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Qualitative Article

Causes and Cultivation of Inhibitory Control Among School-Age Children in Thailand

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Abstract

Background/Problem: Children with dysfunctional inhibitory control tend to be at risk of experiencing more externalizing behavior, such as aggression, hyperactivity, and impulsivity, leading to addictive behavior in the future.
Objective/Purpose: This study had two main objectives, to understand the causes of inhibitory control in students and to identify ways of enhancing inhibitory control among parents and teachers in Nakhon Pathom Province in Thailand.
Design and Methodology: The study used the case study approach focusing on students with good inhibitory control skills, ten parents of these children, and five teachers. Data was analyzed using content analysis techniques.
Findings: The study themes encompassed personal factors, such as personality traits and a sense of responsibility, alongside environmental factors, such as family dynamics and activities fostering communication and skill-building at home. Similarly, strategies to promote inhibitory control skills at school centered on active learning methodologies and attention practices.
Conclusion and Implications: The study clarifies that families with low to moderate socioeconomic status can promote inhibitory control skills in a simple and cost-effective manner. The method proposed in this study can be used as a guideline for the development of inhibitory control, which is the main component of executive function.

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The prefrontal cortex is responsible for people's executive function (EF), controlling their emotions, thoughts, decisions, and actions, ultimately leading to goal-directed behavior (Anderson, 2001). Inhibitory control is classified as a critical component of EF, helping people develop goal-directed behavior (Center on the Developing Child at Harvard University, 2011; Diamond et al., 2007). Inhibitory control is directly related to the cognitive process responsible for controlling thoughts, actions, and emotions until behavior is targeted (Aydmune et al., 2019; Diamond, 2016), while self-regulation is a fundamental process that enables individuals to suppress or stop inappropriate responses (Barkley, 1998; Carlson & Moses, 2001). Formative school age is a critical period that extends from childhood to adolescence. Continuous changes occur in both the hormonal and physical aspects of the body due to the rapid growth of the nervous system and brain. However, in comparison to the emotional brain, the prefrontal cortex (PFC) that lies behind the human forehead will not become fully developed until the age of 25 years (Casey, 2015; Casey et al., 2008). Repressiveness is an important component of self-control, stopping or protecting an individual from exhibiting inappropriate behavior. Inhibitory control skills can develop at an early age, facilitating the prediction of future outcomes, such as work success (Diamond, 2013). However, youths in the age group of 9–12 years may find themselves in the second-chance cycle of pre-adolescence development. During the ages of 13–19 years, the brain structure responsible for reason, namely the limbic brain system associated with emotions, is still not fully developed.

According to a review of previous research, various studies have explored the relationships and underlying factors influencing inhibitory control skills. Most of these studies focused on exploring the relationships and underlying factors influencing inhibitory control skills, primarily with the use of correlation analysis to determine the influence of variables, while a few employed regression analysis and causal models. Previous studies lack understanding or models describing the reasons for some students developing more inhibitory skills than others. Based on the research results from around the world, the causal factors of inhibitors can be divided into internal and external. Internal factors include perceived stress (Zhu et al., 2022), stress (Hanson et al., 2012), working memory (Diamond, 2016), and conscientiousness (Luchetti et al., 2016). External factors include socioeconomic status (SES) (Cascio et al., 2022), child-parent attachment (Low &Webster, 2016), family aspects such as support patterns (Samuelson et al., 2012), and open-ended communication (Kamza & Putko, 2021). School-related factors include teacher-child relationship conflict (Berry, 2012), physical activity in school (Invernizzi et al., 2022), and a teaching management pattern promoting active learning (Shroff et al., 2022). External stimuli also include aerobic exercise (Herting et al., 2014). Moreover, previous studies have found a way to enhance inhibitory control. Researchers have divided inhibitory control development activities for persons with and without disabilities into three categories: (1) Institutional activities involving family and hospital psychology; (2) Activities utilizing information technology (IT) such as virtual reality (VR); and (3) Activities employing intellectual tools, e.g., functional magnetic resonance imaging (fMRI) (Tongkaw & Chadcham, 2020). The benefit of using institutional activities for promoting inhibitory control development in school-age children is that they are the most cost-effective, but activities utilizing IT are popularly used in adolescents, adults, and elderly persons. Although activities employing intellectual tools may require the expertise of specialists and incur the highest costs, they are the least time-consuming.

It is evident that identifying a way of enhancing inhibitory control through activities involving family and hospital psychology in a simple and cost-effective manner among children is a challenging public health and educational issue. Children who practice inhibitory control both at home and in school are likely to develop into responsible teens and adults. This research studied in school-age children at educational opportunity schools in the Nakhon Pathom Province in Thailand, which is considered to represent most of the semi-urban and semi-rural communities. The educational opportunity schools represent most of the public schools under the office of the Basic Education Commission. Few quantitative research studies involve correlation studies, such as those examining the variables influencing inhibitory control (Gerber et al., 2021; Xing et al., 2019). Thus, by concentrating on the real-life perspectives of student experiences in the semi-urban region of Nakhon Pathom Province, Thailand, this study closes the knowledge gap about the causes of inhibitory control through the use of qualitative research. Therefore, this study had two main objectives: to understand the causes of inhibitory control in students and to identify ways of enhancing inhibitory control among parents and teachers in Nakhon Pathom Province, Thailand. The qualitative approach employed in this study could guide the practices of parents and teachers.

