan orang tua dengan kriteria berikut:
- Anak-anak usia: 10-15 bertahun-tahun
- Orangtua dengan anak-anak usia: 10-15 bertahun-tahun

- Normal or corrected-to-normal vision
- Enable to communicate verbally
- Live in the Jakarta Metropolitan Area (JMA)

Duration of the clinical study
The study will take approximately 10 minutes for parents and 10-30 minutes for children.

Investigations in the context of the study
If you agree to participate in this study and you meet the conditions for participation, the following tests and examinations will be performed:
- Hazard perseption skill test
- Questionnaires regarding personal (age, gender, education level) and travel characteristics.

Voluntary participation
You participate in this study completely voluntarily and you have the right to to refuse to participate. If you accept to participate, you will be given this document to keep and you will be asked to sign the attached consent form.

You can refuse to participate before study starts, you can also stop at any time during the study, even after you have signed the consent form. You do not have to give a reason for withdrawing your consent to participate. Withdrawing your consent will not entail any disadvantage or loss of benefits. If you are not sure about the explanation in this document, do not hesitate to address the researcher. You have the rights to obtain the answer to your answer.

Confidentiality, privacy and data usage
Your identity and your participation in this study will be treated in the strictest confidence. You will not be identified by name or in any other recognizable way in any files, results or publications related to the study. This study strictly follows the General Data Protection Regulation - AVG as required by European law. Your identity remains secret as information about yourself will only be indicated on the basis of a unique participant number (i.e., coded).

The information we have about you, will be processed and analyzed electronically (i.e., in the computer) or manually to determine the results of this study. Information that would allow you to be identified as a will not be passed on outside the

- Didiagnosis dengan ASD
- Memiliki penglihatan normal
- Memungkinkan ke menyampaikan secara lisan
- Tinggal di Jabodetabek

Durasi Penelitian
Penelitian akan memakan waktu sekitar 10 menit untuk orang tua dan 10-30 menit untuk anak-anak.

Investigasi dalam Konteks Studi
Jika Anda setuju ke ikut di dalam ini belajar dan Anda memenuhi kondisi untuk partisipasi, tes dan ujian yang akan dilakukan berupa:
- Tes sebagai pejalan kaki
- Kuesioner tentang pribadi (usia, jenis kelamin, pendidikan tingkat) dan karakteristik perjalanan (frekuensi menggunakan mobil, motor, dll).

Partisipasi Sukarela
Anda ikut di dalam studi ini secara sukarela dan Anda memiliki hak untuk menolak untuk berpartisipasi. Jika Anda bersedia ke berpartisipasi, Anda akan diberikan dokumen ini untuk disimpan dan Anda akan menjadi diminta untuk menandatangani lembar persetujuan terlampir.

Anda dapat menolak untuk ikut pada setiap thap, bahkan setelah Anda telah menandatangani lembar persetujuan. Anda dapat menarik kembali persetujuan tanpa memberikan alasan. Penarikan persetujuan tidak akan berakibatkan kerugian atau kehilangan manfaat. Anda berhak bertanya dan memperoleh jawaban peneliti.

Kerahasiaan, Privasi, dan Penggunaan Data
Identitas Anda dan partisipasi Anda studi ini akan diperlakukan secara ketat. Anda tidak akan diidentifikasi dengan nama atau dalam keterangan lainnya yang dapat dikenali sebagai idividu. Data studi diberlakukan sesuai Peraturan Perlindungan Data Umum (AVG) sesuai peraturan Eropa. Identitas Anda tetap dijaga kerahasiannya dan identitas anda akan dibedakan sesuai nomor unik partisipan (yaitu, berkode).

Informasi yang kami miliki tentang Anda, akan menjadi diproses dan dianalisis secara elektronik (yaitu, dengan digital) atau secara manual. Informasi yang memungkinkan Anda untuk teridentifikasi tidak akan diberikan

research team. You have the right to access your personal data, to obtain an electronic copy, to adjust, to request, or to delete the data collected during the project. Your personal data will be encrypted and stored on a data server installed at Hasselt University. This data will be stored for a maximum of 5 years. This server is installed in a secure location and complies with all data security regulations. Hasselt University also has a data security officer who will supervise the correct application of legal procedures related to GDPR within this project. If you have any questions forthis personthe data security officer can you get in touch through dpo@uhasselt.be.

kepada pihak di luar tim peneliti. Anda memiliki hak untuk baik mengakses data pribadi Anda, juga memperoleh salinan elektronik, dan meminta peneliti untuk menyesuaikan, meminta, atau menghapus data Anda yang dikumpulkan selama studi. Data pribadi Anda akan menjadi terenkripsi dan disimpan di server data yang terpasang di Universitas Hasselt. Data Anda akan disimpan untuk maksimal 5 tahun. Server ini terpasang dalam keadaan aman dan sesuai dengan peraturan keamanan data. Universitas Hasselt juga memiliki petugas keamanan data yang akan mengawasi tindakan yang benar sesuai hukum Prosedur GDPR di dalam studi ini. Jika Anda memiliki setiap pertanyaan untuk peniliti terkait keamanan data bisa Anda dapat menghubungi petugas melalui dpo@uhasselt.be.

Committee on Ethics
This research was approved by the Medical Ethics Committee of Hasselt University on the date of ……/……/…… (to be completed later). If you decide to participate in the study, you must sign the corresponding consent form and submit it to us.

Komite Etika Penelitian
Studi ini telah disetujui oleh Komite Etika Medis Universitas Hasselt. Anda dapat menandatangi lembar persetujuan yang terlampir jika Anda bersedia untuk ikut dalam studi ini.

Language
This document is executed in Bahasa Indonesia and English. In the event of any conflict or inconsistency between the English and the Bahasa Indonesia version of this agreement, the English version shall prevail.

Bahasa
Bahasa yang digunakan dalam perjanjian ini adalah Bahasa Indonesia dan Bahasa Inggris. Dalam hal terdapat pertentangan atau inkonsistensi antara versi Bahasa Indonesia dan Bahasa Inggris dalam perjanjian ini, maka versi Bahasa Inggris yang akan menentukan (prevail)

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INFORMASI PERSETUJUAN-LEMBAR PERSETUJUAN
INFORMED CONSENT - CONSENT FORM

Hazard perception skills of children with autism in Jakarta Metropolitan Area: A comparison of test performance

Share only intended for the participant

I, the undersigned (surname & first name) ____

_____

hereby confirm that I have been informed about the study and a copy of the "Participants information" and the "Consent Form". I have read and understood the information. The researcher has provided me with sufficient information regarding the conditions and duration of the study, as well as possible risks and inconveniences. In addition, I was given sufficient time to consider the information and to ask questions, to which I received satisfactory answers.

- I understand that I may discontinue participation in this study at any time, without this causing me any harm.
- I agree to the collection, processing and use of my data, as described in the information sheet information form for the participant.
- I voluntarily agree to participate in this study and to participate in any requested studies. I am willing to provide information and possible participation in other studies.
- I know that if I have questions or if I don't feel good about what happened during the study, I can always contact Jeanly Syahputri jeanly.syahputri@student.uhasselt.be or via +62 818 07 40 89 33. I agree to be contacted in the future regarding a follow-up investigation.

Ditujukan untuk Peserta

Saya yang bertanda tangan di bawah (nama belakang & nama depan) _____

_____

dengan ini menyatakan bahwa saya telah diberitahu tentang penelitian ini dan diberikan salinan dari dokumen ini. Saya telah membaca dan memahami informasi tersebut. Peneliti telah memberi saya informasi yang cukup mengenai kondisi dan durasi penelitian. Selain itu, saya diberi waktu yang cukup untuk mempertimbangkan informasi dan mengajukan pertanyaan, yang saya terima dengan jawaban yang memuaskan.

- Saya mengerti bahwa saya dapat menghentikan partisipasi saya dalam penelitian ini setiap saat, tanpa menyebabkan kerugian.
- Saya menyetujui pengumpulan, pemrosesan, dan penggunaan data saya, sebagaimana dijelaskan dalam lembar informasi untuk peserta.
- Saya secara sukarela setuju untuk berpartisipasi dalam penelitian ini dan untuk berpartisipasi dalam setiap penelitian yang diminta. Saya bersedia memberikan informasi dan kemungkinan digunakannya data dalam penelitian lain.
- Saya mengetahui bahwa jika saya memiliki pertanyaan atau jika saya merasa tidak nyaman tentang apa yang terjadi selama penelitian, saya selalu dapat menghubungi Jeanly Syahputri jeanly.syahputri@student.uhasselt.be atau melalui +62 818 07 40 89 33. Saya setuju untuk dihubungi di masa depan mengenai penyelidikan tindak lanjut.

Share intended for the researcher only

I the undersigned, _____

_____,
hereby confirm that _____

_____
(participant's full name) has given his/her consent to participate in the study.

Ditujukan untuk Peneliti

Saya yang bertandatangan, _____

_____
dengan ini menyatakan bahwa _____

_____
(nama lengkap peserta) telah memberikan persetujuannya untuk berpartisipasi dalam penelitian ini.

Researcher/peneliti:,
Date/tanggal (DD/MM/YYYY):
……/……/……

Signature/ttd:

_____
Full name/nama lengkap:

Respondent/responden,
Date/tanggal (DD/MM/YYYY):
……/……/……

Signature/ttd:

_____
Full name/nama lengkap:

APPENDIX 2. Consent form for non-autistic children

ww.uhasselt.be/imob
Wetenschapspark 5 bus 6 | 3590 Diepenbeek
Tel. 011 26 81 11 | info@uhasselt.be

INFORMASI LEMBAR PERSETUJUAN-INFORMASI PESERTA
INFORMED CONSENT – PARTICIPANT INFORMATION

Based on this information and consent form, we request your consent to participate described research below. This form contains all information about the research.

