UNIVERSITI PUTRA MALAYSIA

MATERNAL ATTACHMENT, EMOTION-REGULATION AND COGNITIVE FUNCTIONING OF INSTITUTIONALIZED CHILDREN IN MALAYSIA

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FEM 2018 49

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By

SITI ZAKIAH BINTI SYED MUSTAFA

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfillment of the Requirements for the Degree of Master of Science

October 2017

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Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Master of Science

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October 2017

Chairman : Rozumah Baharudin, PhD
Faculty : Human Ecology

At least 40% of Malaysians suffer from mental illness as a result of poor mental health. Mental health and depression are associated to cognitive functioning among youth and older people in a way that higher cognitive functioning leads to better mental health. To date, prevalence of depression among adolescents and children in institutional care is known but cognitive functioning of children has yet to be identified. Cases of children abuse reported on mother as the main perpetrator has been increasingly alarming and has caused a major concern to the society, which one of the reasons is the problem in early attachment between mother and child. Attachment with a primary caregiver in an early age of a child's life is vital for current and later functioning of the child. Children in secure attachment are more likely to demonstrate excellency in various developmental functioning when compared to those who are insecurely attached (e.g., maltreated children). Past studies documented that children with insecure attachment would experience lower cognitive functioning (e.g., low IQ, poor academic and school performances) when compared to the non-maltreated. Nonetheless, other factors that contribute to the institutionalized children's cognitive functioning, specifically, in the Malaysian context are less understood. Thus, the present study is undertaken to investigate the relationship between maternal attachment (trust, communication, and alienation) and cognitive functioning among the institutionalized children in Malaysia; and the mediating role of emotion-regulation on these relationships. A total sample of 262 institutionalized children aged 7 to 12 years (mean age= 10.09) was recruited using probability proportional to size (PPS) sampling from six selected states in Malaysia, representing Peninsular (Perak, Pahang, Kuala Lumpur and Pulau Pinang) and East Malaysia (Sabah and Sarawak). The children provided data using self-administered and researcher-administered questionnaires, due to variation in reading ability and then responded to a series of measures including the Inventory of Parent and Peer Attachment-Revised (IPPA-R) for Children, the Raven's Coloured Progressive Matrices (RCPM) and the Emotion-Regulation Inventory for Children and Adolescent (ERICA). The data were analysed using partial least squares – structural equation modelling (PLS-SEM) in SmartPLS 3.0 software to examine direct relationships

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between maternal attachment (trust, communication, and alienation) and cognitive functioning, and indirect effects through emotion-regulation. Results revealed that alienation was positively correlated to cognitive functioning, whereas, insignificant relationship was found for trust and communication. This study also found that emotion-regulation was correlated to alienation and cognitive functioning, which was consistent with previous studies. The findings suggested that alienation is the contributor of healthier cognitive functioning among the institutionalized children in Malaysia. Furthermore, the findings indicated the consequential role of emotion-regulation in influencing the association between alienation and cognitive functioning. In other words, children in the institutions are influenced by the efforts of modulating emotional arousal in order to aid better cognitive performance. According to the theory, high quality of maternal attachment, which is secure attachment tends to support a child's ability to involve further in higher order cognitive processes, however among the institutionalized children, an insecure form of attachment (i.e. alienation) was evidenced to support a child's involvement in the cognitive processes. Further, the findings contribute to the body of knowledge, most notably by demonstrating the potential factors that influence the institutionalized children's cognitive functioning, which would be valuable for clinicians, researchers, policy makers, and the public at large.

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Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

PERAPATAN IBU, REGULASI-EMOSI DAN KEFUNGSIAN KOGNITIF KANAK-KANAK DALAM INSTITUSI DI MALAYSIA

Oleh

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Sekurang-kurangnya 40% daripada rakyat Malaysia menderita kerana penyakit jiwa akibat kesihatan mental yang lemah. Kesihatan mental dan kemurungan berkaitan dengan fungsi kognitif belia dan dewasa dengan cara yang fungsi kognitif yang lebih tinggi membawa kepada kesihatan mental yang lebih baik. Sehingga kini, kelaziman kemurungan dalam kalangan remaja dan kanak-kanak dalam penjagaan institusi diketahui tetapi fungsi kognitif kanak-kanak belum dikenalpasti. Kes-kes penderaan kanak-kanak melaporkan ibu sebagai pelaku utama telah meningkat dengan ketara dan menyebabkan kebimbangan utama masyarakat, yang mana salah satu sebabnya adalah masalah dalam perapatan awal ibu dan anak. Perapatan dengan penjaga, terutamanya, ibu pada awal usia kanak-kanak adalah penting untuk kefungsian semasa dan akan datang seorang kanak-kanak. Kanak-kanak dalam perapatan selamat lebih cenderung untuk menunjukkan kecemerlangan dalam pelbagai fungsi perkembangan apabila dibandingkan dengan kanak-kanak dalam perapatan tidak selamat (contohnya kanak-kanak dianiayai). Kajian lepas mendapati kanak-kanak dalam perapatan tidak selamat mengalami fungsi kognitif yang lebih rendah (contohnya IQ rendah, lemah akademik dan prestasi sekolah) apabila dibandingkan dengan kanak-kanak yang tidak dianiaya. Namun, faktor penyumbang kepada fungsi kognitif kanak-kanak yang dianiaya, terutamanya, dalam konteks Malaysia adalah kurang diketahui. Justeru itu, kajian ini telah dijalankan untuk mengkaji hubungan antara perapatan ibu (kepercayaan, komunikasi dan pengasingan) dan fungsi kognitif kanak-kanak dalam jagaan institusi di Malaysia; dan peranan pengantara pengawalan emosi pada hubungan-hubungan ini. Satu sampel sebanyak 262 kanak-kanak dalam institusi berumur tujuh hingga 12 tahun (purata=10.09) telah diambil menggunakan persampelan kebarangkalian berkadaran saiz (PPS) dari enam negeri terpilih di dalam Malaysia, mewakili Semenanjung (Perak, Pahang, Kuala Lumpur dan Pulau Pinang) dan Malaysia Timur (Sabah dan Sarawak). Kanak-kanak membekalkan data melalui soal selidik ditadbir sendiri dan soal selidik ditadbir penyelidik, disebabkan oleh perbezaan dalam kebolehan membaca, dan menjawab satu siri pengukuran termasuklah Inventory of Parent and Peer Attachment-Revised (IPPA-R) for Children, Raven's Coloured Progressive Matrices (RCPM) dan

