

T.C.
ANKARA YILDIRIM BEYAZIT UNIVERSITY
THE GRADUATE SCHOOL OF SOCIAL SCIENCES

EXPLORING THE EFFECTS OF PROCEDURAL AND DECLARATIVE METACOGNITION ON SOCIAL PROBLEM SOLVING STRATEGIES IN PRESCHOOL CHILDREN

MASTER'S THESIS

Emine Zehra KASAP

DEPARTMENT OF PSYCHOLOGY

Ankara, 2023

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MASTER OF ARTS

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Ankara, 2023

APPROVAL PAGE

The thesis, prepared by Emine Zehra Kasap and titled "Exploring the Effects of Procedural and Declarative Metacognition on Social Problem-Solving Strategies in Preschool Children" is accepted by a unanimous vote as a Master's thesis at Ankara Yıldırım Beyazıt University, Institute of Social Sciences, Department of Psychology.

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PLAGIARISM PAGE

I hereby declare that all information in this thesis has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all materials and results that are not original to this work; otherwise, I accept all legal responsibility. Date (14-06-2023)

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to those who are aware of themselves

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ABSTRACT

Exploring the Effects of Procedural and Declarative Metacognition on Social Problem Solving Strategies in Preschool Children

Previous research in the field has been limited to proposing a potential association between metacognition and social problem-solving abilities in preschool children, without providing empirical evidence to support this assertion. The aim of this thesis study is to investigate the extent to which metacognitive skills (procedural metacognition and declarative metacognitive knowledge) are associated with social problem-solving strategies in the preschool age group. In total, 30 children aged between 51 and 70 months (M_{months} = 60.16, SD_{months} = 6.33) participated in the study. Metacognition was assessed using two different measures in the context of a problem-solving puzzle task. A procedural Metacognition Coding Scheme (ProMeta) was developed for this study, which aimed to capture both procedural metacognition (monitoring and control behaviors) and failure of procedural metacognition during the puzzle task. The Metacognitive Knowledge Interview was used to evaluate declarative metacognition (knowledge of people, task, and strategies) related to the puzzle task. The children's social problem-solving strategies (generation of compromising vs. submissive/self-serving strategies) were evaluated by analyzing their solutions in response to 3 vignettes depicting peer disagreement. Results showed that declarative and procedural metacognition exhibited a positive but non-significant relationship with each other. Hierarchical regression analyses were conducted to assess the influence of procedural metacognition and declarative metacognition on social problem-solving strategies while controlling for age. The results revealed that declarative metacognition was a significant predictor of generating compromising solutions to social problems, whereas procedural metacognition did not have a predictive effect in this relationship. Failure of monitoring behaviors significantly predicted generating submissive/self-serving strategies to peer disagreement. Overall, the results of this study highlight the importance of conscious awareness and articulation of metacognitive skills (declarative metacognition), rather than employing them at the procedural level. The results were discussed in light of the relevant literature in terms of theoretical and practical implications.

Keywords: metacognition, preschool children, social problem-solving,

ÖZET

Okul Öncesi Çocuklarda İşlemsel ve Bildirimsel Üstbilişin Sosyal Problem Çözme Stratejileri Üzerindeki Etkilerinin Keşfedilmesi

Önceki araştırmalar, üstbiliş ile sosyal problem çözme becerileri arasında olası bir ilişki önermiş ancak bu iddiayı destekleyecek ampirik kanıtlar sunmamıştır. Bu tez çalışmasının amacı, üstbilişsel becerilerin (bildirimsel üstbiliş bilgisi ve işlemsel üstbiliş) okul öncesi dönemdeki çocuklarda sosyal problem çözme stratejileriyle ilişkisini araştırmaktır. Çalışmaya toplamda 51 ile 70 ay arasında (Ort_{ay} = 60.16, SS_{ay} = 6.33) yaşlarındaki 30 çocuk katılmıştır. Üstbiliş, bir problem çözme görevi bağlamında iki farklı ölçüm aracı kullanılarak değerlendirilmiştir. Bulmaca görevinin çözümü sırasında işlemsel üstbiliş (izleme ve kontrol davranışları) ve işlemsel üstbiliş başarısızlığını değerlendirmek amacıyla İşlemsel Üstbilişsel Davranışları Kodlama Manueli (ProMeta) geliştirilmiştir. Bulmaca göreviyle ilgili bildirimsel üstbilişi (insanlar, görev ve stratejiler hakkındaki bilgi) değerlendirmek için Üstbilişsel Bilgi Mülakatı kullanılmıştır. Çocukların sosyal problem çözme stratejileri (uzlaşmacı vs. boyun eğen/kendine hizmet eden stratejiler), akran anlaşmazlığını tasvir eden 3 senaryoya verdikleri çözümler analiz edilerek değerlendirilmiştir. Sonuçlar, bildirimsel ve işlemsel üstbiliş arasında pozitif ancak anlamlı olmayan bir ilişkinin olduğunu göstermiştir. İşlemsel üstbiliş ile bildirimsel üstbilişin yaş faktörü kontrol edilerek sosyal problem çözme stratejileri üzerindeki etkisini incelemek için hiyerarşik regresyon analizleri yapılmıştır. Regresyon analizi sonuçlarına göre, bildirimsel üstbilişin okul öncesi çocukların sosyal sorunlara uzlaşmacı çözümler üretme becerisini anlamlı ölçüde yordadığını göstetrmiştir. Öte yandan, işlemsel üstbiliş ve bileşenlerinin bu ilişkide yordayıcı bir etkisi bulunmamıştır. İzleme davranışlarının başarısız olması, akran anlaşmazlıklarına boyun eğen/kendini düşünen stratejiler üretmeyi anlamlı ölçüde yordamıştır. Genel olarak, bu çalışmanın sonuçları, üstbilişsel becerilerin bilinçli farkındalığının ve bu becerileri açıklayabilmenin (bildirimsel üstbiliş) önemini vurgulamaktadır. Sonuçlar, ilgili literatür ışığında teorik ve pratik çıktılar açısından tartışılmıştır.

Anahtar Kelimeler: okul öncesi çocuklar, sosyal problem çözme, üstbiliş

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LIST OF SYMBOLS/ABBREVIATIONS

CPPRG : Conduct Problems Prevention Research Group

Mc : Metacognition

McK : Metacognitive knowledge

McKI : Metacognitive Knowledge Interview

ProMeta : Procedural Metacognition Coding Scheme

SR : Self-regulation

SRL : Self-regulated learning

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1. INTRODUCTION

The preschool period is an important developmental stage where peer interaction starts and evolves (Shantz & Hartup, 1992). During these peer interactions, conflict may arise when children's efforts to reach their goals are inhibited by other children (Chen et al., 2001). Social conflicts offer young children the opportunity to practice problem-solving (Chen et al., 2001), and, in the process, they can monitor their own perceptions and develop new strategies while interacting with others (Baker, 2010). Employing effective conflict-resolution strategies during conflicts is important for the psychological well-being and adjustment of children such as relationship maintenance skills, higher peer acceptance, and higher social understanding (Borbely et al., 2005; Eisenberg & Garvey, 1981; Shantz & Hartup, 1992). To navigate through these social conflicts, children need to organize their knowledge about the situation, generate solutions, and reach a compromise that benefits all parties involved (Pieng & Okamoto, 2020). This necessitates an understanding of the different perspectives and goals of multiple parties involved in the situation, leading to the formulation of a balanced and effective strategy (Spivak, 2016). Such ability serves as an indicator of metacognitive knowledge and skills.