Title research:
Hazard perception skills of children with autism in Jakarta Metropolitan Area: A comparison of test performance

Name & contact details researchers:
Jeanly Syahputri (graduate student): jeanly.syahputri@student.uhasselt.be +62 818 07 40 89 33

Dr. Veerle Ross (occupational therapist & health psychologist): veerle.ross@uhasselt.be --+32 11 26 91 08

Dra. Hélène Dirix (occupational therapist): helene.dirix@uhasselt.be – +32 11 26 91 11

Type of study:
A cognitive task and supplemented with questionnaires.

Dear participant,

You were invited to participate voluntarily in a thesis data collection. Before you agree to this study to participate to this study, it is important that you read this form. In this document the information and consent form study will be presented. The alternatives available to you and the right to withdraw from the study at any time are also described below. You have the right to ask questions at any time to the researchers about the study

We are looking for children who meet the following characteristics criteria to fulfil:
- Children age: 10-14 years

Berdasarkan informasi dan formulir persetujuan ini, kami meminta persetujuan Anda untuk berpartisipasi dalam penelitian yang dijelaskan di bawah ini. Formulir ini berisi semua informasi tentang penelitian..

Judul penelitian:
Bahaya persepsi keterampilan dari anak-anak dengan autisme di Jakarta Metropolitan Daerah: Perbandingan tes performa

Nama & Detail Kontak Peneliti:
Jeanly Syahputri (mahasiswa pascasarjana): jeanly.syahputri@student.uhasselt.be +62 818 07 40 89 33

Dr. Veerle Ross (terapis okupasi & psikolog kesehatan): veerle.ross@uhasselt.be -+32 11 26 91 08

Dra. Hélène Dirix (terapis okupasi): helene.dirix@uhasselt.be – +32 11 26 91 11

Jenis Penelitian:
Sebuah tugas kognitif dan ditambah dengan kuesioner.

Peserta yang terhormat,

Anda diundang untuk berpartisipasi secara sukarela dalam pengumpulan data tesis. Sebelum Anda menyetujui penelitian ini untuk berpartisipasi dalam penelitian ini, penting bagi Anda untuk membaca formulir ini. Dalam dokumen ini, informasi dan formulir persetujuan studi akan disajikan. Alternatif-alternatif yang tersedia bagi Anda dan hak untuk mengundurkan diri dari penelitian setiap saat juga dijelaskan di bawah ini. Anda berhak setiap saat mengajukan pertanyaan kepada peneliti.

Studi ini membutuhkan anak-anak dengan kriteria berikut:
- Anak-anak usia 10-15 bertahun-tahun

- Parents with children age: 10-14 years
- Normal or corrected-to-normal vision
- Enable to communicate verbally
- Live in the Jakarta Metropolitan Area (JMA)

Duration of the clinical study
The study will take approximately 10-30 minutes for children.

Investigations in the context of the study
If you agree to participate in this study and you meet the conditions for participation, the following tests and examinations will be performed:
- Hazard perseption skill test
- Questionnaires regarding personal (age, gender, education level) and travel characteristics.

Voluntary participation
You participate in this study completely voluntarily and you have the right to to refuse to participate. If you accept to participate, you will be given this document to keep and you will be asked to sign the attached consent form.

You can refuse to participate before study starts, you can also stop at any time during the study, even after you have signed the consent form. You do not have to give a reason for withdrawing your consent to participate. Withdrawing your consent will not entail any disadvantage or loss of benefits. If you are not sure about the explanation in this document, do not hesitate to address the researcher. You have the rights to obtain the answer to your answer.

Confidentiality, privacy and data usage
Your identity and your participation in this study will be treated in the strictest confidence. You will not be identified by name or in any other recognizable way in any files, results or publications related to the study. This study strictly follows the General Data Protection Regulation - AVG as required by European law. Your identity remains secret as information about yourself will only be indicated on the basis of a unique participant number (i.e., coded).

The information we have about you, will be processed and analyzed electronically (i.e., in the computer) or manually to determine the results of

- Memiliki penglihatan normal
- Memungkinkan ke menyampaikan secara lisan
- Tinggal di Jabodetabek

Durasi Penelitian
Penelitian akan memakan waktu sekitar 10-30 menit untuk anak-anak.

Investigasi dalam Konteks Studi
Jika Anda setuju ke ikut di dalam ini belajar dan Anda memenuhi kondisi untuk partisipasi, tes dan ujian yang akan dilakukan berupa:
- Bahaya persepsi keahlian tes
- Kuesioner tentang pribadi (usia, jenis kelamin, pendidikan tingkat) dan bepergian karakteristik.

Partisipasi Sukarela
Anda ikut di dalam studi ini secara sukarela dan Anda memiliki hak untuk menolak untuk berpartisipasi. Jika Anda bersedia ke berpartisipasi, Anda akan diberikan dokumen ini untuk disimpan dan Anda akan menjadi diminta untuk menandatangani lembar persetujuan terlampir.

Anda dapat menolak untuk ikut sebelum studi dimulai, Anda bisa juga berhenti di setiap waktu selama studi dilaksanakan, bahkan setelah Anda telah menandatangani lembar persetujuan. Anda dapat menarik kembali persetujuan tanpa memberikan alasan. Penarikan persetujuan tidak akan berakibatkan kerugian atau kehilangan manfaat. Jika Anda adalah tidak yakin mengenai isi dalam dokumen ini, Anda berhak menanyakannya kepada peneliti. Anda memiliki hak untuk memperoleh jawaban dari pertanyaan Anda.

Kerahasiaan, Privasi, dan Penggunaan Data
Identitas Anda dan partisipasi Anda studi ini akan diperlakukan secara ketat. Anda tidak akan diidentifikasi dengan nama atau dalam keterangan lainnya yang dapat dikenali pada setiap dokumen, hasil atau publikasi terkait studi. Data studi diberlakukan sesuai Peraturan Perlindungan Data Umum (AVG) sesuai peraturan Eropa. Identitas Anda tetap dijaga kerahasiannya dan identitas anda akan dibedakan sesuai nomor unik partisipan (yaitu, berkode).

Informasi yang kami miliki tentang Anda, akan menjadi diproses dan dianalisis secara elektronik (yaitu, dengan digitas) atau secara

this study. Information that would allow you to be identified as a will not be passed on outside the research team. You have the right to access your personal data, to obtain an electronic copy, to adjust, to request, or to delete the data collected during the project. Your personal data will be encrypted and stored on a data server installed at Hasselt University. This data will be stored for a maximum of 5 years. This server is installed in a secure location and complies with all data security regulations. Hasselt University also has a data security officer who will supervise the correct application of legal procedures related to GDPR within this project. If you have any questions forthis personthe data security officer can you get in touch through dpo@uhasselt.be.

manual untuk memperoleh hasil studi. Informasi yang memungkinkan Anda untuk teridentifikasi tidak akan diberikan kepada pihak di luar tim peneliti. Anda memiliki hak untuk baik mengakses data pribadi Anda, memperoleh salinan elektronik, menyesuaikan, meminta, atau menghapus data dikumpulkan selama studi. Data pribadi Anda akan menjadi terenkripsi dan disimpan di server data yang terpasang di Universitas Hasselt. Data Anda akan disimpan untuk maksimal 5 tahun. Server ini terpasang dalam keadaan aman dan sesuai dengan peraturan keamanan data. Universitas Hasselt juga memiliki petugas keamanan data yang akan mengawasi tindakan yang benar sesuai hukum Prosedur GDPR di dalam studi ini. Jika Anda memiliki setiap pertanyaan untuk peniliti terkait keamanan data bisa Anda dapat menghubungi petugas melalui dpo@uhasselt.be.

Committee on Ethics
This research was approved by the Medical Ethics Committee of Hasselt University. If you decide to participate in the study, you must sign the corresponding consent form and submit it to us.

Komite Etika Penelitian
Studi ini telah disetujui oleh Komite Etika Medis Hasselt University. Apabila Anda setuju untuk berpartisipasi pada studi ini, silahkan tanda tangan formulir persetujuan yang terlampir.

Language
This document is executed in Bahasa Indonesia and English. In the event of any conflict or inconsistency between the English and the Bahasa Indonesia version of this agreement, the English version shall prevail.

Bahasa
Bahasa yang digunakan dalam perjanjian ini adalah Bahasa Indonesia dan Bahasa Inggris. Dalam hal terdapat pertentangan atau inkonsistensi antara versi Bahasa Indonesia dan Bahasa Inggris dalam perjanjian ini, maka versi Bahasa Inggris yang akan menentukan (prevail)

ww.uhasselt.be/imob
Wetenschapspark 5 bus 6 | 3590 Diepenbeek
Tel. 011 26 81 11 | info@uhasselt.be

INSTITUUT VOOR MOBILITEIT
UHASSELT

INFORMASI PERSETUJUAN-LEMBAR PERSETUJUAN
INFORMED CONSENT - CONSENT FORM

Hazard perception skills of children with autism in Jakarta Metropolitan Area: A comparison of test performance

Share only intended for the participant

I, the undersigned (surname & first name) ____

_____

hereby confirm that I have been informed about the study and a copy of the "Participants information" and the "Consent Form". I have read and understood the information. The researcher has provided me with sufficient information regarding the conditions and duration of the study, as well as possible risks and inconveniences. In addition, I was given sufficient time to consider the information and to ask questions, to which I received satisfactory answers.

- ☐ I understand that I may discontinue participation in this study at any time, without this causing me any harm.
- ☐ I agree to the collection, processing and use of my data, as described in the information sheet information form for the participant.
- ☐ I voluntarily agree to participate in this study and to participate in any requested studies. I am willing to provide information and possible participation in other studies.
- ☐ I know that if I have questions or if I don't feel good about what happened during the study, I can always contact Jeanly Syahputri jeanly.syahputri@student.uhasselt.be or via +62 818 07 40 89 33. I agree to be contacted in the future regarding a follow-up investigation.