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Emotion-Regulation Inventory for Children and Adolescent (ERICA). Data dianalisis menggunakan separa kuasa dua terkecil – permodelan bersamaan berstruktur (PLS-SEM) untuk memeriksa hubungan langsung antara perapatan ibu (kepercayaan, komunikasi dan pengasingan) dengan fungsi kognitif, dan kesan tidak langsung pengawalan emosi menggunakan perisian SmartPLS 3.0. Hasil kajian menunjukkan pengasingan berkait secara positif dengan fungsi kognitif, manakala, perhubungan tidak signifikan ditemui bagi kepercayaan dan komunikasi. Seperti yang dijangkakan, kajian ini mendapati pengawalan emosi mempunyai perkaitan dengan pengasingan dan fungsi kognitif, yang mana ianya konsisten dengan kajian-kajian lepas. Hasil kajian mencadangkan pengasingan ibu ialah penyumbang utama kepada fungsi kognitif yang lebih sihat dalam kalangan kanak-kanak dalam institusi di Malaysia. Tambahan pula, hasil kajian menunjukkan peranan penting pengawalan emosi dalam mempengaruhi perkaitan antara pengasingan dengan fungsi kognitif. Dalam erti kata lain, kanak-kanak dalam institusi di pengaruhi oleh usaha-usaha untuk memodulasi ransangan emosi untuk menggalakkan fungsi kognitif yang lebih baik. Mengikut teori, perapatan ibu yang berkualiti tinggi, iaitu perapatan selamat cenderung untuk menyokong keupayaan kanak-kanak untuk melibatkan diri secara lebih, dalam proses-proses kognitif beraras tinggi, walaubagaimanapun dalam kalangan kanak-kanak dalam institusi, satu bentuk perapatan tidak selamat (iaitu pengasingan) telah dibuktikan dapat menyokong penglibatan kanak-kanak tersebut dalam proses-proses kognitif. Selanjutnya, hasil kajian menyumbang kepada ilmu pengetahuan, iaitu dengan menunjukkan faktor-faktor yang mempengaruhi fungsi kognitif kanak-kanak dalam institusi yang mana bernilai untuk para doktor, penyelidik, pengamal, penggubal polisi dan masyarakat umum.

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ACKNOWLEDGEMENTS

In the name of Allah, the Most Gracious and the Most Merciful

Alhamdulillah. Allah, thank you for permitting me to finish this thesis, though it took the maximum time allocated for a master's thesis. Nevertheless, I believe that everything happens at its perfect time. This thesis would not have been completed without the support and help from many individuals. Here, I would like to express my sincere appreciations to all of them.

First and foremost, I would like to thank my supervisor, Prof. Dr. Rozumah Baharudin for her motivation and trust on me throughout my thesis completion. This thesis would not have been possible without her guidance, constant supervision as well as imparting knowledge and expertise.

I am deeply thankful to Assoc. Prof Dr. Firdaus Mukhtar, the member of the supervisory committee and Dr. Sheereen Zulkefly for their kind help and encouragement throughout my study period.

My special and whole-heartedly thanks to my graduate friends, Amira Najihah, Nurhilmiyani, Nur Atiqah, Marnizah, Shuhaidah, Athirah Yasmin and Nur Aqilah for always being there, when I needed the most.

Not forgotten, I would also like to thank my beloved family especially my motivated and supportive husband, and lovable parents who served as my inspiration to pursue this undertaking.

SITI ZAKIAH
October 2017

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This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Master of Science. The members of the Supervisory Committee were as follows:

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Declaration by graduate student

I hereby confirm that:

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LIST OF ABBREVIATIONS

AVE	Average Variance Extracted
CFA	Confirmatory Factor Analyses
CR	Composite Reliability
DSW	Department of Social Welfare
EDA	Exploratory Data Analysis
EFA	Exploratory Factor Analysis
ERICA	Emotion-Regulation Inventory for Children and Adolescents
GoF	Goodness of Fit
IPPA-R	Inventory of Parent and Peer Attachment-Revised
MCAR	Missing Completely at Random
RCPM	Raven's Coloured Progressive Matrices
PLS-SEM	Partial Least Squares – Structural Equation Modelling
PPS	Probability Proportional to Size
PSR	*Penilaian Sekolah Rendah*
SI	Sampling Interval
SIE	Standardized Indirect Effect
SPSS	Statistical Package for the Social Sciences
STERR	Standard Error
UPM	Universiti Putra Malaysia
WHO	World Health Organization

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CHAPTER 1

INTRODUCTION

The first chapter of this thesis discusses background of the present study on cognitive functioning among Malaysian institutionalized children. Besides that, this chapter comprises statement of problem, research questions, theoretical background, conceptual model, research objectives (general and specific), hypotheses, significance of the study, definitions of key terminologies, organization of the thesis and summary of the chapter.

1.1 Background of the Study

Childhood is a critical period full of vulnerability to children due to the vast changes of physical, emotional, social and cognitive development which take place along this developmental phase. Cognitive development plays a role in speed and efficiency of children's brain processes and enhances the ability to filter out irrelevant information (Amso & Casey, 2006) that determines their future brightness. Cognitive development is a process which focuses on intellect, thinking ability, and language mastery based on different ages of children (Hutagalung & Zulkifli, 2017). Children's cognitive development depends on their brain development and sensory motor skills, and interaction with more experienced people (Hutagalung & Zulkifli, 2017). The Ministry of Education (MOE) embed higher order thinking skills (HOTS) in the curriculum as a preparation for students to face the challenges in the 21st century. The term "21st Century Skills" is used to refer to certain core competencies such as collaborative skills, digital literacy, critical thinking, and problem-solving. Students with HOTS will be able to think critically and creatively, to solve problem and to be innovative in this rapid changing world. These skills are required by the public and private sectors, which constantly seek adept and adaptable employees. The MOE aims to reach at least 40% of students who are tested using the Competency Assessment on Mathematics, Science and Reading Literacy (Pentaksiran Kompetensi Literasi Sains, Matematik dan Bacaan, PKLSMB) to achieve the minimum score of 500 in all the three domains. HOTS is embed in activities related to Mathematics, Science and Reading Literacies. The MOE emphasises on the quality of the curriculum through HOTS because lack of life-skills based education places Malaysian adolescents at greater risk of substance abuse, juvenile delinquency, bullying, teenage pregnancy as well as HIV infection. Unfortunately, lack of life skills is hard to prevent for the less fortunate children specifically the institutionalized children as they are lacking in cognitive processes. The children reared in the institutional care are at significant risk for low academic achievement and poor mental health.

The future of the institutionalized children is vague as they show deficit in various developmental aspects (Chantal Cyr, Michel, & Dumais, 2013) including their cognitive aspect. The institutionalized children are minors, not older than 18 years old, who are reared in protection homes as ordered by court due to maltreatment cases

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(Department of Social Welfare, 2015). The protection homes in Malaysia are established in accordance to the Child Act 2001 Section 54 for children who are maltreated sexually, emotionally, physically and neglected. The United Nation for Children (UNICEF) through a convention in the year 1989 came out with children's right treaty, which is human rights for every child and adolescent up to the age of 18, regardless of birth place, race or ethnicity, gender, rich or poor, able or disabled, HIV-negative or HIV-positive. The children have separate rights as they need special care, nurturing and protection to ensure they survive, thrive, and realise their full potential as productive members of the society. Children have several basic needs such as food, shelter, clean water, education and healthcare to ensure their survival, development and protection. Regrettably, the institutionalized children are missing these basic needs that challenge their mental health condition.