Studies on children's social cognition rely on social information processing models as theoretical frameworks to understand the cognitive processes involved in generating behavioral responses during social interactions (Crick & Dodge, 1994). According to the Social Information Processing Model (Crick & Dodge, 1994), a child's response to a situation is hypothesized to be determined by six steps: i) encoding relevant internal and external cues, ii) interpreting those cues, iii) choosing a goal, iv) accessing potential responses, v) selecting an appropriate response, and vi) enacting that response. Children who effectively perform each of these steps are deemed to possess higher social competence. In parallel with social information processing models, several models of metacognition adopt a similar approach to the regulation of cognition (e.g., Flavell, 1979; Nelson & Naren, 1990). According to Nelson and Naren's (1990) model of metamemory processes, metacognitive skills are higher-order mental functions that encompass a series of cognitive processes enabling the child to engage in monitoring their own thinking, modify or control their behavior based on these monitoring processes, and successfully sustain the information flow

between monitoring and control to learn or solve problems (Brown, 1987; Nelson & Naren, 1990).

Metacognitive abilities are crucial for evaluating one's cognitive processes and implementing strategies and operations based on these evaluations (Brown, 1987; Nelson & Naren, 1990). Flavell (1979) described metacognition as "thinking about thinking" and emphasized its multifaceted nature, including metacognitive knowledge, experiences, goals, and strategies interacting together to facilitate problem-solving. According to his model, metacognitive knowledge includes understanding individual differences in cognitive processes (knowledge of *people*), knowing the requirements and constraints of specific tasks (knowledge of *tasks*), and being aware of various strategies, their effectiveness, and how to apply them (knowledge of *strategies*). By building upon the concept of metacognition, the importance of metacognitive abilities becomes apparent in social problem-solving.

One of the key points of social problem-solving success depends on the child's ability to choose the strategies that offer a way to solve the problem in a balanced way and in line with the desires of multiple parties involved in the situation (Eisenberg & Garvey, 1981). For example, based on the definition of metacognition, it could be a set of metacognitive processes for a child a) to recognize that there are different desires of both parties in conflict, b) to understand there are solutions beyond automatic and dominant responses (i.e., fulfilling solely one's own wishes or those of the opposite party) to end a conflict, and c) to reach a decision, or applying a successful strategy that balances both desires. This type of reasoning should require the child's ability to discern individual differences, such as opposing needs and perspectives, which in turn facilitates informed decision-making about their own cognitive processes and interactions with others in various cognitive tasks and activities. Furthermore, it involves critically evaluating the advantages and disadvantages of each aspect of the situation and considering the situation as a whole (Zimmerman, 2000). In essence, it entails monitoring and regulating one's thoughts and expressing knowledge about relevant cognitive processes (e.g., Efklides, 2008).

For example, suppose two children are working on their own puzzles and they find out that they need the same piece of the puzzle to complete their puzzle constructions. In order to find a compromising solution to this problem, a) they both need to understand each other's perspective, acknowledging that they have both built different constructions and both need the same missing puzzle piece, b) understand there should be solutions beyond giving the

piece to the friend or insisting on holding the piece, and c) reaching a balance that benefits both parties, such as agreeing to reduce the size of their own construction so they can use the puzzle piece they need. This way, they can both achieve their goals. In this example, the child is required to monitor possible alternative solutions, modify them in their mind and articulate it in order to reach a compromise. Therefore, individuals with higher metacognitive abilities should also generate higher social problem-solving strategies. Therefore, it is crucial to assess social problem-solving within the theoretical framework of metacognition. Yet, empirical knowledge is limited on whether or how the metacognition and social problem-solving strategies of preschoolers relate to each other.

There is, however, theoretically based evidence to conceive them as interrelated concepts, with metacognitive abilities potentially affecting what kind of strategies preschoolers use to navigate peer-to-peer social problems (Zimmerman, 2000). In the pursuit of a better understanding of social problem-solving in preschoolers, this thesis holds the aim of gaining improved insights into the development of social problem-solving strategies of preschoolers by examining the intersection between the social and metacognitive domains. Overall, this study is significant due to its aim of providing empirical data on the association of social problem-solving strategies and metacognitive knowledge and skills.

2. SOCIAL PROBLEM SOLVING SKILLS of PRESCHOOLERS

Longitudinal research provides compelling evidence that early experiences significantly influence and shape subsequent functioning, including social competence (e.g., Denham et al., 2003). Social competence is a broad concept that encompasses various social-cognitive processes, including skills related to understanding emotions (such as recognizing and labeling emotional expressions; Blankson et al., 2013), perspective-taking (which involves understanding others' emotions and thoughts; Kampis et al., 2023), and problem-solving (which includes identifying problems, generating solutions, evaluating them, and planning future actions; Fenning et al., 2011). Enhanced social cognitive processes lead to prosocial problem-solving strategies, as well as positive outcomes such as responsibility, cooperation, self-control, and assertiveness in social interactions (Fenning et al., 2011). The present study specifically focuses on investigating the social problem-solving strategies of preschool children in relation to their metacognitive knowledge and skills.

2.1. The Nature and Frequency of Social Conflicts in Preschool Period

Social conflicts are the natural part of preschoolers everyday living, enabling them practicing the ways of satisfactory conflict resolution strategies as they mature. However, it is important to understand the frequency and themes of conflicts that arise among preschoolers to assist them in navigating through these conflicts. Chen et al. (2001) conducted observations in naturalistic classroom settings involving 400 dyads of preschoolers aged 2 to 5 years old. They reported that 322 of these interactions ended up in generating a conflict event during two separate 5-min observation session. Spivak (2016) reported that out of 107 4- to 7-year-olds observed, 106 of them actively engaged in at least one conflict over the 6-week observation period. It has been shown between the ages of 2 and 5, there was a change in the types of conflicts experienced, with a transition from concrete material issues (e.g., distribution of resources) to those that were primarily related to social aspects (e.g., conflict about play and ideas).

For example, Hartup et al. (1988) and Laursen and Hartup (1989) conducted an observation-based study to explore and compare the frequency, duration, and intensity of conflicts between young children and their friends with conflicts between children who are

not friends. The study identified four main conflict-resolution strategies employed by the children: (i) standing firm and verbal/physical insistence, (ii) negotiation and bargaining, (iii) disengagement (i.e., ignoring each other), and (iv) third-party intervention. Based on this categorization, from the most to the less frequently applied strategies were standing verbal/physical insistence on their own goal, disengagement from the problem, and negotiation (e.g., compromising, providing explanations, and yielding). They showed that preschool-aged children mostly used strategies that maintained their interests and rarely considered the opponent's needs. Relatedly, the findings of a meta-analysis also showed that children apply more frequently to coercion than negotiation to resolve their conflicts (Laursen et al., 2001).

2.2. Social Problem-Solving Strategies of Preschool Children

Children may apply an array of strategies to resolve conflict and there are several classifications on what strategies children use when conflict appears (Joshi, 2008). It has been well-documented that children who approach conflicts in prosocial ways like sharing, helping, and forgiving have more adaptive social skills such as higher responsibility and cooperation (Fenning et al., 2011). On the contrary, antisocial behaviors such as physical force or name-calling in navigating social problems are associated with maladaptive outcomes including exclusion by peers, withdrawal, and aggressive behaviors (Webster et al., 1999).

The categorizations of children's social problem-solving strategies vary based on the specific research objectives being targeted. Some researchers have taken an exploratory approach to studying conflicts in young children (e.g., Chen et al., 2001), while others have employed various categorization systems to examine their association with specific outcomes, such as social skills (e.g., Fenning et al., 2011). Given that children were found to apply coercion more often than negotiation when attempting to resolve conflicts (Laursen et al., 2001), it is important to identify the determinants of social problem-solving strategies with positive relational outcomes such as peaceful post-conflict interaction, rather than solely focusing on conflict termination (Spivak, 2016).