Literature Review

This literature review examines the theoretical background, meaning of inhibitory control skills, cause of inhibitory control skills, and potential ways of enhancing the development of inhibitory control skills according to the study variables.

Theoretical Background

The social cognitive theory can be used to explain human behavior phenomena, namely interactions between personal and environmental factors (Bandura, 1977). Human behavior is not only influenced by environmental factors but also internal such as thoughts, feelings, or emotions. Inhibitory control, defined as the capacity of an individual to suppress or override a strong dominant response expressed through human behavior, is regarded as one of the fundamental building blocks of goal-directed and adaptive behavior (Anderson, 2002). Moreover, inhibitory control is the core of self-regulation and can be divided

into two parts: response inhibitory control and interference control (Diamond, 2016). Therefore, the aim of this study is to understand the causes of inhibitory control in students and identify ways to enhance it among parents and teachers in Nakhon Pathom Province. Parents and teachers categorize environmental factors as those that can influence perceptible stimuli and reactions in an individual's inhibitory control. Individual factors, such as thoughts, emotions, feelings, and opinions, facilitate the interactions between external stimuli and reactions in real-life scenarios.

Inhibitory Control Skills

The cognitive processes carried out by the prefrontal cortex are referred to as the executive function (EF), regulating emotions, ideas, decisions, and actions to achieve goal-oriented activities (Anderson, 2001). Inhibitory control is considered a fundamental aspect of managerial cognitive abilities, playing a crucial role in fostering the development of goal-oriented activities (Diamond et al., 2007). Inhibitory control is a cognitive process that involves regulating thoughts, actions, and emotions until a specific behavior is chosen. It is closely linked to self-regulation, a fundamental process that allows individuals to suppress or halt inappropriate responses (Barkley, 1998; Carlson & Moses, 2001). Diamond (2016) states that inhibitory control is a sophisticated cognitive process that originates from intrusive stimuli and localized in the prefrontal region of the brain. Working memory and inhibitory control are the two primary components that cooperate to focus attention in the areas of interference control and response inhibition. The EF involves a long developmental process that begins during the perinatal period and sharply increases at the preschool stage (Shonkoff et al., 2011).

The Cause of Inhibitory Control Skills

The literature review divides the causes of inhibitory control into two categories: external and internal. The term "environmental factors" refers to the environment, such as family, parenting style, socioeconomic status (SES), and school, which can influence the expression of perception, such as the relationship between teachers and children and the instructional model. Parenting style can be divided into two main dimensions: supportive and controlling patterns. Supportive parenting involves aspects such as family warmth, acceptance, involvement, understanding, and the quality of relationships between parents and children. In contrast, the negative control model covers the efforts made by parents to organize, control, and strictly set criteria for children to follow (Smetana & Daddis, 2002). Parenting support is related to the development of EF skills in the areas of planning, inhibitory control, and problem-solving productivity in school-age children to teenagers aged from 7 – 16 years (Samuelson et al., 2012; Sosic-Vasic et al., 2017). SES is linked to the foundational development of brain areas related to EF, including inhibitory control (Brydges et al., 2012; Diamond, 2013). These findings are similar to those revealed by Cascio et al. (2022) found that a family with low SES had decreased inhibitory control. On the other hand, Xing et al. (2019) found that a family with high SES tends to have a direct influence on inhibitory control in early childhood (direct effect: DE = .12, $p < .05$). In general, families with a high level of socioeconomic stability are able to allocate time to engage in activities with their children. School-external factors, such as conflicts in teacher-child relationships, emotional conflicts, and adverse classroom relationships, can cause stress in children. These factors can stimulate the brain to produce higher levels of cortisol (Rappolt-Schlichtmann et al., 2009). Active learning is an enthusiastic process that focuses on student involvement. Experience-building through teaching is a process that enables students to interact effectively by creating a continuous cognitive process (Ginsburg, 2010). Moreover, the school factor refers to environmental influences such as the instructional model and activity. Active learning is related to inhibitory skills, such as cognitive or brain processing, that occur within an individual in the belief that each student already has the necessary understanding, motivation, and interest (Shroff et al., 2021). In comparison, aerobic exercise is an important environmental stimulant for brain development (Herting et al., 2014). Exercise has been found to improve inhibitory skills in individuals across many age groups, including children (Pontifex et al., 2013) and adolescents (Mücke et al., 2020).

Personal factors, such as emotions, feelings, and thoughts, can be measured based on their responses to stimuli. Relevant research divides these factors into the following categories: biological, gender, and age. Between the ages 6 and 12 years a positive relationship exists with the brain's ability to respond to the flanker task. Researchers have found that men exhibit a higher level of knowledge and possess a significantly greater ability to exert inhibitory control compared to women (p-value < .01) (Gerber et al., 2021). Stress affects the neural plasticity process. The occurrence of neural plasticization processes involves shape change and rupture as well as the enlargement of learning characteristics and patterns. Childhood stress can reduce the performance of the prefrontal cortex, which is part of working memory (Hanson et al., 2012). Additionally, a research study conducted by Gao et al. (2020) examined the impact of academic stress on inhibition in children and adolescents. A study by Zahodne et al. (2015) revealed that those who possessed a high level of self-efficacy demonstrated enhanced attention and inhibitory abilities. Conscientiousness is a personality trait characterized by a strong sense of responsibility guided by rationality, perseverance, and a drive for achievement.