Mental health problems are common among the institutionalized children. The children are at increased risk for a variety of social, psychological, and behavioral problems (Akister, Owens, & Goodyer, 2010; Milburn, Lynch, & Jackson, 2008). The children also have emotional difficulties (Akister, Owens, & Goodyer, 2010; Pumariega, Johnson, & Sheridan, 1995) which are sometimes not detected. Mental health is an emotional, psychological and social wellbeing that affects our thinking, feeling and acting which determines our stress management thus making it important at every stage of life (Mentalhealth.gov, n.d.). Young adults are suffering from mental issue because of poor parenting and environmental factors (Arumugam, 2016). Poor mental health among Malaysian is due to financial difficulties, failure to meet expectations and pressure from surrounding environment. The Ministry of Health (MOH) revealed that there was an increase in the number of women suffering from poor mental health because of gender discrimination, overwork, domestic violence and sexual abuse. Signs and symptoms of mental problems are prolonged sadness, constantly feeling irritated, inability to concentrate, and feeling of excessive fear, worry and anxiety, loss of interest in doing routine, becoming withdrawn as well as a drastic change in eating and sleeping habits. Aside from talking to friends and family, having hobbies, spending time alone, leading a healthy lifestyle, having good sleep and building on spirituality helps to overcome this problem. Poor mental health leads to negative coping skills (e.g. emotion-regulation) which results in substance abuse, violence, isolation and eating disorders.

Major mental health problems among the institutionalized children is depression which is significantly associated with past history of abuse and neglect, having visitors, maintaining contact with parents and using non-productive coping. Among the factors that lead to the risk of mental health problems such as depression among children and adolescents in residential or foster care homes are poverty, broken homes, history of abuse and neglect (Schmid, Goldbeck, Nuetzel, & Fegert, 2008). Depression and child abuse remain a major health problem that contributes significantly to long lasting impact on the mental health of children. Mental illness is the leading cause of economic loss to an individual, family, employer, health system, and on the national level, due to direct and indirect health costs, absenteeism, lose productivity while at work, and decreased income that result in reduced national economic output. Mental illness shows a large economic impact because it affects young working-age adults. The Institute of Health Metrics and Evaluation 2010 reported that the compositions of mental health-

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related disability in Malaysia are major depressive disorder (11.0%), anxiety disorder (4.2%) and chronic pain syndrome (4.1%). Mental health disabilities which are related to children and cognitive are childhood behavioural disorders (1.0%) and idiopathic intellectual disability (0.1%). The prevalence rate of poor mental health is higher among the poor and levels off at RM 6000 and above. Risk of mental health in adulthood has been associated to intelligence test scores (Wraw, 2016).

The institutionalized children display risk of mental health that weakens their higher order thinking skills (HOTS). Mental health is an aspect of cognitive development which is related to cognitive functioning. The maltreated children display cumulative deficits in an aspect of cognitive development that is cognitive functioning (Mills et al., 2011; Oliveira, Santos, & Scivoletto, 2012; Pears, Kim, & Fisher, 2008; Pendry & Adam, 2013; Perez & Widom, 1994; Romano, Babchishin, Marquis, & Fréchette, 2014). Cognitive functioning is an individual's perceptions, memory, thinking, reasoning, and awareness, also known as general intelligence (Regan, Cronin, & Kenny, 2014). They are vital not only to perform simple activities of daily lives, but also in making life changing decisions. Cognitive functioning is associated to mental health, specifically depression among youth and older people above 50 years old (Wraw et al, 2016). One of the factors that influence cognitive functioning is related to mother; in which maternal attachment is found as having the influence to an individual in all developmental stages. Emotion-regulation, an aspect of self-regulation is a coping skill that could minimize the negative impact of maltreatment to the institutionalized children. Current condition of mental health and depression which affects cognitive functioning in Malaysia, is supported by statistics.

Statistics of mental health as reported in the New Straits Times article revealed that 40% of Malaysian suffer from mental health issues in their lifetime (Arumugam, 2016). Furthermore, the Institute of Public Health, Ministry of Health found that one in every three Malaysians are suffering from mental health issues (Ning, 2016). According to the Ministry of Health, the psychiatric units in general hospitals manage 90% of all new patients, 83% of all follow-ups, and 75% of all admissions, which is heavy for them to cater. The prevalence of depression among Malaysian adolescents as reported by three different Malaysian studies varies from 10.3% to 24.2% (Nor Yaacob, Juhari, Abu Talib, & Uba, 2009; Ramli et al., 2008; Uba, Nor Yaacob, & Juhari, 2010). The National Anti-Drugs Agency (Agensi Anti Dadah Kebangsaan, AADK) found that depression is one of the reasons for drug addict. The drug addict cases due to depression are increasing from 1207 cases in 2010, 940 cases in 2011, 751 cases in 2012, 2566 cases in 2013, 1986 cases in 2014, 1572 cases in 2015 and 1910 cases in 2016. Although the cases are lesser in 2014 and 2015 but the cases rose again in 2016 (Agensi Anti Dadah Kebangsaan, 2016). On the other hand, the Ministry of Education reported that the percentage of primary school students who are able to answer HOTS questions for Mathematics range between 11% and 51%, while for Science between 46% and 51% (Ministry of Education, 2016). Not only that, the percentage of students who are computers-savvy range between 11% and 15% (Ministry of Education, 2016).

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Annual report by the Department of Social Welfare stated that the number of children in need of care and protection admitted to the institutional care in Malaysia are in a rising trend. Specifically, in 2009, a total of 2789 cases were reported and then escalated gradually to 4295 in 2014 and 4453 in 2015. The typical perpetrators of abuse reported were mother (1422 cases) followed by father (878 cases), child's partner (595 cases), and caregivers (211 cases) (Department of Social Welfare, 2015). The Ministry of Health in the Malaysia Health System Research Vol. 1 2016 reported that household debt in Malaysia has increased consistently over the last decade, which rose from 56.6% in 2001 to 86.8% in 2014. This indicates that Malaysian households are under severe financial pressure and are more likely to focus on de-leveraging than on spending in the near-term (Atun, Berman, Hsiao, Myers, & Wei, 2016). The Ministry of Education in the Malaysia Education Blueprint 2013 to 2035, annual report of 2016 stated that the percentage of parents' attendance in school activities increased from 83.3% to 92.5% in 2016 while the percentage of parents who became volunteers in schools also had increased tremendously from 15.3% to 40.9%, which means that parents' participation to help raising school's achievements are increasing (Ministry of Education, 2016).

Early violence and traumatic experience at home involving children link to deficit cognitive development (Bücker et al., 2012; Mills et al., 2011). Besides, a significant association was found between childhood maltreatment and deficit cognitive functioning during childhood (Hart & Rubia, 2012) to adolescence (Oliveira, Santos, & Scivoletto, 2012; Mills et al., 2011) and prolonged till adulthood (Gould et al., 2012). This indicates that the maltreated children have disrupted cognitive development that positions their further development at risk. The risk factors of maltreatment cases include disrupted family constellation, low socioeconomic status, parental psychopathology, low quality of parent-child relationship, and history of family abuse (Bücker et al., 2012). Consistent with the report by the Social Welfare Department of Malaysia, empirical findings from a study in Malaysia reported that the typical child abusers were among the female parents (Choo, Dunne, Marret, Fleming, & Wong, 2011; Pears et al., 2008). Moreover , a different study stated that mothers were found to have higher participation in socializing, caregiving, supervising and providing emotional support to their children as compared to fathers (e.g., Giallo, Treyvaud, Cooklin, & Wade, 2013; Schoppe-Sullivan, Kotila, Jia, Lang, & Bower, 2013) which is similar with the statistics by the MOE that parents' participation in school are increasing. Nevertheless, it is surprising that the cases reporting mothers as the most common doer of abuse is the highest as stated in a report by the Social Welfare Department of Malaysia in 2014 and 2015. This is because a mother is expected to be a child's primary caregiver whom the attachment is formed in the first year of a child's life.