Mayeux and Cillessen (2003) aimed to explore and analyze the most frequently used social problem-solving strategies among young children and investigate how these strategies

relate to their future social competence as measured by peer status. The authors defined eight categories of strategies in response to a hypothetical conflict with a peer: requesting a solution to be reached (e.g., “request to play together”), displaying antisocial behavior (e.g., “taking away from the child”), showing assertiveness (e.g., “expression of one's own wish”), avoiding conflict (e.g., “starting to play what the other child wants to”), avoiding solution (e.g., “play alone without negotiation”), requesting help (e.g., “request help from a peer”), displaying prosocial behavior (e.g., “attempt to redeem the relationship”), and using manipulation (e.g., “tricking, sneaking, or bribing”). The findings of the study revealed that children with higher peer acceptance displayed a tendency to employ problem-solving strategies such as requesting a solution, being assertive, and responding in a prosocial manner. On the other hand, they were less inclined to suggest ineffective strategies such as avoidance, manipulation, or seeking help from peers or teachers. While this longitudinal study aimed to identify strategies that are associated with later peer acceptance, it did not provide a classification regarding the extent to which positive strategies encompass mutual satisfaction between peers, that is, compromise. For example, showing assertiveness would be positively associated with higher acceptance from peers, but does not guarantee a mutually agreed solution to the conflict.

Similarly, the Social Problem Solving Measure (Conduct Problems Prevention Research Group [CPPRG], 1991), which is a frequently used tool for assessing social problem-solving strategies of children, includes eight illustrations portraying two types of social situations. Half of the drawings depict a child who desires to participate in an activity with other children, thus requiring the participant to actively seek ways of social involvement. In the remaining drawings, a child experiences teasing or frustration from another child, thereby requiring the participant to address and resolve the social conflict. For example, one of the scenarios asks the child to imagine themselves in a situation where another child has been on the swing for a long time and does not want to share. The children were prompted to come up with possible strategies to take a turn on the swing. Their responses were classified into three broader categories: prosocial, impulsive-aggressive, and verbally aggressive. Prosocial strategies included simple asking (e.g., “Can you please get off?”) and positive negotiating (e.g., “I think we should build more swings”). Impulsive-aggressive strategies were physically aggressive (e.g., “Just take the swing from her”) and disruptive strategies (e.g., “Just interrupt and annoy her”). Verbally aggressive strategies included verbal aggression (e.g., “You’re mean”) and threatening to seek authority (e.g.,

“Let me swing on it or I’m going to tell the teacher”). As mentioned earlier, in this categorization system, only solutions that involve positive negotiation strategies can be categorized as compromising strategies, which aim to reconcile the opposing needs of the conflicting sides. The remaining strategies would align with either submissive or self-serving strategies, where children display either a submissive or dominant role.

Some researchers adopted a broader view and classified the conflict resolution strategies based on whether a given strategy coordinates both the target’s and other’s points of view in reaching a solution. For example, Eisenberg and Garvey (1981) classified solutions with coordination of both parties’ needs as “adaptive” and those lacking coordination as “maladaptive”. In a similar vein, Pieng and Okamato (2020) employed the same categorization system, referring to strategies that acknowledge the needs of the opponent as "other-oriented strategies," while those disregarding the opponent's perspective were labeled as "self-oriented strategies." The purpose of their research was to understand whether a higher level of intention understanding contributes to the higher utilization of other-oriented strategies in conflicts with peers.

Other oriented strategies included (i) requests for explanation, (ii) compromise, (iii) submission, and (iv) conditional directive. A request for an explanation asks the opponent child to clarify their goal, e.g., “Why do you need this?”. A compromising solution offers the opponent a balanced way, e.g., “You go first. I’ll go after you.” A submissive strategy is giving in to the opponent, e.g., “Here you go. I don’t want it anymore”. Lastly, a target uses a conditional directive to fulfill a promise to the opponent under certain conditions that the opponent must follow through, e.g., “I am not going to play with you if you take it away.” Other oriented strategies have been shown to be associated with a better understanding of opponent’s intentions (Pieng & Okamoto, 2020).

On the other side, self-oriented strategies included (i) insistence, (ii) mitigation/aggravation, (iii) offering reasons, (iv) teasing/name-calling, and (v) physical force. A target applies insistence to impose their own wants on the opponent repeatedly, e.g., “Mine! Mine! Give! Give!”. Mitigation/aggravation occurs when the child supports their own goal, e.g., “Will you please give it to me? I want it!”. A target child offers reasons to convince the opponent, e.g., “I want this piece to build my own castle”. A target child applies teasing/name-calling to pursue their own goal, “You are stupid, you can’t do it”. Lastly, physical force could occur when the target kicks, bites, hits, etc. the opponent to insist on

their own goal. As outlined above, since this research aims to examine the relationship between intention understanding and other-oriented strategies, the other-oriented strategies solely focus on recognizing that the other person has needs that differ from one's own, even if they do not directly contribute to mutual satisfaction. For instance, a child may understand the intention of an opponent and employ a submissive strategy during a conflict, but this may not guarantee mutual satisfaction. Building on this reasoning, it is important to note that although a strategy might be conciliatory, it may not necessarily involve compromising.

To provide an example of this point, Spivak (2016) divided the conciliatory conflict resolution strategies into "prosocial behaviors" versus "non-prosocial conciliatory behaviors" to understand specifically which conciliatory strategies are associated with mutually beneficial (win-win) resolution and peaceful interaction after conflict termination. Prosocial conciliatory behaviors include the voluntary acts of sharing, helping, aiding, and cooperating for the well-being of others (Mayeux & Cillessen, 2003). However, non-prosocial conciliatory behaviors include i) amicable verbal clarification/apologies (e.g., conveying a feeling of regret), ii) compliance-oriented behaviors (such as following the direction of the conflict partner), and iii) solution-oriented behaviors which cover the amicable but non-prosocial attempts to reach a solution (e.g., "Let's not fight"). The findings of this study indicated that only prosocial strategies predicted mutually beneficial (win-win) resolutions and peaceful post-conflict interaction. Whereas compliance-oriented behaviors, and verbal clarifications and apologies predicted only peaceful interaction after conflict. These findings show that not every conciliatory strategy predicts mutually beneficial solutions.

Prosocial behaviors would be more effective ways to promote collaborative attitudes and relationship-oriented objectives that bring both parties' concerns into consideration. However, non-prosocial conciliatory acts defined in Spivak et al.'s (2016) study would play a buffer role to end the conflict rather than collaborating on the needs of both partners and repairing the relationship. These findings highlight the importance of mutually beneficial strategies in the social competence of preschoolers beyond the termination of the conflict. For instance, suppose a child was asked to provide a solution to a hypothetical scenario where a child character occupies a swing for a long time and seems unwilling to want to share, providing a strategy of "play on the sidewalk together" would be considered a conciliatory strategy rather than a compromising one (Fenning et al., 2011).

The studies presented thus far provide evidence that the adaptive forms of conflict resolution types establish a balance between the target and the opponent. In other words, a compromise between both parties' needs is needed to reach a mutually beneficial resolution. However, children may encounter problems in which both sides' goals are restricted by each other without harmful intentions. In these cases, producing a compromising strategy might be important since there are no harmful intentions to deal with, but conflicting righteous desires. Thus, equitable solutions are necessary for such dilemmas. Therefore, it becomes important to examine children's strategies when encountering dilemmas where both parties have valid desires. Overall, beyond the previous categorizations of 'adaptive vs. maladaptive', 'self-oriented vs. other-oriented, and 'prosocial vs. antisocial' strategies, this thesis categorizes the strategies of preschool children with a focus on whether they include a compromise or not, thereby, "compromising solutions" vs. "solutions with submissive strategies and self-serving strategies."