Guidelines for Developing Inhibitory Control Activities

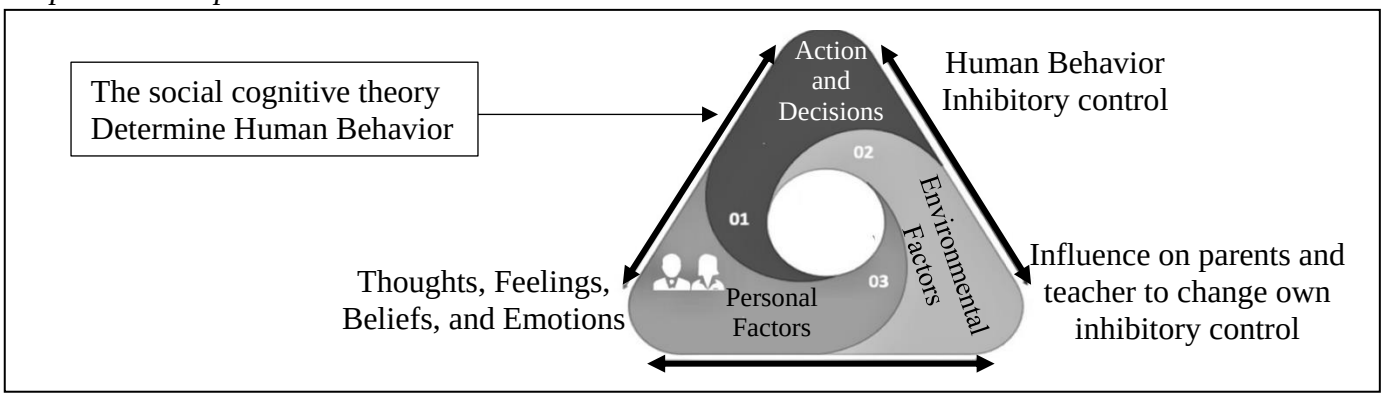
Tongkaw and Chadcham (2020) stated that there are three categories of EF development activities for inhibitory control skills: 1) Institutional activities, 2) Active information technology (IT), such as VR, and 3) Cognitive science activities. Institutional activities are the most cost-effective and commonly used in the development of brain management in preschool and school-age children. Active IT is most commonly used with teens, adults, and the elderly with impairments. Cognitive science activities that use intellectual tools, such as function magnetic resonance imaging (fMRI), require the least time to perform and demonstrate the most obvious results in the development of inhibitions in teens, adults, and the elderly. However, this is the most expensive activity of the three. Volckaert and Noël (2015) conducted a study on institutional activities that target early childhood development, such as classroom games that promote self-control and encourage children to engage in detective role-playing. A game was created by the researchers, drawing upon the notion of deterrence. Donning detective roles is a means of fostering children's imagination. The participant possesses high cognitive abilities and assumes the role of a detective. This activity incorporates both cognitive and physical training, enabling youngsters to enhance their inhibitory control. Jiang et al. (2016) recommended that the activity leader incorporate entertaining activities to engage and stimulate youngsters. The inhibition training game activity entails the act of choosing food items from a plate in accordance with the directions provided by the event leader. Moreover, people with inhibitory control impairments, such as attention-deficit/hyperactivity disorder (ADHD), a neurodevelopmental disorder characterized by executive dysfunction**,** especially low self-control, and impulsivity, may experience significant challenges. Blasco-Fontecilla et al. (2016) reported that the ADHD symptoms of the study participants improved after playing the scorpion game one hour a week for 11 weeks. The activity utilizes the game of chess as a means of engagement. In their activities, Lee et al. (2018) employed the computer game response inhibition training (RIT), derived from the notion of inhibition. In their study, Homer et al. (2018) outlined an educational intervention using the Alien computer game as a tool to enhance the cognitive process of mental induction among secondary school students aged 16 to 18. This activity employs cognitive instruments to advance magnetic resonance imaging techniques, including fMRI to quantify brain activity through the assessment of alterations in blood oxygen levels. After undergoing fMRI, the computer screen displays images of the brain and its specific regions. According to the foregoing literature review the causes of inhibitory skills have been described through quantitative research but not qualitative. According to quantitative research, the causes of inhibitory control can be divided into personal and environmental factors. However, there is a lack of comprehensive data on the real-life experiences of students, making it difficult to pinpoint the true causes of effective inhibitory control in a region of Thailand that combines urban and rural areas. Therefore, this study to understand the causes of inhibitory control in students and to identify ways of enhancing inhibitory control among parents and teachers in Nakhon Pathom Province in Thailand.

Research Objectives

The main objective of this study is to understand the causes of inhibitory control in students and identify ways for its enhancement among parents and teachers in Nakhon Pathom Province. To gain a comprehensive grasp of the phenomenon and obtain specifics on the semi-urban family within the Thai context, this study takes a qualitative research approach with the use of a case study involving a student who possesses a high level of inhibitory control skills from the perspectives of both teachers and parents. This research incorporates the social cognitive theoretical framework. Inhibitory control refers to the ability of an individual to suppress or override a strong dominant response exhibited through human behavior (Anderson, 2002). In addition, response inhibitory control and interference control comprise the two components of inhibitory control, forming the basis of self-regulation (Diamond, 2016). The human behavior phenomena resulting from the interactions between environmental and personal factors can be explained by social cognitive theory (Bandura, 1977). However, internal elements—such as thoughts, feelings, or emotions—as well as external factors can alter a person's actions. Figure 1 shows the conceptual framework of the study.