Past studies have found that mother-child attachment influences a child's cognitive functioning. A child attached securely to a mother shows better cognitive functioning whereas an insecurely attached child shows otherwise (von der Lippe et al., 2010; West et al., 2013). Insecure attachment pattern is prevalent among the maltreated children (Torres, Maia, Veríssimo, Fernandes, & Silva, 2012) and linked between children's maltreatment and when attachment has been established (Katsurada, Tanimukai, & Akazawa, 2017). Attachment is children's early interactions with the parents and is

considered an important protective factor in the development of maltreated children (Cicchetti & Valentino, 2006). Not only that, the increase in parental stress and inadequate emotion-regulation strategies may exacerbate the risk of child maltreatment (Chantal Cyr et al., 2013). In addition to the association between maternal attachment and cognitive functioning of children, emotion-regulation is identified as one of the possible mechanisms to mediate the relationship (Haskett, Stelter, Proffit, & Nice, 2012; Riva Crugnola et al., 2011; Roque, Veríssimo, Fernandes, & Rebelo, 2013; West et al., 2013) because emotion-regulation is vastly developed during middle childhood years (Cook, Blair, & Buehler, 2013). Previous studies found that emotion-regulation was associated to maternal attachment (Borelli et al., 2010; Brumariu, 2015; Cassidy, 1994; Kochanska, 2014; Roque et al., 2013; Zimmer-Gembeck et al., 2017) and cognitive-functioning (Bridgett, Oddi, Laake, Murdock, & Bachmann, 2013; Davis & Levine, 2012; Matthews, Ponitz, & Morrison, 2009; Valiente, Swanson, & Eisenberg, 2012). If the mediation of emotion-regulation is established, it could contribute in developing interventions with critical component of emotion-regulation.

Although past studies have reported on the impact of maternal attachment on children's cognitive functioning, less attention has been paid to maternal attachment as a predictor of cognitive functioning among the institutionalized children especially in Malaysia. In addition to the association between maternal attachment and cognitive functioning, emotion-regulation could also be a possible mediator but has not been conducted yet. Nevertheless, cognitive functioning is an important aspect in children's cognitive development but has been less studied (Bücker et al., 2012) in the Malaysian context. Not only that, studies using partial least squares – structural equation modelling (PLS-SEM) as a data analyzing method is also not common although the method is appropriate for validating theory in social sciences. Lastly, the IPPA-R for Children as a measure for maternal attachment using Asian samples especially in Malaysia is not available until now. Past studies often used composite scores to interpret maternal attachment. Another study conducted in Malaysia used the original IPPA subscales (trust, communication, and alienation) to explain maternal attachment but intended for measuring adolescent's attachment. Thus, the present study chooses to study on the institutionalized children. Due to the limitations, this study investigates on the link between maternal attachment and cognitive functioning of the institutionalized children in Malaysia with emotion-regulation as a mediator using PLS-SEM to interpret maternal attachment using subscales.

The findings of this study provides a better understanding of the institutionalized children's cognitive functioning and information for parental contribution in shaping cognitive functioning among children. This study also contributes to the development of interventions such as child-focused intervention, parent training intervention, family focused intervention (Slater, 2007) and critical component of emotion-regulation that can guarantee better mental health and wellbeing of children. Besides, empirical evidences are needed to refine the understanding of mothers' role on children's cognitive functioning. The present study is designed to investigate the influences of maternal attachment in institutionalized children's development particularly emotion-regulation and cognitive functioning.

1.2 Statement of Problem

Statement of problem is an assertion that illustrates a clear vision of a research and the overall method that will be used to solve arising current issues (Creswell, 2009). Following Creswell (2009), the statement of problem of the present study will be presented according to its major intent, statement of theory, variables used, connection of the variables, unit of analysis, specific type of inquiry strategy and definition of key variables.

The intent of this study was to explain the association between maternal attachment, emotion-regulation, and the institutionalized children's cognitive functioning. The intent arose from a purpose to solve arising current issues in Malaysia. In a report by Dr. Philip George, a consultant psychiatrist and an addiction medicine specialist from the International Medical University, stated that four of ten Malaysian have mental health issue and the number will continue to arise every year (D.Kanyakumari, 2017). Additionally, at least 40% of Malaysian will suffer from mental health issue in their lifetime (D.Kanyakumari, 2017). Depression is a form of mental health issue and this illness is a result of poor mental health. Not only among adults, mental health problems are also common among children too, including those in the residential homes (Wan Salwina, 2014). Young adults are suffering from mental health issues due to poor parenting and environmental factors (Arumugam, 2016). Prevalence of depression among Malaysian adolescents as stated in Malaysia studies in the year 2008 to 2010 varies from 10.3% to 24.2% (Wan Salwina, 2014). In this study, cognitive functioning is defined as general intelligence *g* that is associated to mental health, specifically depression among youth and older people in the age of 40 and 50 years (Wraw et al, 2016). Cognitive functioning is associated to mental health in a way that higher cognitive functioning leads to better mental health. To date, prevalence of depression among adolescents and children in residential homes (Wan Salwina et al, 2014) is identified but cognitive functioning of the children have yet to be known.

The children in residential homes or institutionalized children in Malaysia are children in need of care and protection, who experience traumatic incidents in their early life (Department of Social Welfare, 2015). Cases of children abuse reported that mother as the main perpetrator has been increasingly alarming and has caused major concerns to the society (Choo, Dunne, Marret, Fleming, & Wong, 2011). One of the abuse reasons is a problem in early attachment between a mother and a child. The Health Ministry revealed an increase in the number of women suffering from poor mental health because of gender discrimination, overwork, domestic violence and sexual abuse (Arumugam, 2016). Past studies reported that major patterns of maternal attachment (i.e. secure and insecure) influence cognitive functioning (Bucker et al., 2012; Hart & Rubia, 2012; Oliveira et al., 2012; Pechtel & Pizzagalli, 2011; Perna & Kiefner, 2013). Children with insecure attachment experienced lower cognitive functioning (e.g., low IQ, poor academic and school performances) while the securely attached children showed higher cognitive functioning (von der Lippe, Eilertsen, Hartmann, & Killen, 2010; West et al., 2013). Realizing a healthy cognitive development guarantees individuals' present and later success and the need of promoting better cognitive functioning. Therefore, this study is designed to examine influence of factors that

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contribute to the institutionalized children's cognitive functioning. In order to examine the influence of these factors to the institutionalized children's cognitive functioning, the present study is guided by two developmental theories, namely Piaget's cognitive theory and Bowlby and Ainsworth's attachment theory.