3. METACOGNITION

3.1. Definition of Metacognition and Its Theoretical Background

The definition of metacognition, simply defined as "cognition about cognition", dates to Flavell's conceptualization in 1979. According to this definition, metacognition involves higher-order thinking processes by which individuals perceive, understand, and remember, while also engaging in reflection on their own perception, understanding, and memory (Flavell, 1979). Until now, the terms metacognition (Mc), self-regulation (SR), and self-regulated learning (SRL) have been interchangeably conceptualized and used, which results in a jangle fallacy where different constructs have been explicitly defined with similar terms (e.g., regulate, cognition, monitor, control, behavior, etc.) (Dinsmore et al., 2008). However, according to Dinsmore et al. (2008), the distinction between Mc and SR lies in which components are monitored or controlled during the processes of Mc and SR. It has been suggested that behavior, emotions, motivation, and cognition are monitored and controlled in SR. In contrast, specifically, cognition is monitored and controlled during Mc, aligned with the early definition of Mc, an individual's thinking about thinking. Thus, SR is defined with broader terms, while Mc is defined with terms restricted to cognition.

After Flavell's model, in 1987, Brown's theory of metacognition examined the knowledge about cognition and regulation of cognition as interrelated but separate processes. Brown (1987) framed metacognition as follows: "predicting, checking, monitoring, reality testing, and coordination and control of deliberate attempts to learn or solve problems" (p. 78). While knowledge about cognition involves an individual's knowledge about their own cognitive processes and related factors influencing one's performance, regulation of cognition involves monitoring and controlling cognitive processes such as planning or implementing change in the performance. For example, if an individual could effectively track and evaluate their performance in a problem-solving task, they would be more likely able to form a more accurate knowledge of what is a successful strategy in the task.

However, despite being complimentary, knowledge of cognition and regulation of cognition are distinct processes (Papaleontiou-Louca, 2008). For example, an individual may know that planning the time before solving a problem is a useful strategy. Still, they may not be able to enact this strategy during problem-solving. Similarly, an individual might

apply a specific strategy during problem-solving. Still, one may not notice or verbally express what they applied. For example, a preschool child may talk about the puzzles they are doing, such as "Yellow triangle is going there, let's see the red square". However, when asked whether talking to themselves during solving puzzles was a useful strategy, they may disagree and think that it distracts their attention. The differences between "knowing" and "knowing how to do" lies in the separation of declarative (articulated) metacognitive knowledge and procedural metacognitive abilities, respectively (Flavell, 1979).

In Flavell's (1979) model of cognitive monitoring, metacognition is a multifaceted concept. Four main components of metacognition were introduced which were suggested to be interrelated and important in monitoring and controlling one's cognitive processes. These four components were "metacognitive knowledge", "metacognitive experiences", "metacognitive aims", and "metacognitive strategies". Metacognitive knowledge is framed as knowledge about the people, tasks, and strategies for achieving a cognitive goal. For example, a person's thinking that they are better than their friend at writing an essay than playing a musical instrument would be considered an example of metacognitive knowledge about *people*. Metacognitive knowledge of a *task* involves the awareness of the characteristics of cognitive activity, for example, knowing that some tasks need more time to complete than others. Lastly, metacognitive knowledge of *strategies* is the knowledge about which strategies produce more successful results than others in a cognitive activity or a task. Metacognitive experiences refer to conscious experiences related to thinking such as the feeling of knowing, or feeling of confidence (Koriat, 2007). Metacognitive aims are the goals aimed at achieving and sustaining a goal related to cognitive activity, and metacognitive strategies constitute the cognitions or behaviors to achieve these goals. Overall, this study utilizes Flavell's model of cognitive monitoring when referring to declarative metacognitive knowledge of people, task, and strategies.

Unlike other models, Flavell (1979)'s model of cognitive monitoring elaborates and incorporates metacognitive knowledge. Such a distinction is important because some studies report different results of declarative and procedural metacognition in children for different targeted variables. For example, Marulis and Nelson (2021) found that declarative metacognitive knowledge (McK, knowledge of people, task, and strategies) is a stronger predictor of executive functions and suggested that declarative McK would be more difficult to achieve than procedural McK at an early age.

With specific regard to the procedural metacognitive skills of individuals, Naren and Nelson's (1990) widely used model of metamemory processes adopts an information-processing perspective on metacognition and offers an approach to understanding how metacognitive abilities influence memory processes to facilitate learning. According to this model, cognitive processes are divided into two interrelated levels: the object level refers to the objective of thinking, which is a cognitive task being worked on (e.g., a sudoku puzzle), and the meta-level which is the mental representation of the object-level (e.g., "a difficult puzzle"), or a cognitive task. These two levels are thought to operate in a dynamic exchange of information. The direction of this information exchange produces two dimensions of metacognition: monitoring and control. Monitoring occurs when the information flows from the object-level to the meta-level, for example, noticing a misplaced piece in a puzzle. Monitoring enables an individual to update the mental representation of the task to pave the way for implementing change or controlling. Thus, in the reversed direction, control occurs when information flows from the meta-level to the object level, for example, by placing the misplaced puzzle in the correct position. The control behaviors are the correction responses that allow an individual to apply strategies and correct the errors detected in the monitoring processes. As outlined previously, the successful interaction between monitoring and control is deemed to be a precursor of better learning and problem-solving performance (Whitebread et al., 2007, 2009). This study adopts Naren and Nelson's (1990) model of metacognition when referring to the procedural metacognitive processes of young children since the model does not incorporate declarative metacognitive knowledge.

3.2. Metacognitive Abilities in Preschool Period

The early years of childhood are deemed critical for a lot of developmental domains (e.g., Denham et al., 2003). Despite having been overlooked during the very beginning of the theorizing of metacognition research, for the last decades, there has been growing research providing evidence of developing metacognition during preschool years. Early research assumptions had been based on a Piagetian theory of development which suggests that for children to develop metacognitive abilities, they would have to shift to the concrete operational stage which typically begins around the ages of 7-8 (Flavell, 1979; Veenman et al., 2006). Early Piagetian researchers utilized self-report methods with young children on the claim that only when one is consciously aware and articulates the metacognitive

processes, should it be considered a metacognitive skill (Brown, 1987). However, evidence produced by incorporating observational methods shows that the ability to monitor and control one's cognitive processes appears to emerge and develop in early childhood, albeit in more implicit forms (see Lyons & Ghetti, 2010 for a review). In other words, these studies show that young children could often perform tasks by utilizing effective strategies, yet they wouldn't be as successful in articulating their cognitive processes which facilitated their success (e.g., Shamir et al., 2009).

Regarding monitoring abilities, findings show that between the ages of 3 and 5 years, children show age-related improvements in their capacity to monitor nuanced differences among their knowledge states. For example, Cherney (2003) reported that following an incidental spatial location memory task in which children were asked to remember the place of a toy animal, children's spontaneous utterances of mental verbs indicating certainty (*know, forget, remember*) or uncertainty (*think, guess, bet*) became more congruent with their memory behaviors, putting the toy in the right place or misplacing, respectively. In other words, with age, there was a higher amount of correspondence between mental state verbs indicating certainty and the amount of correct placement, and between mental state verbs conveying uncertainty and the amount of incorrect placement. Findings from this study indicated that children could become increasingly able to discern or monitor the nuanced differences between knowledge states of certainty and uncertainty and behave upon these differences. In a similar vein, 5-year-olds were tested on their recall ability of a list of semantically associated words a) accompanied with a picture, and b) without a picture. They reported higher confidence judgments (i.e., how confident one is about the accuracy of one's answer) for their correct answers compared to the false ones (Ghetti et al., 2002). In another study, children as young as 3.5-year-old age were found to be able to guide their own learning in a recognition task. In this study, children were presented with a set of non-verbal paired associates and the option to skip the uncertain trials in the subsequent recognition part. Their responses were more accurate for the answered questions than for the skipped ones (Balcomb & Gerken, 2009), which is indicative of the aspects of the memory-monitoring processes of preschoolers. More, it has been shown that 3-year-olds could engage in control processes based on monitoring that they tend to avoid responding when they are not confident in their evaluation of certainty and tend to respond when being confident (Lyon & Ghetti, 2011).