Ditujukan untuk Peserta

Saya yang bertanda tangan di bawah (nama belakang & nama depan) _____

_____

dengan ini menyatakan bahwa saya telah diberitahu tentang penelitian ini dan salinan dari "informasi peserta" dan "Formulir Persetujuan". Saya telah membaca dan memahami informasi tersebut. Peneliti telah memberi saya informasi yang cukup mengenai kondisi dan durasi penelitian, serta kemungkinan risiko dan ketidaknyamanan. Selain itu, saya diberi waktu yang cukup untuk mempertimbangkan informasi dan mengajukan pertanyaan, yang saya terima dengan jawaban yang memuaskan.

- ☐ Saya mengerti bahwa saya dapat menghentikan partisipasi saya dalam penelitian ini setiap saat, tanpa menyebabkan kerugian.
- ☐ Saya menyetujui pengumpulan, pemrosesan, dan penggunaan data saya, sebagaimana dijelaskan dalam lembar informasi untuk peserta.
- ☐ Saya secara sukarela setuju untuk berpartisipasi dalam penelitian ini dan untuk berpartisipasi dalam setiap penelitian yang diminta. Saya bersedia memberikan informasi dan kemungkinan digunakannya data dalam penelitian lain.
- ☐ Saya mengetahui bahwa jika saya memiliki pertanyaan atau jika saya merasa tidak nyaman tentang apa yang terjadi selama penelitian, saya selalu dapat menghubungi Jeanly Syahputri jeanly.syahputri@student.uhasselt.be atau melalui +62 818 07 40 89 33. Saya setuju untuk dihubungi di masa depan mengenai penyelidikan tindak lanjut.

Share intended for the researcher only

I the undersigned, _____

_____,
hereby confirm that _____

_____
(participant's full name) has given his/her consent to participate in the study.

Ditujukan untuk Peneliti

Saya yang bertandatangan, _____

_____
dengan ini menyatakan bahwa _____

_____
(nama lengkap peserta) telah memberikan persetujuannya untuk berpartisipasi dalam penelitian ini.

Researcher/peneliti:,
Date/tanggal (DD/MM/YYYY):
……/……/……

Signature/ttd:

_____
Full name/nama lengkap:

Respondent/responden,
Date/tanggal (DD/MM/YYYY):
……/……/……

Signature/ttd:

_____
Full name/nama lengkap:

APPENDIX 3. Children pedestrian hazard perception skill test

No hazard at all

Misal, pada gambar ini kamu sedang berjalan di parkiran.

Objek apa yang harus kamu perhatikan agar terhindar dari bahaya?

Sekarang coba kamu klik objek tersebut. Jika tidak ada sama sekali, kamu boleh klik kotak kuning diatas gambar.

Kamu juga dapat memilih objek yang menurutmu menghalangi pandanganmu dari objek berbahaya.

Misalkan, jika menurutmu mobil hitam tersebut menghalangi pandanganmu dari kendaraan yang mungkin keluar dari parkiran, kamu dapat memilih mobil tersebut.

Silahkan dicoba

No hazard at all

Untuk objek yang menghalangi pandangan dari kemungkinan bahaya, klik objek tersebut dua kali sampai area berwarna merah

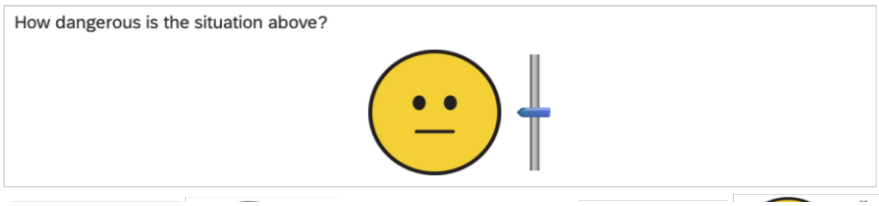
Silahkan dicoba sekarang

No hazard at all

Remember, there are 3 ways to click the object:

Remember, there are 3 ways to click the object:


Setelah kamu mengidentifikasi objek pada gambar, kamu akan ditanya seberapa berbahaya situasi tersebut untukmu
Sangat berbahaya
Tidak berbahaya
Tidak ada jawaban yang benar dan salah! Penilaianmu adalah yang paling penting pada survei ini

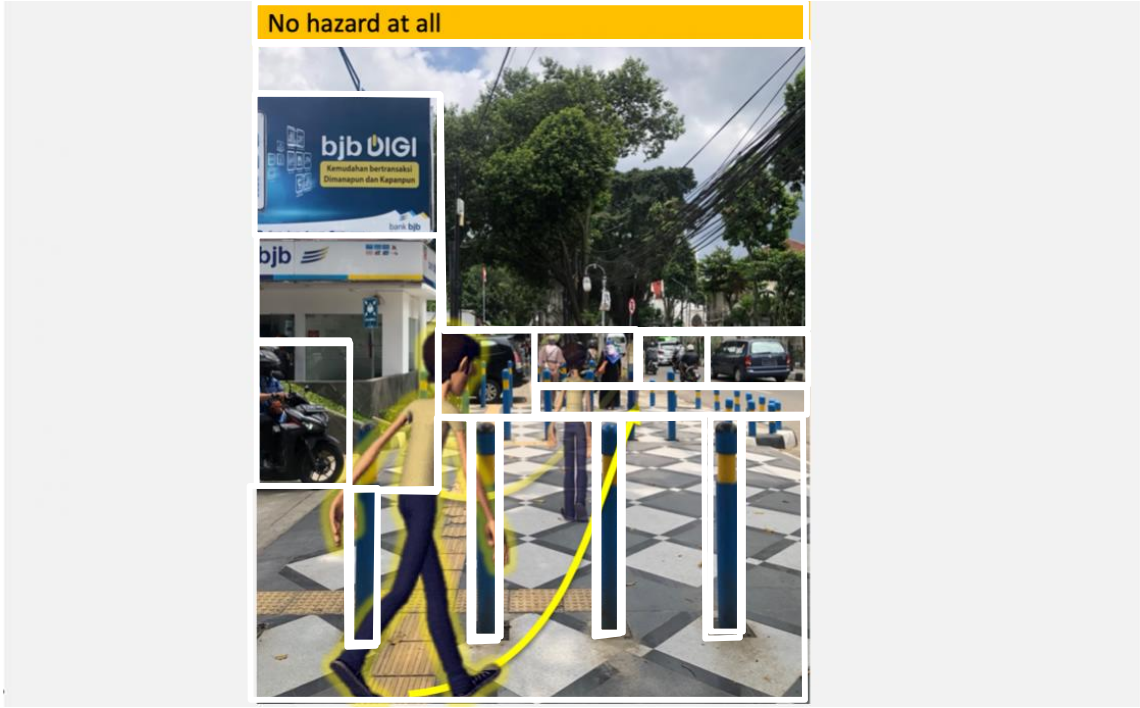

How dangerous is the situation above?


Sekarang kita mulai dengan pertanyaannya.
Have fun!
Sekali lagi, jangan lupa...
1
Klik sekali untuk objek berbahaya
2
Klik dua kali untuk objek yang menghalangi pandangan dari potensi bahaya

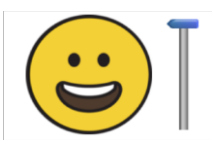
Note: Q01 BP1

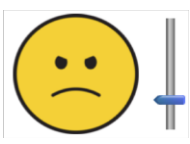
In the next picture, you are walking straight ahead in a pedestrian path, who or what should you be paying attention to so that a dangerous situation does not arise?

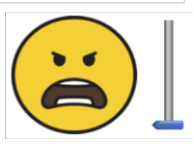
Click on your choice(s) .



How dangerous is the situation above?