The fundamental idea in Piaget's cognitive theory specifies on the concrete operations stage, which is to understand the cognitive development of children in the age of 7 to 11 years old, is to understand that the experience of adapting to environment influences the ability of a child to think logically (King, 2014). Meanwhile, Bowlby and Ainsworth's attachment theory held that the patterns of mother-child attachment (i.e. secure and insecure) influence children's development holistically. Further elaboration on the theoretical concept is discussed in Section 1.4 Theoretical Background. Derived from the essences of these two theories and past studies, three main variables are identified to be examined further.

This study comprised three main variables which are maternal attachment, emotion-regulation and cognitive functioning. The rising maltreatment cases in Malaysia because of a poor quality of parent-child relationship or family disputation (Department of Social Welfare, 2015), is suggestive of an impaired mother-child attachment growing in the society (Choo et al., 2011). Past studies reported that mother-child attachment influenced various child development including cognitive functioning (Jacobsen, Edelstein, & Hofmann, 1994; John, Morris, & Halliburton, 2012; Stanojević et al., 2015; von der Lippe et al., 2010; Wacha, 2010; Wellisch et al., 2011) and emotion-regulation (Brumariu, 2015; Stanojević et al., 2015; Zimmer-Gembeck et al., 2017). Higher IQ in youth was linked to better overall mental health, lower levels of depression and reduced risk of having sleeping difficulties by the age of 40 (Der, Batty, & Deary, 2009). High IQ score in youth was also associated to a reduced risk of mental health problems by the age of 50 (Wraw, 2016). Another variable, emotion-regulation is possible to mediate the relationship between maternal attachment and cognitive functioning. Emotion-regulation is a complex process involving initiating, inhibiting, or modulating one's state or behaviour in a given situation (Doyle & Cicchetti, 2017). A strong emotion-regulation is formed by a solid attachment with the mother and later influences the child's cognitive development. Children acquire emotion-regulation strategies by interacting with their primary caregivers through various socialization methods (Brumariu, 2015). Considering the interrelation of maternal attachment, emotion regulation, and cognitive functioning, the three variables are discussed in this study.

In terms of connection of the variables, maternal attachment in the present study is an independent variable, cognitive functioning is a dependent variable and emotion-regulation is a mediating variable that positions between the independent and dependent variables. A direct link between maternal attachment and cognitive functioning has been observed in past research (e.g. von der Lippe et al., 2010; Wellisch, Brown, Taylor, Knight, & Berresford, 2011; West et al., 2013). The past studies documented linkages between maternal attachment and emotion-regulation (e.g. Brumariu, Kerns, & Seibert, 2012; Borelli et al., 2010; Riva Crugnola et al., 2011), and emotion-regulation and cognitive functioning (e.g. Calero, Garcia-Martin, Jimenez,

Kazen, & Araque, 2007; Graziano, Reavis, Keane, & Calkins, 2007). Thus, emotion-regulation could be associated to maternal attachment and cognitive functioning via indirect effect that is mediator. Although empirical evidences on the connection between maternal attachment, emotion-regulation and cognitive functioning are limited, information on the interrelation among the institutionalized children is missing especially in Malaysia. To overcome the limitation, this study employed PLS-SEM to investigate the connection between maternal attachment (trust, communication, and alienation), emotion-regulation, and cognitive functioning among the institutionalized children in Malaysia. Not only that, as previous studies used composite score to explain overall maternal attachment, this study uses subscales of IPPA-r for Children (trust, communication, and alienation) to identify the maternal attachment of the institutionalized children in Malaysia.

Given the objective to advance the understanding on the relationship between maternal attachment, emotion-regulation and cognitive functioning, this study attempts to illuminate and elaborate the relationships between the three variables by considering Malaysian maltreated children by mother resided in the institutional care as the unit of analysis. This study focuses primarily on the population of the school age children. It is important to focus on middle age children because in this stage of life, the school age or elementary school year's children are being taught to master the three fundamental skills of education such as reading, writing and counting, where the child is formally exposed to the broader world and its culture. The present study employed a cross-sectional design, and survey questionnaires were used to collect data. The data was collected from samples of children in the institutional care governed by the Social Welfare Department throughout Malaysia. The samples of children was collected using the proportional probability to size (PPS) sampling technique, which enables generalization of findings to the population of institutionalized children in Malaysia. Then, the data was analysed using the partial least squares - structural equation modelling (PLS-SEM), a flexible multivariate analysis technique (Sudano & Perzynski, 2013). Structural equation modelling is the second generation multivariate method which allows simultaneous analysis of all the variables in the model instead of separately. Furthermore, PLS-SEM allows complex hypotheses testing including direct and indirect effects in where variables can be either observed or latent (Smith, 2015) besides having the ability to handle non-normal data.

In summary, this section presents statement of the problem for the current study. This study held philosophical worldview of post positivism that is intended for theory verification. Thus, this study is to test Piaget's cognitive theory, and Bowlby and Ainsworth's attachment theory that relates maternal attachment and emotion-regulation to cognitive functioning of the institutionalized children aged 7 to 12 throughout Malaysia. In this study, maternal attachment as the independent variable is defined as bonding of a mother and child which is developed in the first year of the child's life as a result of security and protection provided by the mother, and cognitive functioning as the dependent variable is defined as general intelligence or *g* factor, which is the ability to make sense of new situations, recall relevant information, qualities such as judgment and a store of specialist information (Raven, 2004). Lastly, emotion-regulation as the mediating variable is defined as following Thompson (1994), "processes for monitoring, evaluating, and modifying emotional reactions to accomplish goals".

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1.3 Research Questions

The following research questions were addressed in this study:

1. What is the pattern of maternal attachment, emotion-regulation and cognitive functioning across selected background variables?
2. What extent do institutionalized children's maternal attachment and emotion-regulation influence cognitive functioning?
3. Does emotion-regulation mediate the relationship between maternal attachment and cognitive functioning?

1.4 Theoretical Background

In formulation of a theoretical perspective for studying maternal attachment, children's emotion-regulation and cognitive functioning, Piaget's (1960) cognitive theory and Bowlby and Ainsworth's (1969) attachment theory provided a useful model.

1.4.1 Cognitive Theory

Jean Piaget in 1960 provides an appropriate theoretical perspective to understand the cognitive functioning in children (Mishra, 2014). Piaget held that cognitive functioning is the product of interaction between environmental influence and maturation of organism (see Figure 1). This means that, the Piaget's cognitive theory provides base for this study in understanding the relations of environmental influence (maternal attachment) and biological maturation (children's emotion-regulation) which leads to the development of cognitive functioning.