Nevertheless, the metacognitive abilities of young children seem limited and complex in nature. For example, findings indicate that monitoring mental imagery develops earlier than monitoring thoughts in the stream of consciousness, which suggests that monitoring perceptual information precedes lexical information (Lyons and Ghetti, 2011). In another example, when it comes to being instructed to study (encode) specific items for being tested later, 3-year-olds demonstrated poor performance in some ways of strategically regulating their cognition, which is directing their attention to these specific items (Miller, 1990). However, given the limitations in young children's metacognitive abilities, it is crucial to utilize appropriate and age-sensitive measurement tools to effectively assess the metacognition of preschoolers.

3.3 Measurement Methods of Metacognition in Preschool Years

Researchers have argued that it is crucial to use questions that are appropriate and sensitive for the developmental stage of children to accurately detect monitor and control processes. Children tend to respond with less reliable and less accurate answers when questioned with hypothetical, complex, suggestive, and decontextualized questions within domains in which they have limited previous knowledge and experience (e.g., Kreutzer et al., 1975; Winne & Perry, 2000). The verbal demands of these types of questions were found to be too challenging for young children (Whitebread et al., 2020). However, when systematically observed within their naturalistic settings, such as classrooms, it has been shown that 3-5-year-old children displayed a significant range of metacognitive behaviors. This was particularly evident during self-initiated learning situations and learning activities that required collaboration and verbal interaction among the children, (Whitebread et al. 2007).

Similarly, in Shamir et al. (2009) study, 4–5-year-old children were asked to recall nine picture cards in a memory recall task in both an individual classroom setting and a peer-assisted learning classroom setting to measure procedural McK and declarative McK related to the task. Their behaviors were observed to measure procedural Mc, and they were asked to verbalize their strategies for recalling the pictures, or what they told their friends in order to help them recall the pictures, to assess declarative McK. In both settings, children exhibited several examples of Mc and higher levels of procedural McK compared to declarative Mck.

In a similar vein, after completing a familiar puzzle task in a classroom setting, Marulis et al. (2016) asked 3-5-year-olds metacognitive knowledge interview questions regarding the knowledge of *strategies* they employed during puzzle-solving, knowledge of the requirements and demands of the puzzle *task*, and knowledge of the performance of other *peers* who could solve the puzzles. Preschool children were able to reflect on and articulate their own cognitive activity during solving the puzzles. These empirical findings have important implications. First, asking developmentally sensitive and concrete questions that are directly related to familiar learning activities can provide valuable insights into the metacognitive abilities of young children. Second, using observational assessments that incorporate both verbal and non-verbal codes of behavior within a naturalistic environment allows for a comprehensive examination of these abilities. Building on these premises, the current study offers a nuanced view and presents a positive picture of the metacognitive abilities of preschoolers by applying developmentally appropriate ways of assessments to measure both declarative and procedural Mc.

3.4. Metacognition and Social Problem-Solving

Previous research linking metacognition and social problem-solving has been limited to suggesting the association between these two variables without providing empirical evidence to support it (e.g., Fenning et al., 2011). For instance, in a study conducted by Plociennik (2018), interviews were conducted with 369 preschool children to examine their wise thinking skills in hypothetical dilemmatic situations. These situations included scenarios like depicting a girl playing with a gas cooker, or a boy going around a room with a crayon in his mouth, presenting challenges that required the children to generate wise solutions. The study aimed to assess various abilities associated with wise thinking, including the ability to give reasons, integrate and reconcile opposing viewpoints, identify the most effective ideas, and eliminate the least effective ones. The children were asked questions such as "What could happen to the kids in the picture?", "What advice would you give them?", and "How should they change their behavior?".

Analysis of their statements demonstrated that preschool children had the ability to offer suggestions to improve or modify the behavior of the characters in the pictures while also considering universal norms and values. They proposed changes in behavior, evaluated the usefulness of their own ideas, and reflected on their thoughts and actions, thus serving

as a foundation for metacognition. However, despite the researcher suggesting a link between wise thinking skills and metacognition, the focus of the study was primarily on examining the children's wise thinking skills in everyday situations, rather than explicitly evaluating their metacognitive processes (Plociennik, 2018).

Successful social problem-solving relies on a child's ability to choose balanced strategies that align with the desires of all parties involved (Spivak, 2016). Metacognition should play a role by helping children recognize conflicting desires (e.g., knowledge of people having distinct cognitive processes), consider alternative solutions beyond automatic responses (e.g., knowledge of strategies regarding the requirements of a specific problem), and make decisions that address the needs of everyone (regulating one's cognition). Overall, it should involve monitoring and regulating thoughts and expressing knowledge of cognitive processes (Efklides, 2008).

In summary, understanding how metacognitive abilities relate to children's effective conflict-resolution strategy can have benefits how to help best preschool children successfully navigate conflict. Therefore, there are several reasons to expect that coordinating one's concerns with an opponent should be related to higher metacognitive skills. These strategies constitute the metacognitive abilities which are monitoring and controlling processes employed in one's thinking. Therefore, the primary purpose of this study is to examine to what extent greater levels of metacognitive abilities could predict greater use of compromising strategies that took into consideration both one's and others' perspectives and combine and reconcile these opposing viewpoints.

4. PRESENT STUDY

4.1. Research Aims and Hypotheses

This thesis seeks to address the effects of declarative metacognitive abilities (knowledge of people, task, and strategies) and procedural metacognitive abilities (monitoring and control) on producing compromising solutions to social problems, which is conceived as one of the most effective ways of solving a social conflict (e.g., Spivak, 2016).

4.2. Declarative Metacognition and Social Problem Solving

Declarative Mc signifies that one is aware of and able to articulate a cognitive process. Declarative metacognition comprises knowledge of people, tasks, and strategies (Flavell, 1979; Marulis et al., 2016). Knowledge of *people* reflects the child's awareness and understanding of individual differences in cognitive processes. Metacognitive knowledge of *tasks* refers to understanding the specific characteristics, requirements, goals, and constraints of a particular task, while knowledge of *strategies* involves knowing different approaches to successfully accomplish and maintain a goal in a task. (Flavell, 1979). Therefore, the current study predicts that each component of metacognitive knowledge positively associates with producing compromising strategies, and negatively associates with submissive and self-serving strategies in a social dilemma. Therefore, the following hypotheses were stated.

Hypothesis 1. Declarative metacognitive knowledge and social problem solving

H1a. Higher (vs. lower) levels of declarative McK are related to higher compromising strategies.

H1b. Higher (vs. lower) levels of declarative McK are negatively related to submissive/self-serving strategies.