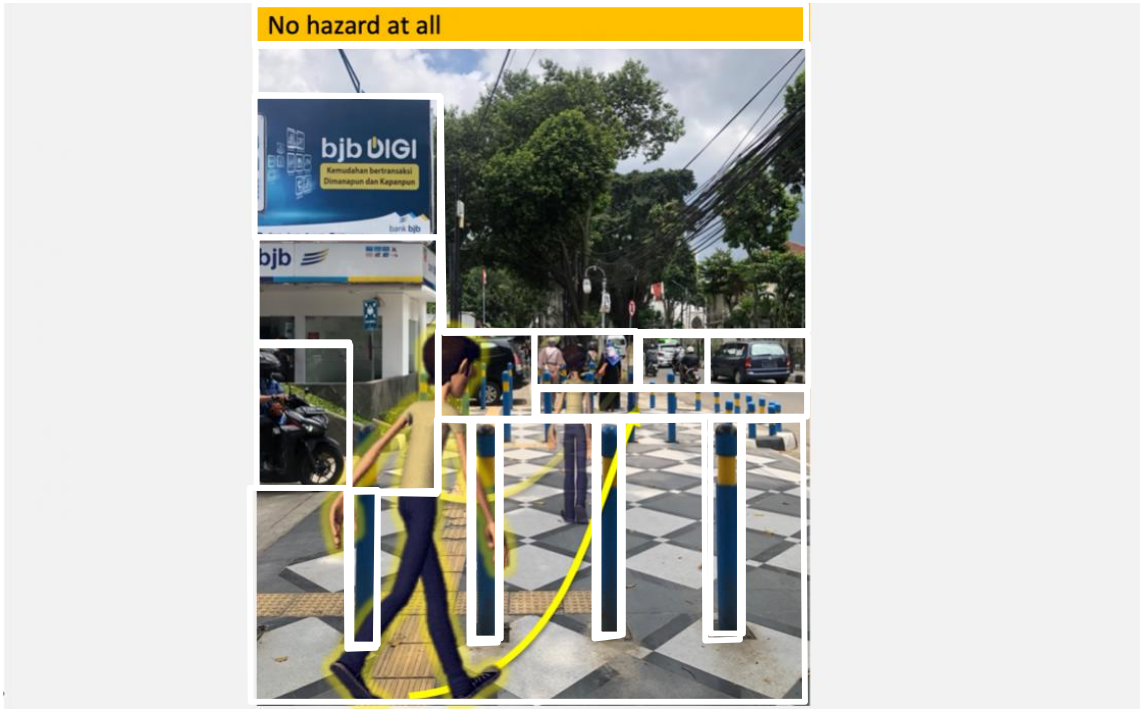




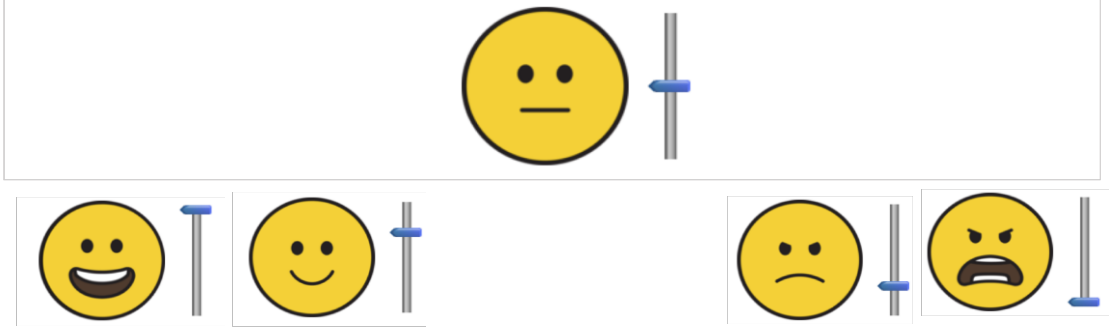
Note: Q01 BP1

In the next picture, you are walking straight ahead in a pedestrian path, who or what should you be paying attention to so that a dangerous situation does not arise?

Click on your choice(s) .



How dangerous is the situation above?

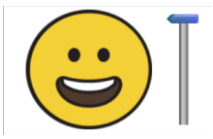


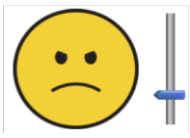
Note: Q02 EP1

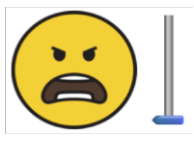
In the next picture, you are in the middle of walking in pedestrian path and want to enter a property. Which object should you pay attention to prevent hazard?

Click on your choice(s) .

How dangerous is the situation above?



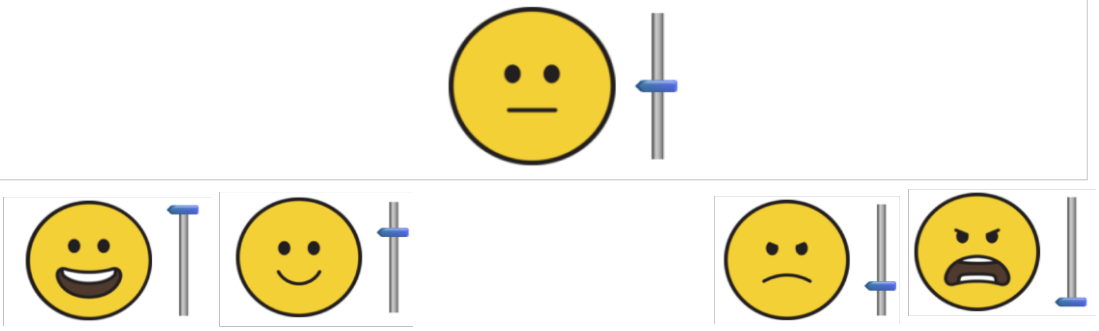




Note: Q03 DF1

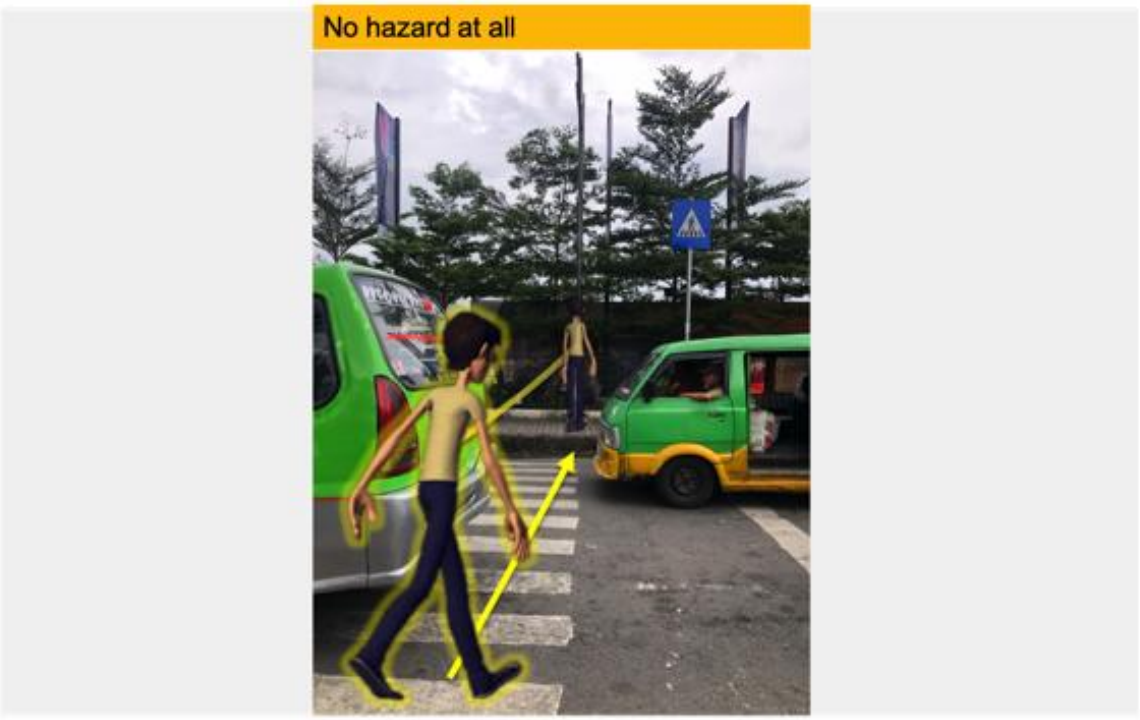
In the next picture, you are in the middle of crossing the street. Which object should you pay attention to prevent dangerous situation?

How dangerous is the situation above?

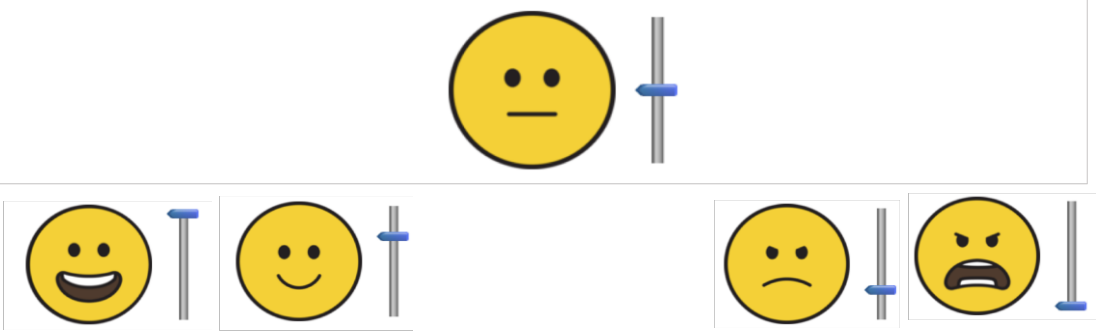


Note: Q04 DF2

In the next picture, you are in the middle of crossing a street. Which object should you pay attention to prevent dangerous situation?



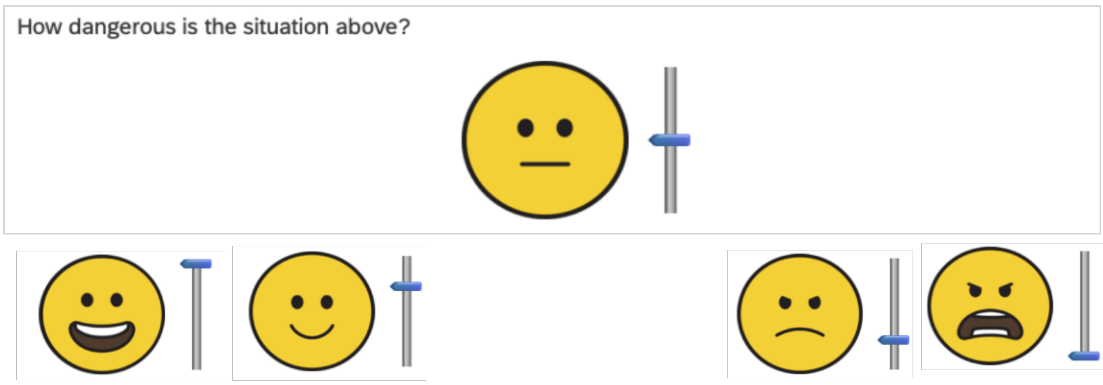
How dangerous is the situation above?



Note: Q05 DF3

In the next picture, you are in the middle of walking in pedestrian path. Which object should you pay attention to prevent hazard?

Click on your choice(s) .




Sudah selesai 5 pertanyaan, great job!
1
Klik **sekali** untuk objek berbahaya
2
Klik **dua kali** untuk objek yang menghalangi pandangan dari potensi bahaya

Note: Q06 EP2

In the next picture, you are in the middle of walking in pedestrian path. Which object should you pay attention to prevent hazard?