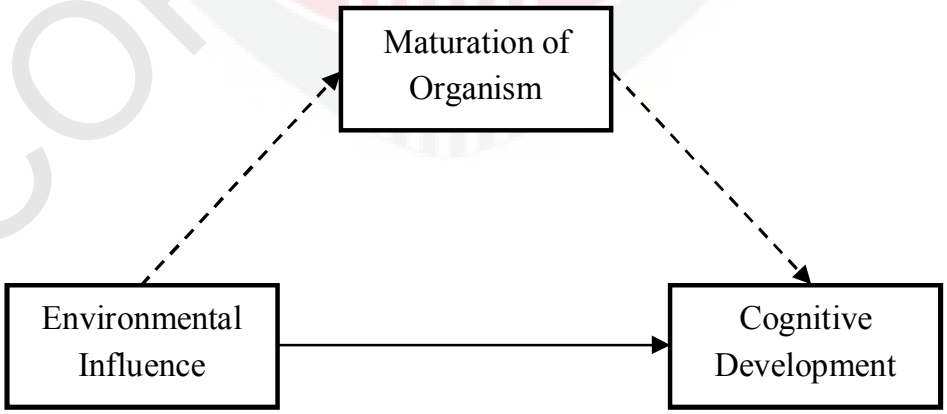

Figure 1 : Framework for Cognitive Theory

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Piaget has derived with four stages of cognitive development through naturalistic observations. The first stage is the sensorimotor that begins from birth to two years old. In this stage, infants build an understanding of the world by organizing experiences with motor actions (King, 2014). In Piaget's second stage, the preoperational, lasts from two to seven years of age. In the preschool years, children begin to interpret their world with words, pictures and illustrations (King, 2014). The Piaget's concrete operational stage (7 to 11 years) involves children's ability to think logically and make more mature moral judgements (Papalia & Feldman, 2011). Individuals enter the formal operational stage at the age of 11 to 15. This stage continues through the adult years. In this stage, children think more than concrete things, start to make predictions, and use logic to come up with hypotheses about the future (King, 2014). In summary, as children actively construct their cognitive world, they go through four development stages, and progress from sensory-motor cognition to abstract, idealistic and logical thought.

Each stage has its distinctive characteristics and is closely related to the children's mental age rather than their chronological age. Furthermore, each stage level of achievement is different in different children due to individual differences and environmental condition (Joubish & Khurram, 2011). This suggests that variations in attachment patterns and differences in children's emotion-regulation possibly show a discrepancy in children's cognitive functioning. The concrete operational stage is apt to elaborate cognitive functioning of participants in the present study, who are institutionalized children aged 7 to 11 years. This stage is named concrete because children's thinking is limited to what they confront through everyday experiences. Also, the word operational or logic means children are capable of thinking about actions that they had formerly experienced, clearly and reversible. Children in this stage are able to think logically about objects and events, achieve conservation of number (age six), mass (age seven) and weight (age nine). Besides that, they can categorize objects according to several features and can arrange them in a single dimension such as size (Joubish & Khurram, 2011).

Guided by the Piaget's theory, this study hypothesized that maternal attachment, as perceived by the children, influence children's cognitive functioning, via emotion-regulation.

1.4.2 Attachment Theory

The attachment theory is a collaborated work of John Bowlby and Mary Ainsworth (Bretherton, 2013). John Bowlby verbalized the basic principles of the theory and then, Ainsworth tested the principles empirically to expand the theory and introduced some new ideas. Attachment refers to an eternal psychological connection between human beings (Bowlby, 1969). Infants have innate tendencies for proximity and emotional bond from their caregiver usually mothers, not only oral needs, but protection and reproductive attainment. Bowlby (1969) proposed that attachment formation between an infant and a primary caregiver occur within the infant's first year of life that remains as an important aspect across childhood and lasting to adulthood. Attachment

influences various developmental aspects including cognitive development (cognitive functioning) and personality development (emotion-regulation) (see Figure 2).

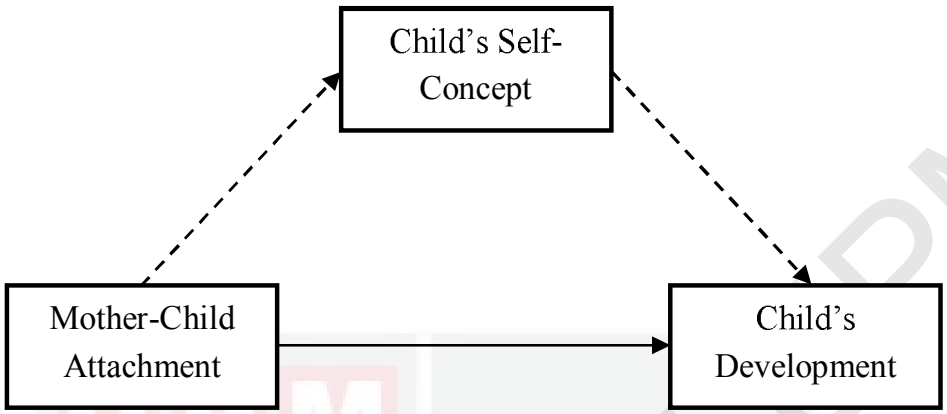

Figure 2 : Framework for Attachment Theory

Subsequently, Ainsworth guided by Bowlby's ethological perspectives, conducted further observation studies on mothers and infants. Subsequent from the studies, Ainsworth hypothesized that attachment quality was related significantly to maternal sensitivity. To define, maternal sensitivity refers to excellent informants mothers who offered spontaneous detail of their babies (Ainsworth, 1967). Ainsworth added that all babies become attached to their caregivers but only that the type of attachment varies.

Insecure attachment developed through patterns of inconsistent of harsh responding and sometimes frightening. Due to that, the insecurely attached children feel restrained in their discovery and observation of the environment that is full of information and resources, which constraint their learning and cognitive development. Among the characteristics of a secure attachment relationship include children express cheerful response when interacting with parents or when seeing them, welcome their presence with pleasure, explores environment when knowing their parents are around, find parents every time they feel sad or depressed, show confidence and trust when parents are handling them (Jabatan Perdana Menteri, 2013). They also feel free to explore the environment and learn with full of confidence, stable emotion, able to handle and express feelings appropriately, and anticipate that their emotion cues will be responded to.

Other than that, sensitive, responsive, caring, loving and comforting parental responses lead to secure attachment. The securely attached children explore and observe their environment actively then become knowledgeable, experienced and skilled, besides having the advantage in cognitive development. On the other hand, among the characteristics of an insecure attachment are children express worry and look up for their parents, refuse to explore the environment, demonstrate annoyance to parents, burst out, show fear and confusion (Jabatan Perdana Menteri, 2013). Other than that, they feel less confident in learning and exploration, show negative behaviours such as hostile, anti-social and hard to mix around with other children, unstable emotion,

having difficulty to manage and express feelings, and believe that not all of their emotion signals will be responded.

Drawing from the principles of attachment theory, child-mother attachment relationship significantly influences children's interaction with the environment and later development. Their interaction with the environment depends on patterns of attachment formed in their first year of age. Pattern of insecure attachment put constraint in children exploration of the environment and they tend to show deficit in cognitive development. On the other hand, pattern of secure attachment encourage children to explore the environment and they tend to show better cognitive development. Other than cognitive development, the pattern of attachment also influences children's personality development such as self-concept. Children's self-concept (emotion-regulation) is influenced by the attachment relationship through the children's expectations of the parent's response behavior on children's emotion signals. Emotion-regulation then influences children's development in cognitive functioning.

1.5 Conceptual Model

Drawing from the theoretical framework described earlier, the study sought to identify the extent to which maternal attachment and emotion-regulation influence institutionalized children's development (cognitive functioning). Additionally, the study sought to investigate the direct and indirect processes of these variables and cognitive functioning. Figure 3. illustrates the conceptual framework of the study.