4.3. Procedural Metacognition and Social Problem Solving

Procedural metacognitive skills refer to the ability to monitor and control one's cognition (Nelson & Naren, 1990). Higher levels of monitoring and controlling behaviors

and their efficient interaction have been found to be facilitators of efficient learning (Marulis et al., 2013). While engaged in a task, preschool children apply their cognitive repertoire based on the task's demands. This repertoire encompasses setting goals, developing a program of action, monitoring performance, applying strategies, and evaluating the outcomes (Bryce & Whitebread, 2012; Whitebread et al., 2007, 2009). For example, if individual notices that solving a puzzle with a hundred pieces would be difficult compared to one with ten pieces and thinks that sorting the puzzle pieces according to the colors would facilitate solving, they are thought to be engaging in metacognitive processes. These cognitive abilities are predicted to be operating in solving social problems. Higher levels of failure of monitoring and control, on the other side, might hinder the processes of effective social problem-solving. Given the importance of higher metacognitive skills in problem-solving, the present study predicts the following hypotheses.

Hypothesis 2. Procedural metacognition and social problem solving

H2a. Higher (vs. lower) levels of procedural Mc (monitoring and control behaviors) are related to higher compromising solutions.

H2b. Higher (vs. lower) levels of failure of procedural Mc are related to higher submissive and self-serving strategies.

5. METHOD

5.1. Participants

The sample consisted of 30 children attending a private preschool in Kastamonu, which is a city located in the northern region of Turkey with below-average socioeconomic development compared to other cities in the country (State Planning Organization, 2017).. After taking informed consent from parents, among children who volunteered to participate in the study a) the ones with having difficulties interacting with the researcher and comprehending the interview questions (two children), and b) those showing excessive movement and very low attention to the research materials (one child) were excluded.

Children were between the ages of 51 and 70 months (*Mage* = 60.16, *SD* = 6.33). There were 18 (60%) girls and 12 (40%) boys. Most of the children were coming from families of middle (45%) and high socioeconomic status (45%). The remaining parents reported low socioeconomic status (9%). Forty percent of mothers and 22% of fathers were high school graduates, 50% of mothers and 73% of fathers were university graduates, and lastly, 9% of mothers and 4% of fathers were master graduates.

Prior to data collection, ethical approvals were obtained from Ankara Yıldırım Beyazıt University's Social and Human Sciences Ethics Committee (code: 2022-749; see Appendix A), and necessary permissions were obtained from the Ministry of Education.

5.2. Materials

5.2.1. Social Problem Solving Vignettes

To measure children's social problem-solving abilities, three vignettes were created by the researcher. The development of the materials for the study was inspired by open tasks that Plociennik (2018) designed to assess wise thinking skills in preschool children. According to the findings of Plociennik (2018, 2020) open tasks were found to be useful to i) feature scenes that the children could easily concern about, such as positive and negative behaviors displayed by children interacting with their peers; ii) inspire the children to

actively search for solutions to the problems faced by the characters in the pictures, and iii) prompts the children to provide elaborate responses and interpretations of the pictures.

Therefore, the vignettes portrayed scenarios depicting a dilemmatic situation about a social problem occurring between two child characters of the target child's age. Visual demonstrations of the scenarios were drawn by a professional animator and presented in 15x15 cm format thick papers. Colorful and simple illustrations were used to make the scenarios easily understandable and familiar for young children. Chen et al. (2001) showed that the sources of the conflicts between preschool-aged children become more social with age (e.g., "differences in beliefs about play ideas"). Thereby, each vignette depicted dilemmas of *conflicting play goals* occurring between two peers. When creating the scenarios, it is aimed to elicit a wide range of open-ended responses and to engage children by using familiar content to encourage solution generation. The usefulness of the scenarios was pilot tested in a previous study with 40 preschool-aged children whose ages were ranging from 50 months to 70 months.

The first vignette (Scenario 1 – Swing and Sandcastle; see Appendix D) depicted two child characters having a struggle in a park. One of the children is waiting to ride on a swing, but there is another child making a sandcastle with the sand under the swing (see Figure 5.1). The child was instructed: "There are two children here. This child (pointing to child) loves swinging on the swing and had been waiting at the swing for a long time to take a turn. Then they noticed another child under the swing making sandcastles. If someone swings here, the sandcastles might get destroyed. What do you think these children should do?"

In the second vignette (Scenario 2 – Missing Puzzle; see Appendix D), two children individually do models with puzzle pieces. Both children needed a piece of the puzzle to complete their models but struggled with how to share it (see Figure 5.2). The child was instructed: In this picture, two children are making shapes from puzzle pieces. This child needs the puzzle piece that is in his friend's hand to complete the shape he has made. However, his friend also needs the same puzzle piece. If he gives it away, he won't be able to complete the wall of the house he has made. What do you think these children should do?" In the third vignette (Scenario 3 – Swimming and Bicycle; see Appendix D), children want to spend time together on vacation. One of them wants to swim and is afraid of riding a bicycle, so they suggest swimming to her friend. Conversely, the other child wants to ride a bicycle because she fears swimming, so she suggests riding a bicycle together (see Figure

5.3). The child was instructed: “These two children in this picture have gone on vacation. They want to play together. This child children to the other: “Let’s go ride bikes!”. But the other child is afraid of riding bikes and loves swimming. So, the child who was afraid of bikes said to their friend, “I am afraid of riding bikes, let’s go swimming instead.”. But as it turns out, the child who loves biking is also afraid of swimming. What do you think these children should do?”.



Figure 5.1. Scenario 1, swing and sandcastle



Figure 5.2. Scenario 2, missing puzzle



Figure 5.3. Scenario 3, swimming and bicycle

Following the presentation of vignettes, each child was asked "What do you think these children should do?" After the children offered their initial advice, they were prompted to generate more advice/solutions for the characters in the scenarios, "What else do you think they should do?", "Is there another reason you can think of?". This prompt was repeated until the children stated they could not think of any other advice.

Responses were audio recorded and transcribed. In order to quantify the social abilities of children based on the advice they provided in response to each vignette, a coding system was developed to categorize the advice as either "compromising solutions", or "solutions with submissive strategies and self-serving strategies". Each response was coded as outlined below.

Coding of the Responses to Scenarios

Each child's responses/solutions to each scenario are coded separately by the author and an independent coder. The solutions were scored with the presence/absence ("1"/ "0") system. The first coder rated 100 % of the entire sample. The second coder, who is blind to the hypotheses and additional information (i.e., metacognition measures) of the participants, read and rated 35% of the sample. For each child, solution ratings were averaged separately per and across scenarios to create a single score of i) compromising solutions, and ii) solutions with submissive strategies and self-serving strategies. Note that not every solution

was codable under either category. There was substantial agreement between the coders for each scenario, Cohen's kappas, 0.86, 0.94, 0.81 respectively for compromising solutions, and .89, .92, .83 respectively for submissive/self-serving solutions.

Compromising Solutions

The critical feature of a compromising solution is that the child offers an idea sensitive to the interests of both parties in the scenario. A compromising solution includes a balance between self-oriented and other-oriented interests. More specifically, for the solution proposed by the child to be considered and scored as a compromising solution, it is expected to offer to fulfill the wishes of both sides. For example, for Scenario 1 (Swing and the Sandcastle), the solution of "She should shorten the rope of the swing and her friend can continue to play with the sands" was coded under *compromising solutions* since it offers a way to accomplish the goals of both children. Other examples are the solution of "They should create a square-shaped puzzle match with the size of the missing one with Play-Doh" in response to Scenario 2 (Missing Puzzle**)**, and "This child can teach the other child to ride a bicycle, and the other child can also teach this child to swim in the sea" for Scenario 3 (Swimming and Bicycle) were coded as compromising solutions. Therefore, a typical solution including such a balance was considered a compromising strategy and got a score of "1" (see more examples in Table 5.1).