Figure 1

Proposed Conceptual Framework



Methods

Design

This qualitative study employed a multiple-case (holistic) design and single-unit analysis to investigate multiple-case inhibitory control across a diverse range of case studies. This method was chosen because it requires students with good inhibitory control experience to be examined in multiple dimensions, including collinear and non-collinear points, to fully complete the discovery (Yin, 2014). The main objective of this study is to understand the causes of inhibitory control in students and identify ways to enhance it among parents and teachers in Nakhon Pathom Province.

Sampling Procedures

Students who exhibited a good level of inhibitory control at Educational Opportunity Expansion Schools under the Nakhon Pathom Primary Educational Service Area District Office 2 were subjected to purposive sampling in December 2023 after being assessed by the Behavior Rating Inventory of Executive Function, Second Edition (BRIEF-2) (Gioia et al., 2015).

Inclusion and Exclusion Criteria

The study was conducted on school-age children at Nakhon Pathom Primary Educational Service Area District Office 2 in 2023 under the following inclusion criteria: (i) male and female students aged 9–12 years; and (ii) exhibiting a good level of inhibitory control. Children with T scores of less than or equal to 60 (T scores $\leq$ 60) were identified and chosen for interviews. Children lacking Thai citizenship or those experiencing physical and mental difficulties that could hinder information processing were excluded.

Participants

The study participants were divided into three groups to provide information. The first group of 10 students with T scores of less than or equal to 60 (T scores ≤ 60) were identified and chosen for interviews. They exhibited a good level of inhibitory control, assessed according to the Behavior Rating Inventory of Executive Function, Second Edition (BRIEF-2) by teachers. This study specifically focused on questions relating to inhibition, selecting a subset of 8 out of the 63 questions. These 8 questions had three response options: never, sometimes, and often. The raw scores were compared to standard t-scores by age, and gender. The second group included parents of elementary school students in Grades 4 to 6 who had a good level of restraint skills. They were selected by a counsellor who observed their behavior while caring for them at school, with a total of 10 individuals chosen for the study. The third group consisted of the children's teachers who possessed strong inhibitory skills and experience, playing a crucial role in assuming responsibility, monitoring, and providing support (SDQ) to students.

Instrument

The data collection tool was a semi-structured open-ended questionnaire consistent with the purposes of the research and reviewed by experts before use. The index of item objective congruence for 32 items was .66–1.00. These questions set the preliminary tone for the interview in a direction that aligns with the research objectives, but in practice, the questions would be likely to change based on the situation. The main question was used to open the interview, with probing employed to gather more detailed information. The questionnaire consisted of three sections. The first section asked for basic information regarding the information provider. The second section referred to the potential causes of inhibitory control skills. For example: 1) What factors contribute to a student's development of inhibitory control skills? 2) Does parenting style help to strengthen inhibitory control skills? The final section explored ways in which parents and teachers could promote inhibitory control skills. For example, 1) What activities are important for your child to develop inhibitory control? and 2) What strategies do you use to teach your student about inhibitory control skills?

Procedure

This research used in-depth interviews, with the researcher building a rapport with the respondents before and after the interview. At the end of the interview, the researcher assigned a code rather than a name for the child, parent, and teacher to record the data. The in-depth interviews were conducted in a conference room provided by the school. The researcher continued to select and interview the respondents until the level of response saturation had been achieved. Data triangulation entailed interviews with children who had good levels of inhibitory control skills and people around them, such as parents and close teachers, as well as a collection of theoretical data and related documentation to describe the phenomenon. The data was analyzed according to the following qualitative processes (Podhisita, 2011); 1) Data organization: The data from the perspective of the data provider were removed from the tape word for word, and the quotation was put into a smooth and orderly format and read over again to divide the item according to purpose, 2) The audio tapes of the in-depth interviews were transcribed for coding and clustering, 3) The content consisted of two themes: Causes relating to inhibitory control skills and the promotion of inhibitory control by parents and teachers. The researcher collaborated with the other peer debriefing professor, who provided guidance on coding, verifying the code, and its interpretation, and 4) The content analysis was then incorporated into the research report.

Results

The research findings were organized into three primary sections: 1) Overview of the sample group, 2) factors influencing inhibitory control abilities, and 3) strategies for improving inhibitory control skills through parental and teacher involvement. The demographic characteristics of the sample groups of students and parents encompassed gender, age, grade, number of siblings, and occupations (Table 1). The

teacher sample consisted of respondents, predominantly female. These individuals typically had professional experience ranging from three to nine years, with ages ranging from 27 to 46 years.