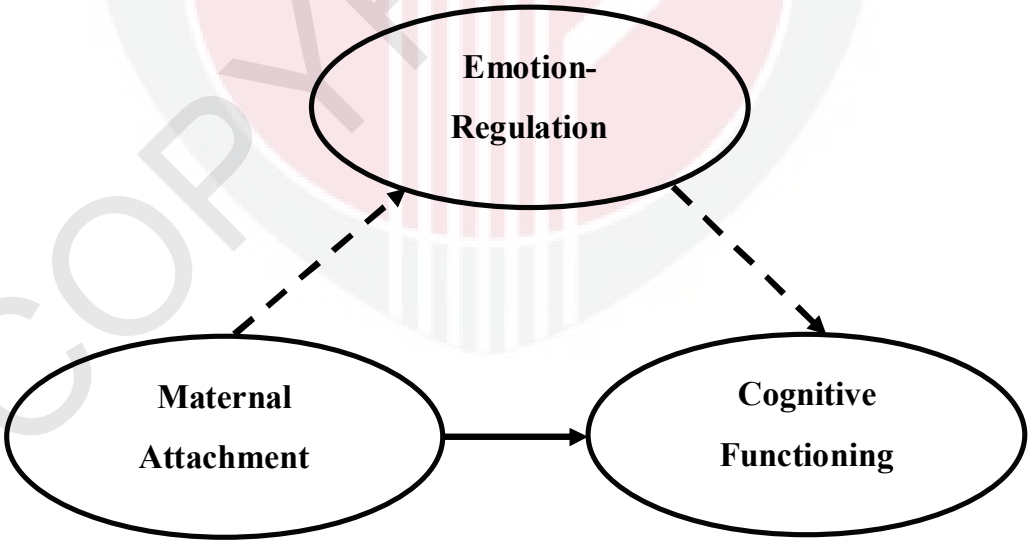

Figure 3 : Conceptual Framework of the Study

The conceptual framework employed the developmental perspectives of Piaget's cognitive theory, and Bowlby and Ainsworth's attachment theory as the theoretical basis, which suggested that the interaction of environmental influence and maturation of organism; contribute to the development of children.

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In the present study, environmental influence refers to maternal attachment (trust, communication, and alienation), maturation of organism refers to children's emotion-regulation whereas children development is children's cognitive functioning. Based on the study by Haskett et al. (2012), the present study expects that maternal attachment will be associated to children's cognitive functioning. Furthermore, trust and communication attachment will lead to better cognitive functioning while alienation will indicate otherwise. Nevertheless, in the case of maltreated children, direction of the associations might appear different.

Maternal attachment could also contribute to children's cognitive functioning through emotion-regulation (Stanojević et al., 2015; West et al., 2013). The present study expects that emotion-regulation will mediate the relationship between maternal attachment and cognitive functioning. Emotion-regulation has been found to be associated with maternal attachment and cognitive functioning. Maternal trust and communication attachment could contribute to strong emotion-regulation, which in turn lead to development of cognitive functioning in children. In contrast, maternal alienation attachment leads to weak emotion-regulation, which then deteriorates cognitive functioning.

In summary, maternal attachment in the study is measured through three dimensions, namely trust, communication, and alienation attachment. The present study investigated the relationship between maternal attachment, emotion-regulation and cognitive functioning of institutionalized children. Not only that, the study also tested the mediation role of emotion-regulation on the relationship.

1.6 Objectives of the Study

This section presents the general objective and specific objectives of the study.

1.6.1 General Objective

Generally, the present study aims to examine the relationships between maternal attachment (trust, communication, and alienation), emotion-regulation and cognitive functioning of institutionalized children, and the extent to which the relationships are mediated by emotion-regulation.

1.6.2 Specific Objectives

Based on the general objective, the specific objectives of the study are listed as follows:

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1. To examine the differences in maternal attachment, cognitive functioning, and emotion-regulation of institutionalized children across selected child's personal characteristics (age, sex and number of children in family).
2. To examine the relationships between maternal attachment (trust, communication, and alienation) and cognitive functioning in institutionalized children.
3. To examine the relationships between maternal attachment (trust, communication, and alienation) and emotion-regulation in institutionalized children.
4. To examine the relationships between emotion-regulation and cognitive functioning in institutionalized children.
5. To determine the influence of emotion-regulation on the relationships between maternal attachment (trust, communication, and alienation) and cognitive functioning.

1.7 Hypotheses

Hypotheses formulated for the present study were in accordance to the specific objectives (objectives 2, 3, 4 and 5) and hypothesis is not necessary for objective 1 as it is descriptive in nature. There are altogether 10 hypotheses formulated in the study that are organized into four groups. The hypothesized model is presented in Figure 4.

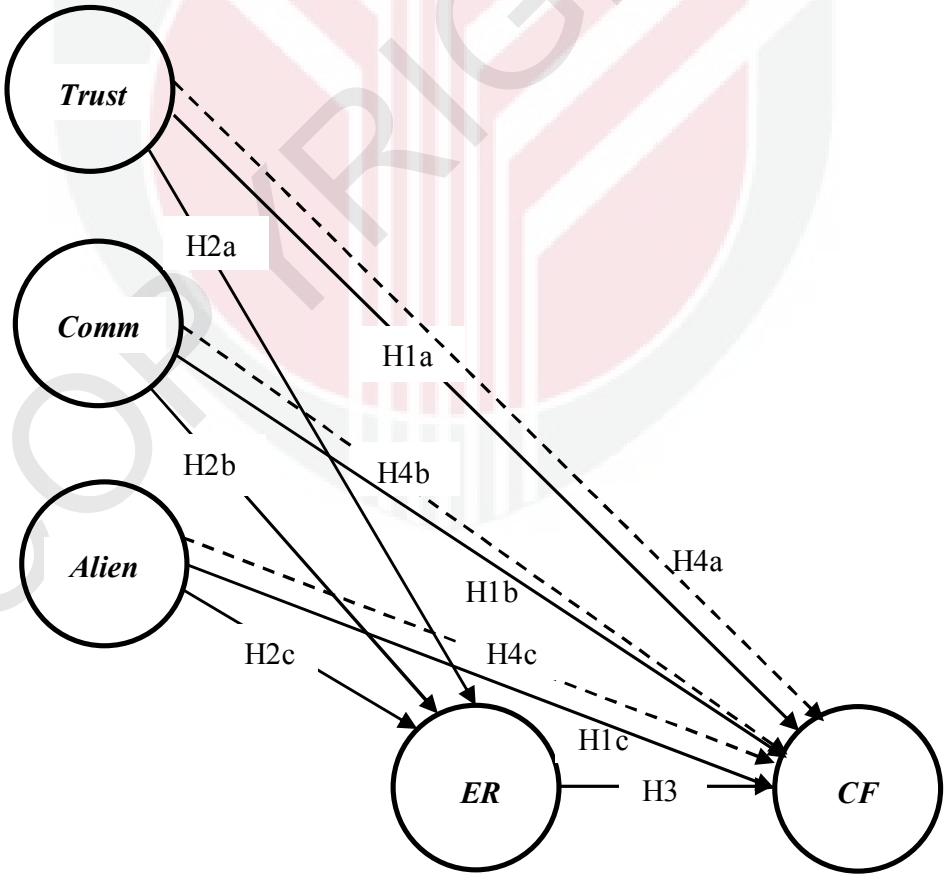

Figure 4 : Research Model of the Study with Hypotheses

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Objective 2: To examine the relationships between maternal attachment (trust, communication, and alienation) and cognitive functioning in institutionalized children.