How dangerous is the situation above?

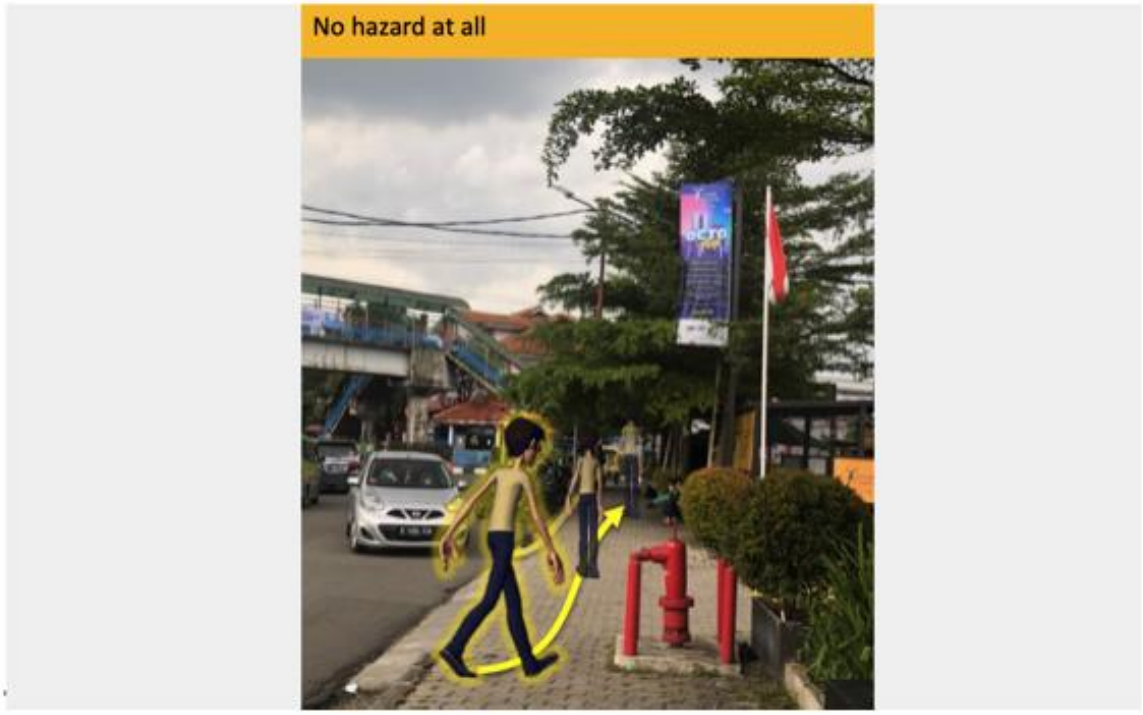
Note: Q07 EP3

In the next picture, you are walking on a pedestrian path and want to enter a school parking lot . Which object should you pay attention to prevent hazard?

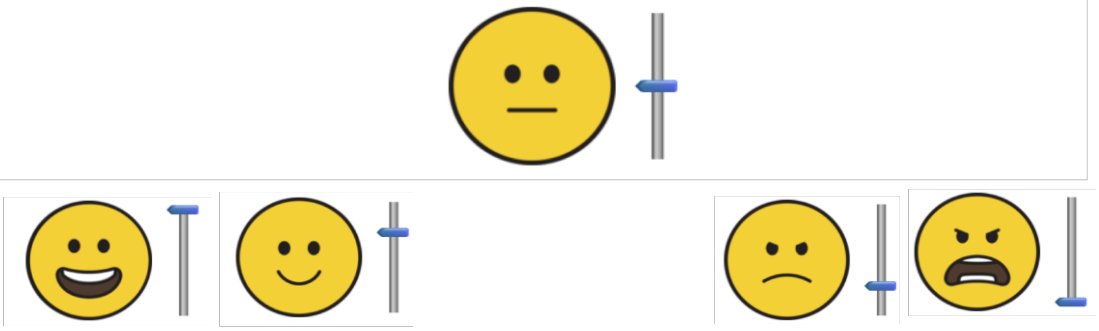
How dangerous is the situation above?

Note: Q08 BP2

In the next picture, you are in the middle of walking in pedestrian path. Which object should you pay attention to prevent hazard?



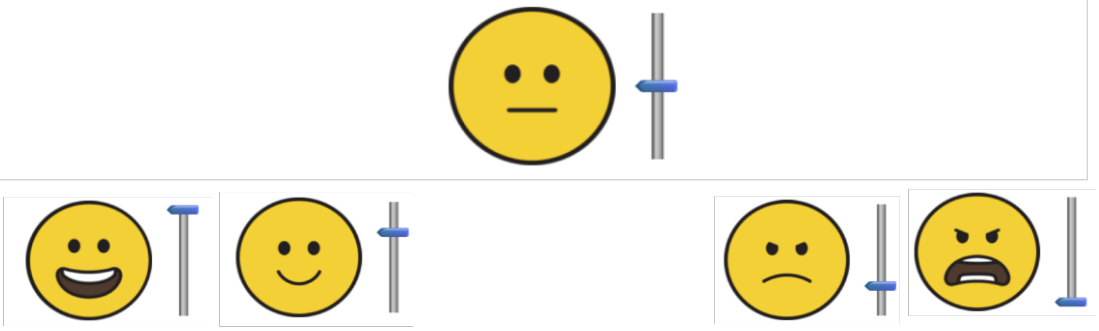
How dangerous is the situation above?



Note: Q09 DF4

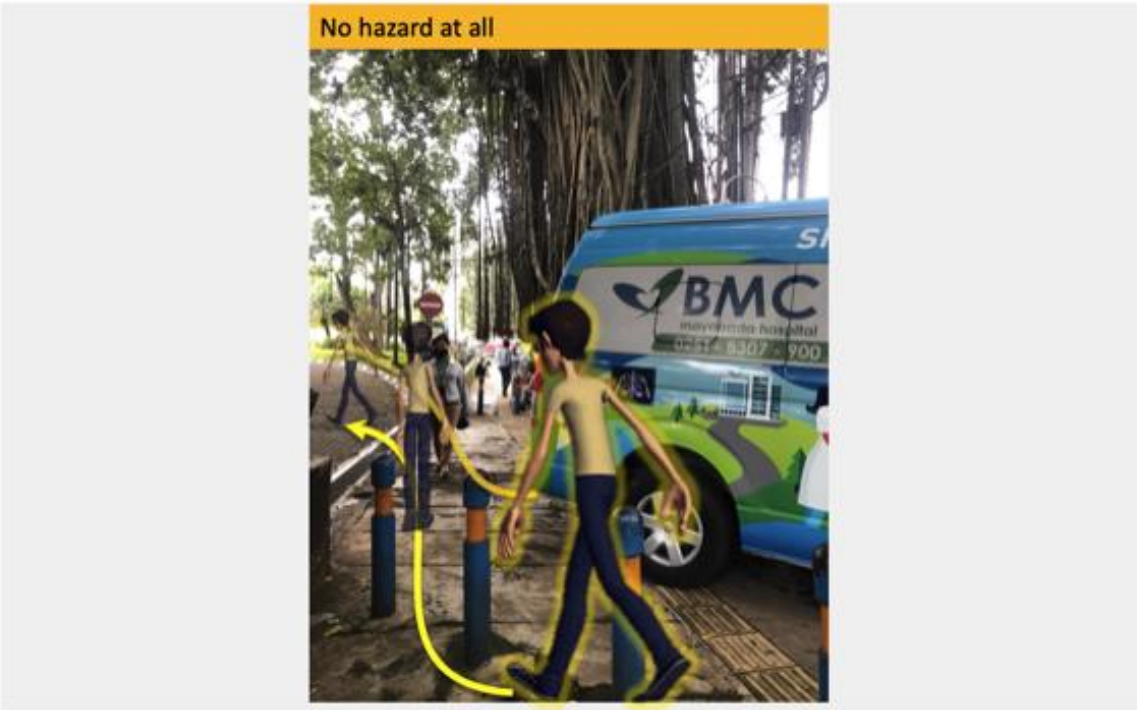
In the next picture, you want to cross the street. Which object should you pay attention to prevent hazard?

How dangerous is the situation above?

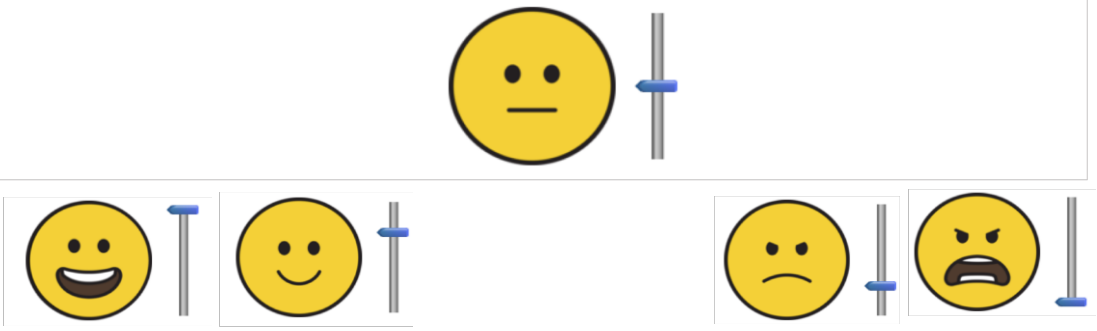


Note: Q10 EP4

In the next picture, you are walking on a pedestrian path and want to enter a store's parking lot . Which object should you pay attention to prevent hazard?