Table 1
Demographic Characteristics of the Students and Parents

Name	Sex	Age (years)	Grade	Parents	Education level	Occupations	Age (years)	Marital status	Number of siblings
A	Male	10	4	Mother	Junior high school	Work for hire	29	Living together	2
B	Female	11	5	Father	Vocational certificate	Motor car mechanic	41	Living together	3
C	Male	12	6	Mother	Elementary school	Unemployed	47	Living together	2
D	Male	12	6	Mother	Elementary school	Housekeeper	40	Divorced	2
E	Male	12	6	Mother	Elementary school	Agriculture	49	Living together	2
F	Female	10	4	Father	Vocational certificate	Motor car mechanic	41	Separated	3
G	Female	11	5	Mother	Vocational certificate	Work for hire	57	Living together	3
H	Female	12	6	Mother	Junior high school	Employee	43	Living together	2
I	Male	10	4	Father	Vocational certificate	Employee	37	Living together	2
J	Male	12	6	Mother	Vocational certificate	Trade	46	Living together	3

Codes, Subthemes, and Themes

The results were organized into two themes: 1) Cause of inhibitory control, and 2) Promotion of inhibitory control among parents and teachers. Within theme one, there are two subthemes: internal factors and external factors. These subthemes are further divided into three categories: personality, having a good sense of self, and habits of success. The emerging external factors were later further broken down into family engagement, spending free time doing a joint activity, and communication between parents and students. Within the second theme, two subthemes emerged: 1) The promotion of children's inhibitory control skills by parents surfacing at home was subsequently categorized into two groups: family communication patterns and activities in which parents encourage their children's participation, and 2) The promotion of these students' inhibitory control skills by teachers surfacing at school were further categorized into two groups: active learning and focused attention in the classroom.

Theme 1: Cause of Inhibitory Control

At a good level, the children recognized two categories for causes of inhibitory control: external factors and internal factors. The external factors were identified as follows: According to the in-dept interview, family engagement, which refers to family bonding, was found to result in the student remembering the family, experiencing sympathy, attention, concern, intimacy, and mutual support within the family, and prioritizing doing the right thing over their own desires.

> "I have to take care of my brother. I go back and play with our three-year-old sister. I just take care of her before doing something, I help her; I wipe her; maybe I run to her." (Boy A)

During holidays, parents often have the opportunity to spend quality time with their families by engaging in activities such as assisting mothers in selling, preparing meals, participating in group games, watching films, and enjoying each other's company.

> "I engage in the practice of purchasing items at a low cost and subsequently selling them at a higher price for financial gain. Additionally, I dedicate my time on Saturdays and Sundays to assisting my mother. I spend the entire day with my mother during my leisure time." (Girl B)

Finally, the communication between parents and children focused on self-obedience and obedience to the parent's teaching; understanding the good intentions of teaching. When a conversation takes place between parent and child, smooth communication causes self-satisfaction, such as the pleasure the parent accrues.

> "There are parents who want to recommend it, and we might think of it ourselves at times. Parents recommend it for everyday routines, such as doing homework and finishing it. Mother doesn't always use positive words. These skills are useful because we can utilize them as we mature, especially considering that our parents may not be present throughout our entire journey of growing up." (Girl G)

Three internal factors determine individual causal factors: 1) Personality or individual characteristics, such as responsibility; 2) Having a good sense of self; and 3) Habits of success, such as setting goals and exertion. Responsibility involves being aware of one's duty, working at home, completing homework, and performing other tasks assigned by a parent without needing a reminder. It also means not wasting a day off and instead engaging in activities that provide rest and relaxation, such as painting, taking care of pets, or playing games on phones.

> "I like to draw and paint, but it's conditional on finishing my homework. Usually when I get home, I first attend to my homework. Then, I can pursue my hobby of painting and sketching. Next, I might go to see my grandmother, who works at the local hospital. She lets me play game apps on her smartphone." (Boy A)

Feeling good about oneself, being proud of one's abilities, skills, special abilities, self-efficacy, and staying focused and engaged in one's own activities are important. People need to do it and enjoy it. As in the words of one key informant: "I know what I can do best. Besides art, when I study art, I do well and get good grades. I'm satisfied with what I've done, and I'll score highly on those assignments." (Girl F)

Goal setting is what a person sets themselves to do with the goal of leading their thoughts towards performing good deeds. A person needs to make themselves aware of what to do. There are both short-term goals, such as high marks at school, and longer-term objectives, such as being a veterinarian or teacher. Once a person knows what their life aspirations are, they try to achieve those goals for the benefit of themselves and their future family. If a person can achieve their goals, they can boost their self-esteem, recognizing that they are capable. In the words of another key informant.

> "I want to be a teacher while also aspiring to be good at football. I believe that becoming a teacher is important because it will allow me to share knowledge with those who study under me and help them pass their knowledge on to others. I also want to play football well in order to help my team win." (Boy I)