Hypothesis-Group 1:

H1a: Children with trust attachment will more likely have higher cognitive functioning scores.
H1b: Children with communication attachment will more likely demonstrate higher cognitive functioning scores.
H1c: Children with alienation attachment will more likely demonstrate lower cognitive functioning scores.

Objective 3: To determine the relationships between maternal attachment (trust, communication, and alienation) and emotion-regulation in institutionalized children.

Hypothesis-Group 2:

H2a: Children with trust attachment will more likely have higher emotion-regulation scores.
H2b: Children with communication attachment will more likely demonstrate higher emotion-regulation scores.
H2c: Children with alienation attachment will more likely demonstrate lower emotion-regulation scores.

Objective 4: To examine the relationship between emotion-regulation and cognitive functioning in institutionalized children.

Hypothesis-Group 3:

H3: Children with higher emotion-regulation scores have higher cognitive functioning scores.

Objective 5: To determine the influence of emotion-regulation on the relationships between maternal attachment (trust, communication, and alienation) and cognitive functioning.

Hypothesis-Group 4:

H4a: Maternal trust attachment is indirectly related to cognitive functioning of children via emotion-regulation.
H4b: Maternal communication attachment is indirectly related to cognitive functioning of children via emotion-regulation.
H4c: Maternal alienation attachment is indirectly related to cognitive functioning of children via emotion-regulation.

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1.8 Significance of the Study

Findings from the present study are significant at least in three aspects, as follows: theoretical, methodological and practical. Theoretically, investigation of emotion-regulation as a potential mediator in the link between maternal attachment and institutionalized children's cognitive functioning will fill the gap found in the existing literatures. As mentioned earlier, limited empirical evidences available to provide information on the role of child's emotion- regulation is a mediator in the link between maternal attachment and child's cognitive functioning.

Methodologically, the study employs the Partial Least Square–Structural Equation Modeling (PLS-SEM) for the data analysis that represents a sophisticated and comparatively modern statistical analysis technique. To date, a relative handful of studies on children's attachment employed this analysis method, signifying the distinctive nature of the current study. The usage of PLS-SEM is also expected to produce more meaningful and valid results (Werner & Schermelleh-Eagel, 2009) in testing of multivariate relationships involved in the present study.

Practically, results in this study serve as a reference and guidance for the practitioners, child welfare organizations and policy makers, who aim to provide attachment-based interventions that contribute to the cognitive and social development of the institutionalized children to overcome adversity (Chantal Cyr et al., 2013). Many empirical evidences exist to support the application of attachment based on preventive interventions to improve development of maltreated and high risk children (Stronach et al., 2011). Besides that, findings of this study could also benefit the clinicians, researchers and public at large.

1.9 Definition of Terminology

Maltreated Children

Conceptual: Maltreated children that are abused and severely neglected, who are in out-of-home placement, which is institutions (Nowacki & Schoelmerich, 2010)

Operational: Refer to children aged 7 to 12 years reared in institutional care across Malaysia due to being maltreated.

Maternal Attachment

Conceptual: Bonding with the mother develops within the first year of children's life, when provided with enough security and protection (Bowlby, 1969).

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Operational: Participants' score on 28 items of the Inventory of Parent and Peer Attachment – Revised (IPPA-R) for Children (Gullone & Robinson, 2005). The IPPA-R for Children is divided into trust, communication, and alienation. Higher z-scores in the trust subscale and the communication subscale, and lower z-scores in the alienation subscale indicate higher level of the respective maternal attachment and secure attachment. On the contrary, lower score scores in the trust subscale and communication subscale, and higher scores in the alienation subscale indicate higher level of the respective maternal attachment and insecure attachment.

Trust

Conceptual: A factor in the IPPA-R for Children that contained items that assessed the understanding and respect between children and their mothers (Armsden & Greenberg, 1987)

Operational: Participants' score on 10 items trust subscale. The highest z-scores among trust, communication, and alienation subscales indicate attachment shows by the institutionalized children.

Communication

Conceptual: A factor in the IPPA-R for Children, which items measure the perceived quality of communication between children and their mothers (Armsden & Greenberg, 1987).

Operational: Participants' score on 10 items communication subscale. The highest z-scores among trust, communication, and alienation subscales indicate attachment shows by the institutionalized children.

Alienation

Conceptual: A factor in the IPPA-R for Children that contained items measuring feelings of isolation and separation between children and their mothers (Armsden & Greenberg, 1987).

Operational: Participants' score on eight items alienation subscale. The highest z-scores among trust, communication, and alienation subscales indicate attachment shows by the institutionalized children.

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Emotion-Regulation

Conceptual: "The extrinsic and intrinsic processes for monitoring, evaluating, and modifying emotional reactions, especially intensive and temporal features to accomplish goals" (Thompson, 1994).

Operational: Participants' score on the Emotion-Regulation Index for Children and Adolescents (ERICA) (Macdermott, Gullone, Allen, King, & Tonge, 2010). Higher scores indicate higher level of emotion-regulation.

Cognitive Functioning

Conceptual: General intelligence or *g* factor, which is the ability to make sense of new situations and recall relevant information; qualities such as judgment and a collection of specialist information (Raven, 2004).

Operational: Participants' score on the 36 items of the Raven's Coloured Progressive Matrices (RCPM, Raven, 2004). Higher scores indicate higher level of cognitive functioning.

1.10 Organization of the Thesis

The thesis is divided into five chapters. A brief description of each of the chapter is as follow:

Chapter 1: Introduction

The introduction provides an overview of the study by introducing the background of the research, statement of problems, the theoretical background, followed by conceptual model that steered the study, research objectives, and ends with the significance of the study.

Chapter 2: Literature Review

This chapter comprises a critical review of the literature related to the study interest. The review is scrutinized and analysed in order to provide the essence of the related findings of past research that impact the current study.

Chapter 3: Methodology

This chapter describes the methodology of the study, including research design, information on the measures employed, and details on statistical analysis.

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Chapter 4: Results and Discussions

This section encompasses the results and discussions of the findings from the present study. The chapter begins with the descriptive and correlational findings of the key variables of the study. After that, this chapter presents the results of the structural equation modelling on the relationships between maternal attachment, institutionalized children's emotion-regulation and cognitive functioning.

Chapter 5: Summary, Conclusions, Implications, and Recommendations for Future Research

The final chapter of this thesis summarizes the findings of the present study based on the research questions. Additionally, this chapter discusses the conclusions, theoretical and practical implications as well as the recommendations for future studies.

1.11 Chapter Summary

Realizing the lack of studies investigated on maternal attachment, emotion-regulation and cognitive functioning amongst institutionalized children, a study is deemed to be conducted. The present study applied two theories (Piaget's cognitive theory and Bowlby and Ainsworth's attachment theory) to provide theoretical perspectives to conduct the research. Thus, the main objective of the study was to examine the relationship between maternal attachment (trust, communication, and alienation), emotion-regulation and cognitive functioning of institutionalized children, and the extent to which the relationships are mediated by emotion-regulation.

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