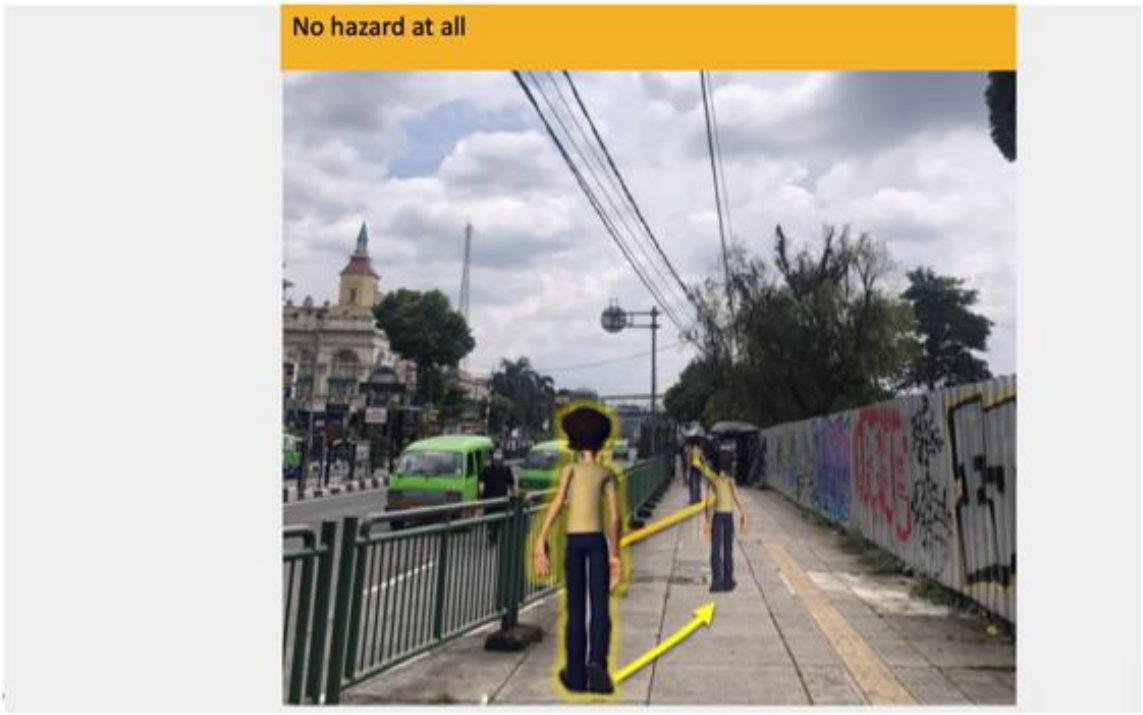
How dangerous is the situation above?

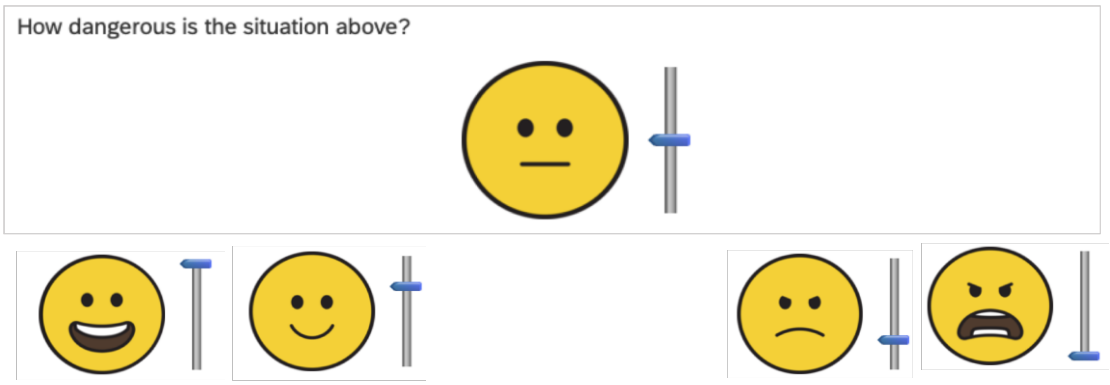



Wah sudah selesai setengah!
1
Klik **sekali** untuk objek berbahaya
2
Klik **dua kali** untuk objek yang menghalangi pandangan dari potensi bahaya

Note: Q11 NO1

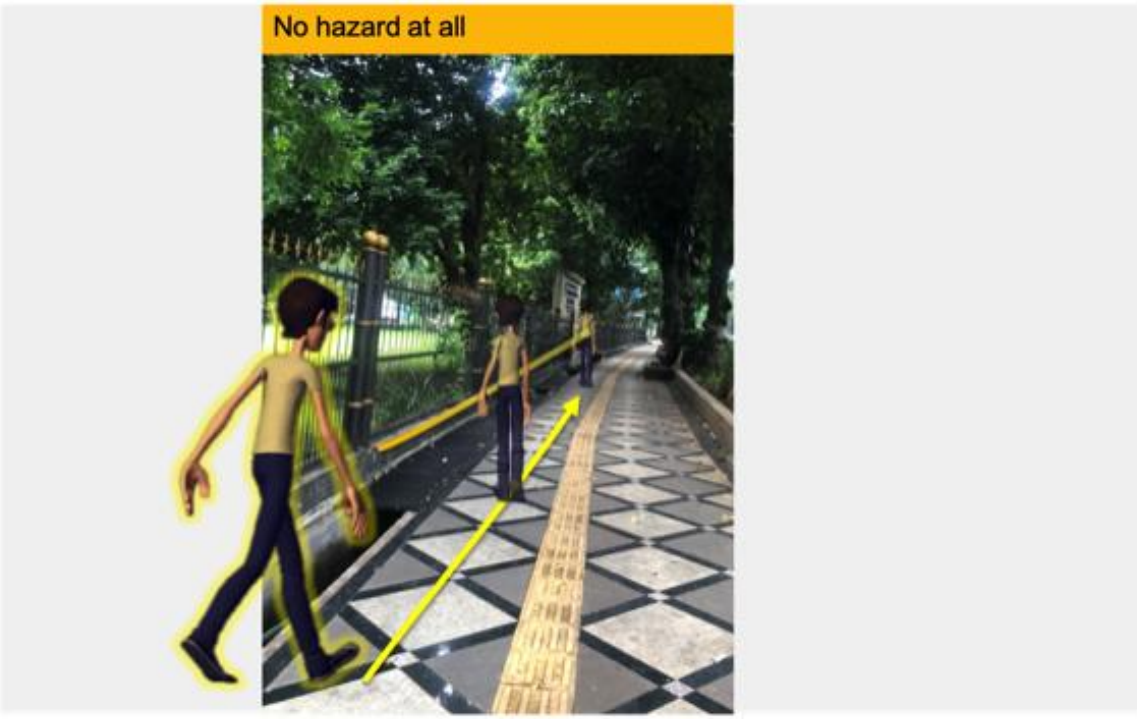
In the next picture, you are in the middle of walking in pedestrian path. Which object should you pay attention to prevent hazard?



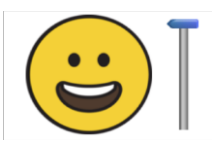


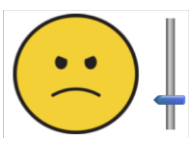
Note: Q12 EP5

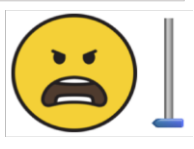
In the next picture, you are in the middle of walking in pedestrian path. Which object should you pay attention to prevent hazard?



How dangerous is the situation above?