Table 5.1. Examples of compromising solutions

Scenario 1 - Swing and the Sandcastle	**Scenario 2 - Missing Puzzle**	**Scenario 3 - Swimming and Bicycle**
"They should together carry the sandcastle to somewhere safe with the help of a big stone and then the child can swing as much as she wants."	"They should shrink the size of their models and more pieces will remain"	"They can turn the bicycle into a pool float and then lay on it on the sea."
"She would help the child swing and then they make the sandcastles again."	"They can borrow a piece from a friend and return it when they are done."	"One can teach the other how to use the bike, and the other can teach how to swim."

"She should request: "Could you please move aside and play in another place? There are a lot of sand"	"They should join their pieces to build a shape. After finishing, they can break them apart and make other shapes."	"They should ask for help from someone older to overcome their fears."
"This child should keep his feet on top to avoid hitting the sandcastle."	"They can make more pieces from wood and paint them."	"This child can buy a four-wheeled bike. The other one could buy a lifebuoy or arm floats."
"They can fill the swing with sand and play with both sand and the swing. They can swing and throw sand out at the same time."	"They would count their pieces. Then whoever had more pieces could use the piece first, and the other could play next."	"This child could swim in the sea while the other following her on the shore with a bicycle."

Solutions with Submissive Strategies and Self-Serving Strategies

A submissive strategy indicates giving in to the wishes of another person at the expense of their own interest. For example, in Scenario 1 (Swing and the Sandcastle**)**, the solution of "She should play in another area", and in Scenario 2 (Missing Puzzle), "He should give the puzzle to her friend" define submissive strategies. In the reversed direction, a self-serving strategy refers to behaving in one's own self-interest, at the expense of others (Eisenberg & Garvey, 1981). For example, "She should destroy her sandcastle" in response to Scenario 1, or "One should swim and the other should ride a bicycle" in response to Scenario 3 (Swimming and Bicycle) define self-serving strategies which do not take the other party's goals into account. Submissive strategies and self-serving strategies are coded under the same category since both types of strategies serve to fulfill one side's wish. Therefore, a typical solution serving only one child's wish and excluding the other one in the picture was categorized as either a "submissive strategy" (see more examples in Table 5.1.) or a "self-serving strategy" (see more examples in Table 5.2) and got a score of "1".

Table 5.2. Examples of solutions with submissive strategies and self-serving strategies

Scenario 1 - Swing and the Sandcastle	**Scenario 2 - Missing Puzzle**	**Scenario 3 - Swimming and Bicycle**
"After pouring water, the sandcastle breaks down and she should immediately run to the swing."	"He should wait for her friend."	"They should ride the bike."
"She should make her sandcastle anywhere else."	"He should pass the puzzle to her friend when he finishes."	"This one should watch the other ride, and this one should watch the other swim."
"She should wait for her to finish the castle."	"She should say, 'Could you bring me that piece? You should get another one for yourself."	"They should leave each other so they can play what they want."
"Either both of them can build a sandcastle or both of them can swing."	"She should say, 'I saw it first."	"This child should wait."
"The girl can hang the swing somewhere else and swing there."	"He should report it to the teacher."	"They should either ride a bike or swim in the sea."

5.2.2. Metacognition

Procedural Metacognition Coding Scheme

To evaluate the procedural metacognitive behaviors of children, the procedure of Marulis et al. (2016) was applied. In the procedure, children were presented with a puzzle design card and asked to construct a set of building blocks, to replicate the design in the puzzle card and complete the puzzle. Each child initially completed the first puzzle, with assistance provided if needed, as a warm-up exercise. If a child completed the second puzzle within four minutes, they were given a third puzzle that was more challenging. This process

continued with subsequent puzzles until the child was unable to solve the puzzle within the given time period. The same procedure was applied in the current study, however, instead of using a three-dimensional block puzzle, the Tangram puzzle task was used to elicit the procedural metacognitive abilities of children. Prior to its implementation, a pilot test was conducted, revealing that the task was enjoyable and familiar, aligning well with the activities commonly found in preschool settings. Similarly, this task consisted of pieces of different shaped and colored puzzles and model cards with gradually increasing difficulty levels. There were two-dimensional structures on each model card. The children were instructed to copy the picture on the card using the puzzle pieces. The pieces and the puzzle board stand next to each other. The time allotted for each model card was 4 minutes. The reason for choosing this kind of task was to challenge children at appropriate levels (not too easy and not too difficult) to keep them emotionally and behaviorally engaged in the task.

Specifically, at first, children were expected to copy the model on a "warm-up" puzzle which is the easiest form among the cards (see Figure 5.4). In this phase, the child is introduced to the components (pieces) and how the puzzle works. The other aim of the warm-up phase was to understand whether the child can rotate figures since each puzzle requires the ability to rotate pieces. Exceptional to this warm-up puzzle, the researcher provided general assistance and information about the puzzle. Next, the children attempted to do the second puzzle with no assistance. If they succeeded in completing the puzzle in under 4 minutes, they moved to the more challenging third puzzle, and so on, up to the fifth puzzle (see Figure 5.5). The task is finished when the child cannot finish the card in time. The last puzzle that the child was doing was the basis for the assessment of procedural metacognition.

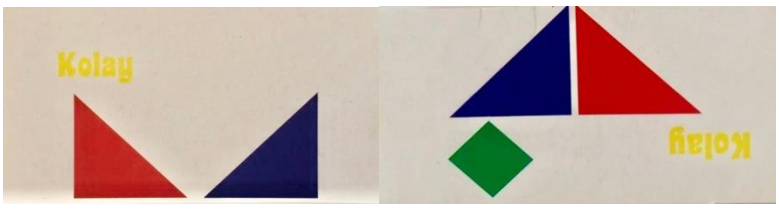


Figure 5.4. Warm-up puzzles

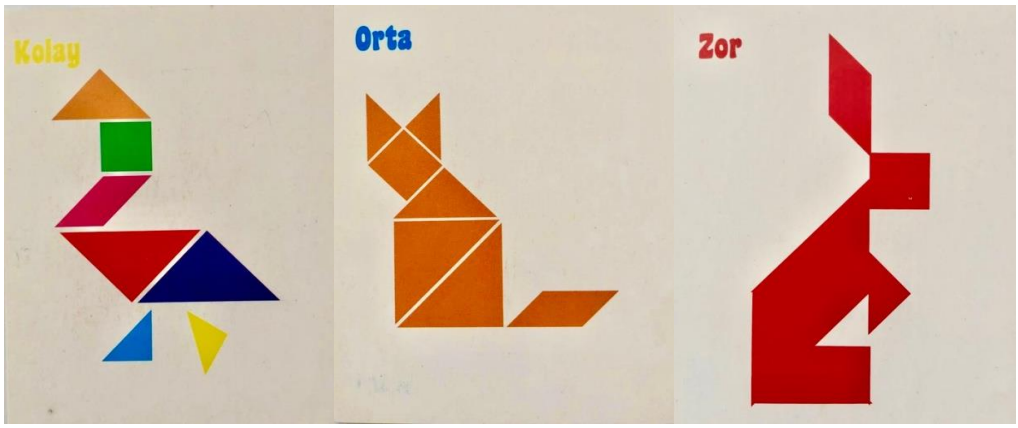


Figure 5.5. Tangram puzzles, from the easiest to the hardest, from left to right

During the task, the child was videotaped. The video recordings were used to code verbal and non-verbal indicators of procedural metacognitive skills during the task and to match the actual performance of the child with the declarative metacognitive knowledge, which they produced during the interview conducted immediately after they completed the task.