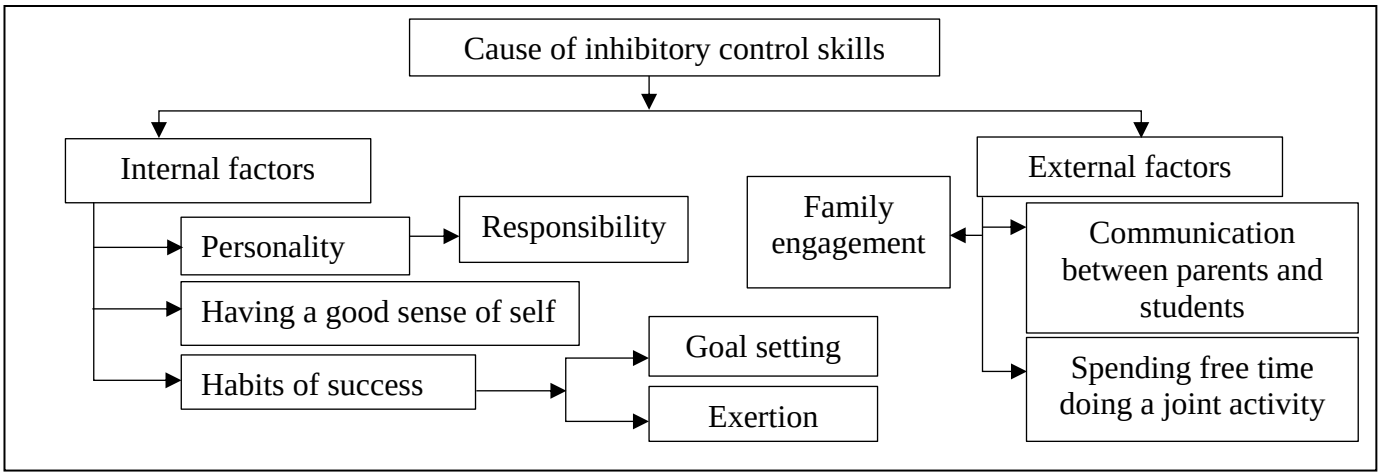
Exertion refers to the act of students not being able to overcome any challenges unless they establish specific goals in their thoughts as a reminder. This requires them to be aware, make a strong effort, be dedicated, and persevere, both academically and in their work. They must persevere diligently without taking any unnecessary breaks or prematurely giving up. In the words of one key informant.

> "I've never done my friend's homework. If I did, I might not do it well enough, and that would cause my friend hardship. Even though group work may be more fun, it is better for each person to do their own homework in order to feel a genuine sense of accomplishment." (Girl B)

The causes of inhibitory control are summarized in Figure 2.

Figure 2

Causes of Inhibitory Control in School-Age Children (9–12 years)



Theme 2: Promotion of Inhibitory Control Among Parents and Teachers

Subtheme 2.1: Promoting Inhibitory Control at Home

Parents in this study explained the ways they enhance the inhibitory control skills of their children under two subthemes: "communication pattern in the family" and "activities parents invite their children to do".

Communication pattern in the family

The first pattern entails a mutually agreed-upon set of rules and expectations the youth is required to adhere to. These rules are established by voluntary discussion and agreement between the youth and their parents, without any unforeseen hurdle, such as an interview. In the words of one parent:

> "I might start by asking: 'Shall we engage in a brief period of play?' Upon completion of the school day, it is imperative that there is engagement in the task of completing homework. The primary imperative is to possess a willingness to engage in diligent study, to be prepared to engage in daily study sessions, and to prioritize the completion of assignments." (Parent of Child D)

Second, the parents use communication, such as examples of events, videos, clips, and news, to help their child(ren) understand and provide guidance on the adverse consequences of their actions.

> "I demonstrate that when the battery is depleted, the device will not function until it is recharged. By presenting a video tutorial on phone usage, I illustrate how one can easily comprehend and follow instructions. It is crucial for parents to prevent their children from accessing a smartphone for inappropriate use." (Parent of Child J)

Third, the pride commendation asserts that parents employ verbal communication with their children to foster a familial bond rather than solely to motivate them. The aim is to instill in them a sense of self-assurance, acknowledge their capabilities, encourage them to strive for excellence, and value their endeavors or talents. As in the words of one parent key informant:

> "There is a commendation or statement to express advancement, such as, 'I have matured and am virtuous.' I have come to understand that verbalizing a compliment is not necessary on every occasion. It will still be regarded as a kind of praise." (Parent of Child A)

Finally, listening to opinions helps a person to recognize that they need to be open and communicative, assertive in expressing an opinion, and confident enough to consult, ask questions, exchange opinions, and accept one another within the family. There are no barriers. Respect for each other's opinions is an expression of identity acceptance, as articulated in one of the in-depth interviews:

> "Together, consult, play, be friends, raise this youth like a friend—there is a lot to talk about. Whether it is about things like food, asking for everyone's opinions, such as what they don't like or what they want to eat." (Parent of Child B)

Activities that Parents invite Children to do. This subtheme illustrates the activities that parents invite their children to do in order to practice their inhibitory skills, allowing them to open up about opportunities or experiences. Rain training is an exercise for children to learn the value of things. In this role play, parents do not respond immediately to a request. There are waiting periods. There is an opportunity for the youth to start doing their own activities through daily routines. According to the perception of parents, it is a practice for the child to know the value of something. The parents do not respond instantly to what the child wants. There's a period of waiting. There are several reasons for discussing waiting with the child, including family income and flexibility. Additionally, it is important to practice small tasks like counting from 1 to 10 and saving money to buy something the child wants now. As expressed in one of the in-depth interviews:

> "The child has 20 baht available each day to top up his phone. He has to see the value of money as a gateway to satisfaction with the phone; otherwise, he will not take care of it." (Parent of Child E)

Moreover, parents perceive assigning homework to children as a means of developing their endurance and fostering a consistent sense of responsibility. By taking on tasks such as completing assignments, assuming responsibility, organizing their time, and prioritizing their obligations before engaging in leisure activities, individuals can cultivate self-reliance. The specific tasks undertaken may vary depending on age, ranging from simple chores like fetching water to more complex responsibilities like assisting parents in a food shop business, painting the house, or doing the laundry. As stated during an in-depth interview: "The youth assists their mother by completing tasks, such as filling the water container, folding clothes, and washing the kitchenware. The youth also assists their father by peeling garlic." (Parent of Child H)

From the parental perspective, a family group activity refers to engaging in a shared endeavor during leisure time. It is a collaborative endeavor. This activity entails collaborative participation by multiple individuals. There are explicit guidelines for collaborating as a team that must be mutually acknowledged. Engaging in activities such as cycling, competing, and achieving success helps children develop good control. Additionally, participating in sports (e.g., badminton, volleyball, etc.) promotes physical well-being. Furthermore, engaging in activities like playing word games on phone apps can be beneficial.