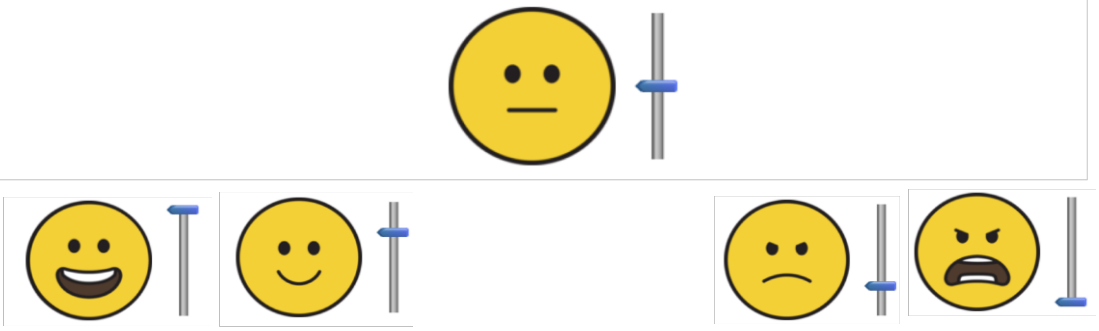




Note: Q13 NO2

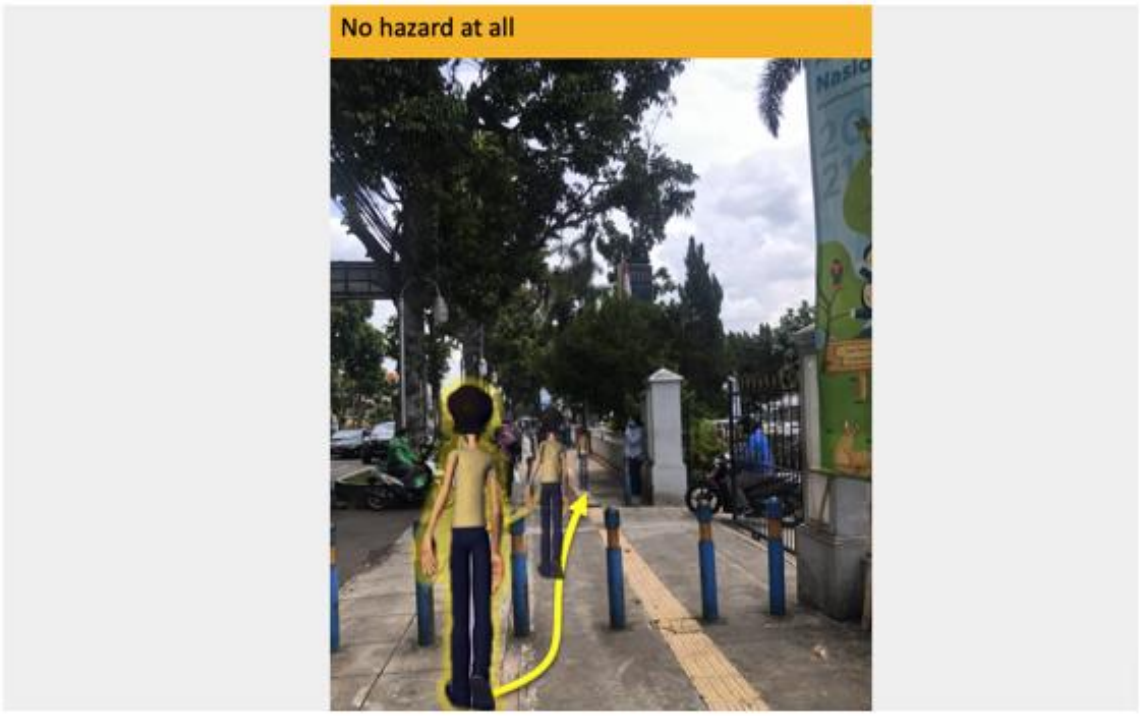
In the next picture, you are in the middle of crossing a street. Which object should you pay attention to prevent hazard?

How dangerous is the situation above?

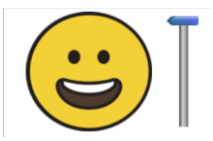


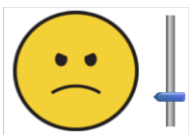
Note: Q14 BP3

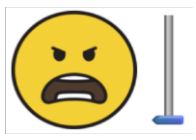
In the next picture, you are in the middle of walking in pedestrian path. Which object should you pay attention to prevent hazard?



How dangerous is the situation above?



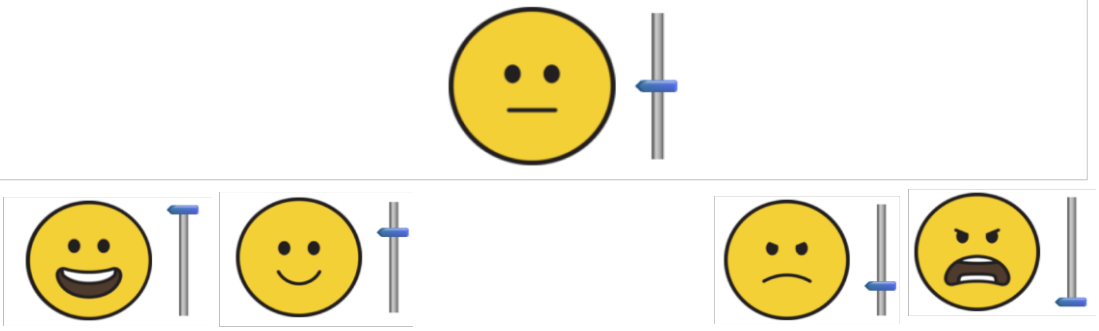




Note: Q15 NO3

In the next picture, you want to cross the road. Which object should you pay attention to prevent hazard?

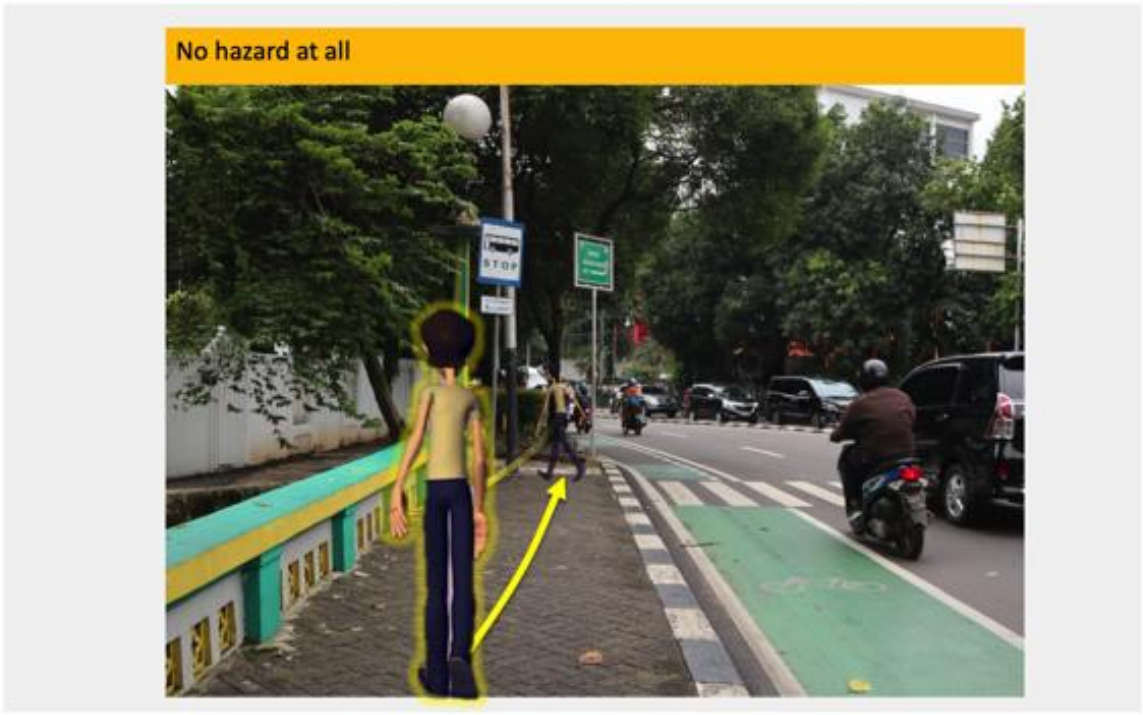
How dangerous is the situation above?



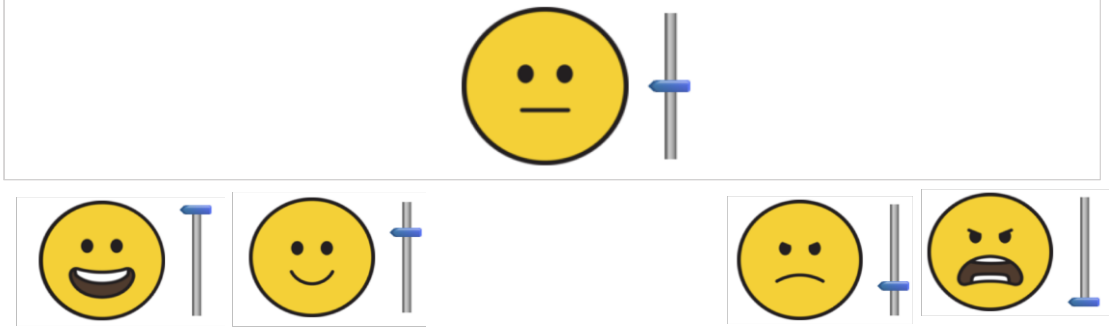

Ayo dikit lagi, tinggal 5 pertanyaan!
1
Klik **sekali** untuk objek berbahaya
2
Klik **dua kali** untuk objek yang menghalangi pandangan dari potensi bahaya

Note: Q16 NO4

In the next picture, you walking in the pedestrian path, who or what should you be paying attention to so that a dangerous situation does not arise?

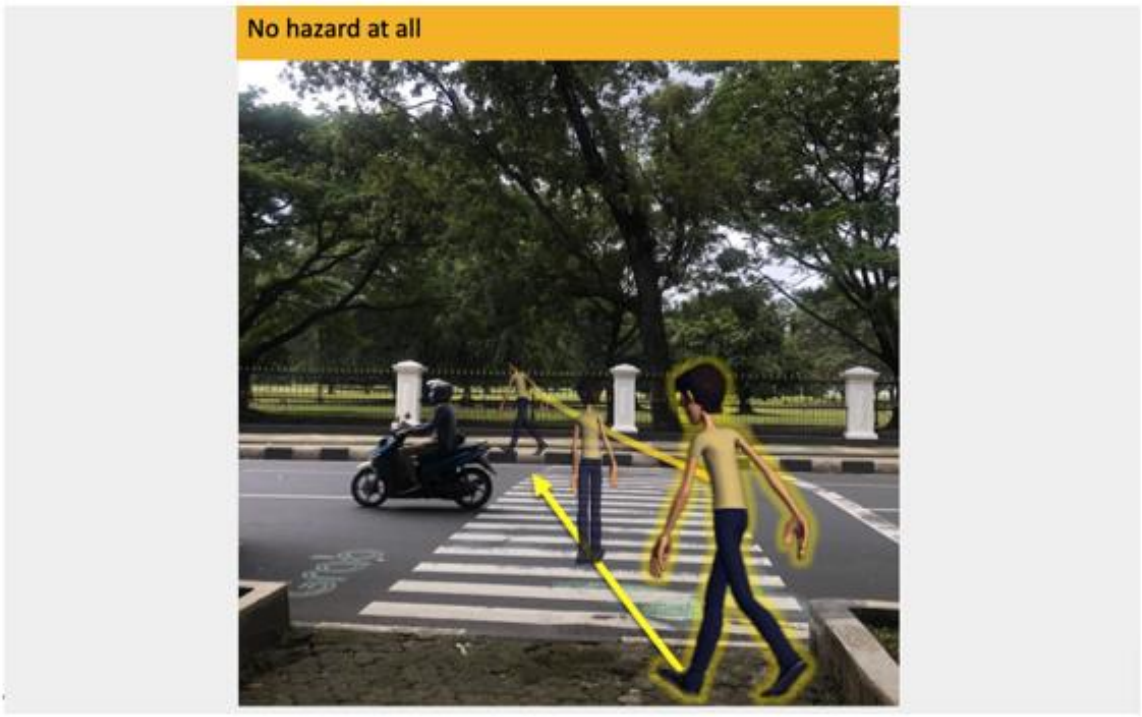


How dangerous is the situation above?