> "There will come a point in time when the child experiences weight loss. They will triumph every evening, receive an invitation to participate in the game during certain hours, with the family joining them in the game." (Parent of Child D)

Subtheme 2.2: Promoting Inhibitory Control at School

Teachers explained the methods they use to enhance the inhibitory control skills of students under two subthemes: "active learning" and "focus attention in the classroom".

The promotion of inhibitory control skills at school refers to the guidelines and processes used in classroom activities, both directly and indirectly. "Active learning" does not focus on content but on the process of creating experiences for students in various ways, such as assuming roles, group activities, using music, compiling clips, etc. As stated by one of the key informants:

> "I personally don't think there's a school that focuses on developing inhibitory control skills. The most relevant thing I'm using right now is active learning. I actually use active learning, which emphasizes student involvement. It gives students a chance to do more than just study the content of the text. If they remember what I've done, it will be group activities and engaging in realistic role play to promote learning in a fun way." (Teacher E)

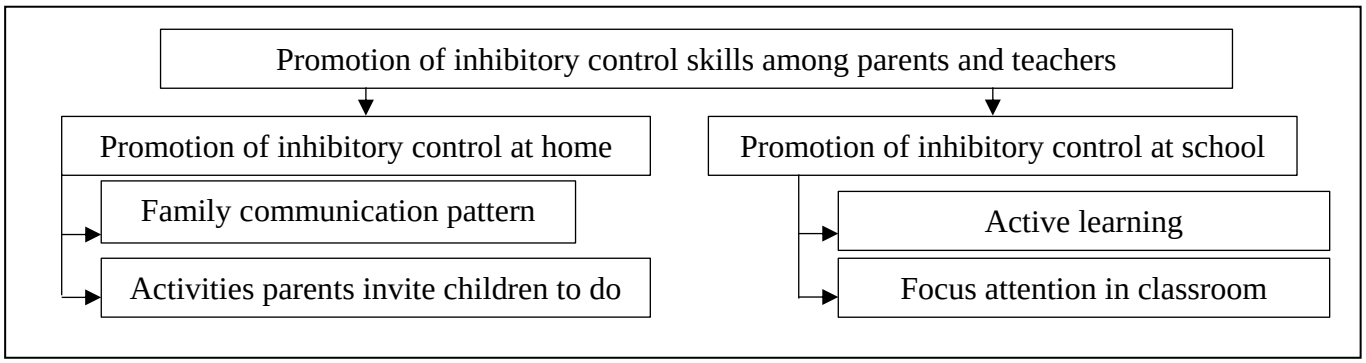
Teachers can also enhance inhibitory control abilities in the classroom setting by engaging in another activities, such as concentrating prior to class, participating in lesson sharing, revisiting instructions, incorporating fundamental concepts, and engaging in discussions involving real-life situations.

> "Previously, I would frequently segment the lessons, incorporating breaks to review the instructions and assess the child's comprehension. Additionally, I would occasionally incorporate moral anecdotes into my teaching, drawing inspiration from Thai teaching methods, with a particular emphasis on honesty. In the event of news or a popular event, students might enquire about the course of action to take as a student. Alternatively, if a meditation practice was available, we could engage in that. Subsequently, in the event the youngster failed to remain silent, they would be told in a hushed manner." (Teacher A)

The promotion of inhibitory control among parents and teachers are summarized in Figure 3.

Figure 3

Promotion of Inhibitory Control among Parents and Teachers



Discussion and Conclusion

Discussion

Two themes emerged from the results of this study, the first being the cause of inhibitory control. There are two subthemes under this topic, namely internal factors and external forces. These subthemes were further separated into three categories: personality, having a good sense of self, and habits of success. While the external influences became apparent, they were further divided into three categories: family engagement, spending free time doing a joint activity, and communication between parents and students. In line with the fundamental principles of social learning theory, it is posited that behavior is not solely

influenced by environmental factors. Rather, personal factors such as intelligence, biology, and other internal aspects also play a role. It is further argued that these individual factors must interact with behavior and environmental elements in a mutually-influential manner, a concept known as reciprocal determination (Bandura, 1977). Internal factors are associated with students having a good level of self-determination: 1) personality, such as responsibility; 2) having a good sense of self; and 3) habits of achievement consisting of goal setting and exertion. The surrounding environment, rather than individuals directly, is responsible for the causal factors outside. This part of the research confirms that perceived student complacency is a contributing causal factor, in addition to the findings from the literature review. The participants were school-age children at Nakhon Pathom Primary Educational Service Area District Office 2, 10 students with good inhibitory control, who came from low to moderately-educated parents working for hire. This affects the amount of time spent they can spend engaging in activities with their children. Another study found a link between declining socioeconomic (educational occupation and family income) conditions and the basic building blocks of brain development, and the EF of thinking, specifically the ability to inhibit impulsively (Brydges et al., 2012; Diamond, 2013).