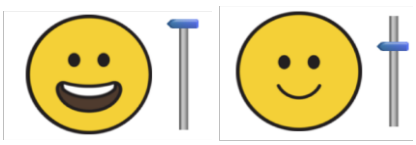


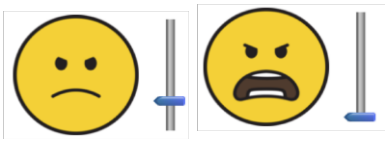
Note: Q17 NO5

In the next picture, you want to cross the road. Which object should you pay attention to prevent hazard?



How dangerous is the situation above?





Note: Q18 BP4

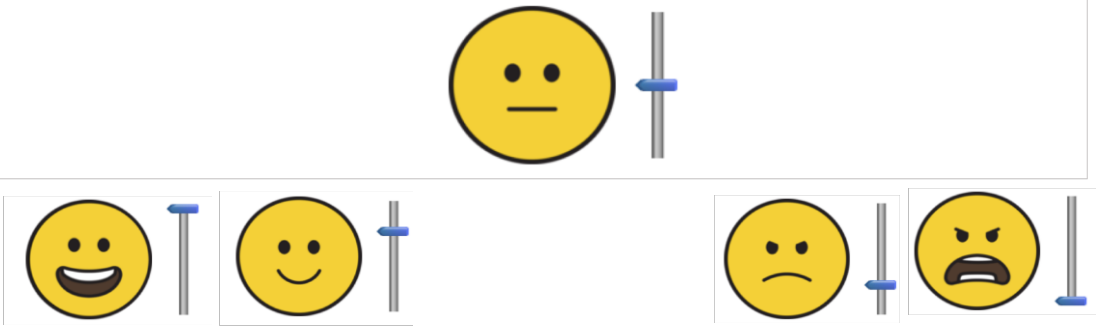
In the next picture, you are in the middle of crossing the street. Which object should you pay attention to prevent hazard?

How dangerous is the situation above?

Note: Q19 BP5

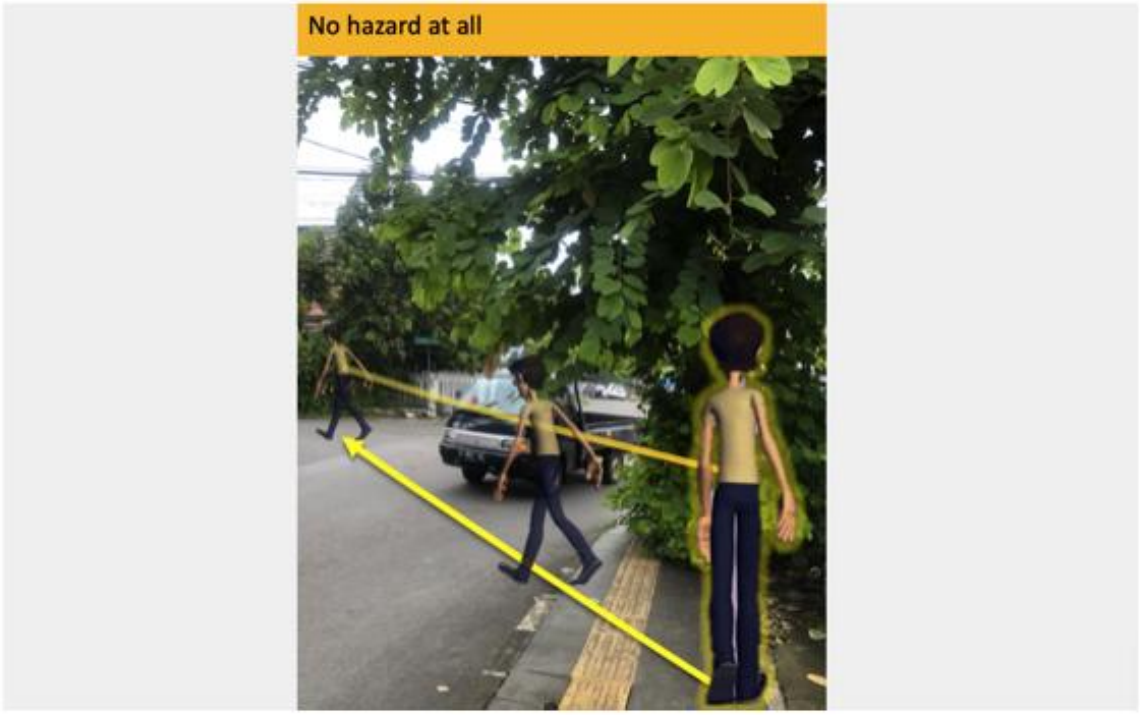
In the next picture, you are in the middle of walking in a parking lot. Which object should you pay attention to prevent hazard?

How dangerous is the situation above?

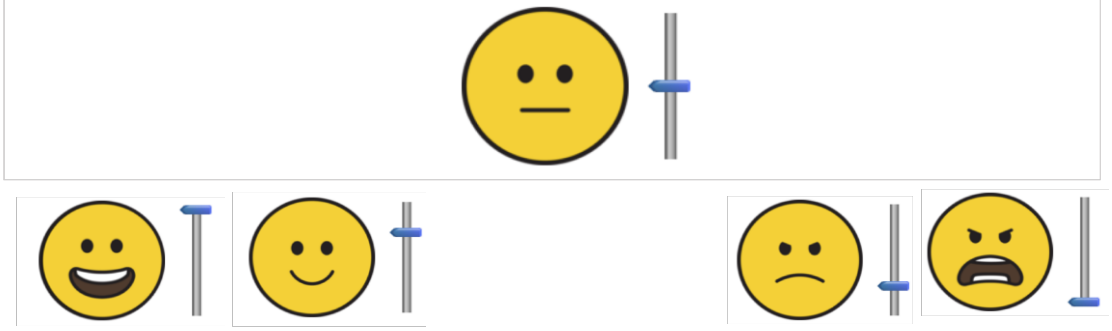


Note: Q20 DF5

In the next picture, you are in the middle of walking in pedestrian path and want to cross an intersection. Which object should you pay attention to prevent hazard?



How dangerous is the situation above?



APPENDIX 4. Non-autistic children's personal and travel characteristic questionnaire

UHASSELT

English

Default Question Block

Respondent ID (A/N _ _)

Age

Gender

- Male
- Female

Children's level of education (grade _)

Residential area

- Jakarta
- Bogor
- Depok
- Tangerang
- Tangerang Selatan
- Depok
- Bekasi

Type of residential area

- Urban/large city
- Small city/rural/country

Frequency per week of traveling with the following mode (in days)-before pandemic

Travel purpose based on transportation mode

	Mandatory	Discretionary	Leisure	None
Car	☐	☐	☐	☐
Motorcycle	☐	☐	☐	☐
Bicycle	☐	☐	☐	☐
Walk	☐	☐	☐	☐
Public transport	☐	☐	☐	☐

APPENDIX 5. Parents questionnaire

UHASSELT

English

Respondent ID (A/N _ _)

→

Children's Age

Children's Gender

- Male
- Female

Children's level of education (grade _)

Residential area

- Jakarta
- Bogor
- Depok
- Tangerang
- Tangerang Selatan
- Depok
- Bekasi

Type of residential area

- Urban/large city
- Small city/rural/country

Frequency per week of traveling with the following mode (in days) before pandemic

0 1 2 3 4 5 6 7

Car

Motorcycle

Bicycle inside the residential area

Bicycle outside the residential area

Foot inside the residential area

Foot outside the residential area

Public transportation (BRT, MRT)

Children's travel purpose based on transportation mode

	Mandatory	Discretionary	Leissure	None
Car	☐	☐	☐	☐
Motorcycle	☐	☐	☐	☐
Bicycle	☐	☐	☐	☐
Walk	☐	☐	☐	☐
Public transportation	☐	☐	☐	☐

Siblings information

0 1 2 3 4 5

Older sibling with ASD

Older sibling without ASD

Younger sibling with ASD

Younger sibling without ASD

Have caregiver

- Yes
- No

Type of school

- Homeschooling
- Integrated school
- Segregated school

Parents' age

Parents' Gender

- Male
- Female

Level of education

- Did not complete primary school
- completed primary school
- completed secondary school
- completed university
- completed post-graduate degree

Number of correct answers my child identified

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

none

Comparison of my child's correct answer compared to the counterpart group

Extremely lower 1 2 3 4 5 6 7 Extremely higher

Correct answer

Comparison of my child's reaction time compared to the counterpart group

Extremely slower 1 2 3 4 5 6 7 Extremely higher

Reaction time

Thoughts on my child's HP skill from 1 (strongly disagree) - 7 (strongly agree)

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

I am very worried about of current pedestrian HP skill of my children

I am very worried about of pedestrian HP skill of my children when they become an adult

Having adequate pedestrian HP skill is very important for my children in the present time

Having adequate pedestrian HP skill is very important for my children when they become adult

I believe that my child can improve their HP skill

I believe that similarly to non-ASD individuals, my children can perform independent mobility when they become an adult

Thoughts on my child's HP skill from 1 (extremely lower) - 7 (extremely higher)

Extremely lower 1 2 3 4 5 6 7 extremely higher

My children's daily living HP skill compared to the counterpart group

My children's overall pedestrian HP skill compared to the counterpart group

End of questions