According to the findings, it is evident that positive communication can foster creative, positive emotions in youngsters, thereby promoting emotional stability (Davies & Cummings, 1994). Engaging in collaborative activities between children and parents does not need to be costly but a straightforward endeavor involving the entire family spending time together. Even during working hours, parents have the opportunity to foster connections and engage in collaborative endeavors with their children. Engaging in activities such as assigning duties to children, watching movies on Sundays together, and playing with parents can foster the development of inhibitory control skills through the establishment of supportive raising patterns. A study conducted by Sosic-Vasic et al. (2017) revealed a correlation between the cognitive patterns of supportive rearing for 11–14-year-olds and the development of inhibitory control skills. In addition, increased parental support and the use of open-ended enquiries in communication were found to enhance the development of a child's inhibitory control skills. Having a good sense of self is similar to self-efficacy but also involves a sense of self-righteousness. It is crucial to cultivate a sense of personal pride. Youths need to acknowledge the diverse facets of their aptitudes, particularly in relation to the acquisition of knowledge and the concept of unique capabilities. When a child possesses self-awareness of their own abilities, positive outcomes are likely to manifest. In line with the assertion by Evans and Stanovich (2013), if a person possesses a perspective of their own capability, they will demonstrate that capacity, manifested in the capacity to exhibit tolerance, industrialization, non-regression, and ultimately success. According to Zahodne et al. (2015), having a strong sense of self-efficacy is linked to improved attention and inhibitory control abilities.

Common strategies for improving inhibitory control abilities involve engaging in activities with youngsters. This aligns with the recommendations of the Center on the Developing Child at Harvard University (2011), which advises enhancing and cultivating EF skills in youths aged 9–12 with the aim of providing stimulating activities or games. The intricacy of strategies in managing a game enhances self-assurance. A card game with a variety of forms to capture the child's interest or one that pairs players based on numerical values can improve inhibitory control. Furthermore, within the context of gaming, it is imperative to stimulate attention and focus and stop responding when stimuli are appropriate.

Nevertheless, it is noteworthy that employing various modes of communication can facilitate the development of inhibitory mechanisms in youngsters. Discovering that enhancing one's ability to control impulses at home through various forms of communication can lead to an engaging scenario. Initially, before the process of inhibition, the listening phase should be structured as a form of positive communication. The study by Samuelson et al. (2012) suggests that a positive maternal upbringing, as perceived by students aged 7–16 years, is associated with the development of managerial thinking skills, particularly in the domains of planning, inhibitions, and problem-solving effectiveness.

According to the teachers, the promotional subthemes surfacing on students' inhibitory control skills can be further categorized into two groups: active learning and focused attention in the classroom. Active learning is a cognitive process that fosters continuous student engagement and interaction. This approach emphasizes the individual's existing understanding, motivation, and interest and encourages them to become an enthusiastic creator of knowledge through their awareness and interaction with physical phenomena (Shroff et al., 2021). According to the findings:

> "The most relevant thing I'm using right now is active learning, which is mostly designed to train students with the skills they need in the twenty-first century. It gives students a chance to do more than just study the content of the text. If they remember what I've done, it will be through group activities and engaging in realistic role play to promote learning in a fun way." (Teacher E)

Nevertheless, previous research primarily relies on correlation studies, such as investigations into factors that affect inhibitory control (Gerber et al., 2021; Xing et al., 2019), which is quantitative research. Thus, by using qualitative research, this study bridges the knowledge gap concerning the causes of inhibitory control by focusing on the real-life perspectives of student experiences in the Nakhon Pathom Province, a semi-urban area of Thailand. The results of this study will aid the understanding of the underlying reasons behind the development of inhibitory control, particularly from the perspective of parents and teachers.

Limitations

This study focused solely on the content obtained from in-depth interviews with students to explore the proficiency of inhibitory control skills. However, the study did not include an examination of a cohort with a lower degree of inhibitory control skills to identify any hindrances.

Implications for Behavioral Science

The integration of psychology and neuroscience is necessary to comprehend the cause-and-effect relationship of inhibitory skills, as revealed by the qualitative research findings in this study. Collectively, there has been an improved understanding of the factors linked to inhibitors and strategies to enhance children's inhibition abilities both at home and in school. Furthermore, parents used the results tailored to their parenting style, while teachers used classroom teaching guidelines. Furthermore, the Office of Basic Education could implement a policy brief to enhance inhibitory skills in public schools, thereby contributing to the development of children through brain vaccination.

Conclusion

The results of this qualitative study highlight the personal and environmental factors that contribute to inhibitory control skills. These characteristics include personal factors such as personality traits and a sense of responsibility, as well as external elements such as family dynamics and activities that promote communication and skill development at home. Similarly, efforts to enhance inhibitory control skills in schools focus on active learning approaches and attention-stimulating activities. The findings of this study can be used to inform guidelines for the development of inhibitory control, the primary constituent of EF.

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Declarations

Conflicts of Interest: The authors declare no conflicts of interest.

Ethical Approval Statement: Approval for this research was obtained from the Institution of the Human Research Ethics Committee of Srinakharinwirot University (SWUEC-G-424/2565E/) on 21 November, 2022

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