The children's procedural metacognition was assessed based on their performance on the last puzzle. For the purposes of this study, Procedural Metacognition Coding Scheme (ProMeta) was developed specifically for the Tangram task by identifying behaviors and verbalizations a) from other coding schemes for metacognition which are the observation tools developed to assess the metacognitive skills of children during quasi-naturalistic problem-solving tasks, and b) from a pilot study. The other coding schemes were The Metacognitive Skills Coding Scheme (Bryce & Whitebread, 2012), The Metacognitive Skills in Constructional Play Engagement (MetaSCoPE; Marulis & Nelson, 2021), and the coding scheme of Kuvalja et al. (2013). All these schemes were created based on task-specific behaviors exhibited by children while performing a given problem-solving task. Each of these schemes was based on Nelson and Naren's (1990) information processing approach to metacognition and classified the verbal and non-verbal behavior behaviors under the codes of "monitoring processes", "control processes", "failure of monitoring processes", and "failure of control processes". Monitoring behaviors serve to update the mental representation of the task while control behavior refers to the acts of changes at the task at hand.

In monitoring processes, information flows from the object level (the Tangram task being performed) to the meta-level (mental representation of the task). Conversely, in control processes, information flows in the opposite direction, from the meta-level to the object level. For example, during reviewing (a monitoring behavior), the child might get informed about whether she has put in the accurate pieces in her construction and update how the task is mentally represented, e.g., a completed versus an uncompleted construction. Oppositely, during changing puzzle construction, the child considers the task, decides on the next move to make the puzzle better based on the information (e.g., the top pieces should be in the same color), and changes the construction accordingly to reach the goal more accurately and efficiently. A failure of monitoring was detected whenever the child gets distracted from the task and shifts her attention to something in the environment as well as when they are aware that there is something wrong with the construction but do not ask but looked to the experimenter. A failure of control was identified when the child applied inaccurate strategies on the task such as making an incorrect placement repeatedly or deciding to build something completely different from the given puzzle model.

Based on a pilot study, specific metacognitive behaviors to the Tangram task were revealed. For the monitoring and control processes, only behaviors that showed signs of positive metacognitive skills were coded. Additionally, a separate group of codes was created for the failure of monitoring and failure of control. The monitoring behaviors included checking cards and pieces, reviewing, clarification, and evaluation (see Appendix C for definitions and examples). The control behaviors included planning, sorting, searching, looking for the piece in the box, and changing puzzle construction (see Appendix C for definitions and examples). The failure of monitoring behaviors included distraction and using others for monitoring. The failure of control behaviors covered finishing error, goal neglect, repetition, unsuccessful change in construction, and asking the experimenter (see Appendix C for definitions and examples). These behaviors were detected verbally and nonverbally, if possible.

In addition to these behaviors which are specific to each component, pairs of behaviors were created to detect the examples of "positive self-regulation". Some behaviors tap the question of "What is happening?" during solving the puzzle and covered a sequence of behaviors, rather than single units of behavior. For example, during 'looking for the piece in the box', the child searches for the puzzle in the box and locates the correct piece in the

board as a result of monitoring. However, during checking the card, the child glances at the card while solving the puzzle.

The procedural metacognitive behaviors of the child were coded using the above-introduced scheme in Mangold Interact Software (2018) which is a qualitative and quantitative video coding software designed for observational research. This software enables the categorization, analysis, and visualization of observational data as well as calculating inter-rater agreement between the coders. In the current study, the first coder rated the %100 of the entire sample. The second coder, who is blind to the hypotheses of the research coded the %25 of the randomly selected videos of the sample. The interrater reliability in total for each group of codes was good, 0.82 (Cohen's Kappa).

The scores for each category of behaviors were calculated by summing up the frequency rates in a single group of codes. Then, the rates for the monitoring behaviors and the control behaviors were summed up and the number of failure of procedural metacognition scores was subtracted to calculate the total score of successful procedural metacognitive behaviors (Bryce & Whitebread, 2012). Similarly, the rates for the failure of monitoring and the failure of control were summed up to represent the failure of metacognitive skills.

Declarative Metacognition and Coding

After the child completed the last puzzle, the children's knowledge of their cognitive processes during the tangram puzzle-solving activity was measured with the Metacognitive Knowledge Interview (McKI; Marulis et al., 2016; see Appendix E). The McKI consists of 15 questions related to the puzzle and intended to be perceived as a naturalistic extension of the previous puzzle game rather than a formal test. From the fifth question and so on, an alien finger puppet named Gogi (a gender-neutral name) is introduced to the child along with the explanation, "*I have another friend to show you. This puppet's name is Gogi, and /s/he is from another land. S/he does not go to a school like yours or have a teacher like yours and doesn't know anything about puzzles like the ones you just did. Will you help Gogi learn about these kinds of puzzles?".* The children are encouraged to compare their performance with a puppet who was introduced as not knowing about the puzzle task at all. Four questions (Questions 1, 4, 5, and 6) assessed the knowledge of people (e.g., "Would the puzzle be

easier when you are older?"). Five questions (Questions 2, 3, 9, 10, and 11) assessed the knowledge of tasks (e.g., "Would the puzzle be easier with bigger or smaller pieces? Why?"). Six questions (Questions 7, 8, 12, 13, 14, and 15) assessed the knowledge of strategies (e.g., "If I gather the pieces that I need first and then build the puzzle, would it be easier/more difficult? Why/Why not?"). To prevent children from consistently choosing the last option, the choice of "easier" versus "more difficult" was counterbalanced. For the metacognitive knowledge interview, the minimum score is 0 and the maximum score is 30 out of 15 questions.

In coding, the children's responses were evaluated to determine whether they were not at all metacognitive (0 points), partially metacognitive (1 point), and appropriately metacognitive (2 points). For instance, the child is asked whether gathering the pieces they needed together before building the puzzle would make it easier, an answer was rated as 'an appropriately metacognitive answer' when the child gives an answer related to either a) their cognitive ability or thinking on the puzzle, b) the difficulty of the task, or c) the efficacy of a strategy, which they applied to the puzzles. Next, to the "why" question, the child provides a follow-up metacognitive explanation to justify their thinking. For example, if the child agrees that gathering the pieces together would be helpful because that would make her faster, she would receive a total score of '2' for the entire question.

Important to note that the child doesn't necessarily provide the correct answer to receive a score of appropriately metacognitive answer. For example, the child may disagree that gathering the pieces would be helpful and subsequently provides a metacognitive answer of why it wouldn't, i.e. "Because I want to see everything to compare" and got a score of '2' for this answer, too.

An answer was coded as 'partially metacognitive and was given a score of '1' when the child could not back up their response with a metacognitive explanation (e.g., "It helps because it's fun."). For example, the child may agree that gathering the pieces before completing the puzzle would make the puzzle easier, but they cannot provide a backup explanation related to this strategy. Thus, the child might give a correct answer but could not provide a following metacognitive explanation to justify the answer.

Lastly, an answer was rated as 'not at all metacognitive' if the child cannot provide any correct strategy and a metacognitive reason to justify their answer. For example, the

child might disagree that gathering the pieces together would be helpful and couldn't give an answer related to the strategy, and got a score of 0 for this answer. This coding system assesses both declarative (knowing what) and conditional (knowing why) metacognitive knowledge (Marulis & Nelson, 2021).

Specifically, for the first question, the children are asked whether they did a good job, an okay job, or not so good of a job on the puzzles. Their responses to this question were evaluated whether their responses match their actual performance in the video recordings. In the original form of the task with three-dimensional models (The Wedgits Block Task), the children's performance scores were determined based on how many model cards they successfully completed. To obtain a score of 'good', the children should accurately complete the first and the second puzzle in time (4 min.). A score of 'okay' was given when the child accurately completed the first and at least half of the second puzzle. Lastly, the children received a score of 'not so good' if they couldn't complete half of the second puzzle. However, the findings of the pilot study of this thesis showed that children evaluated themselves within the scope of what they received as model cards. For example, if a child only saw the first and the second cards and could accurately complete the first puzzle model, she would have thought that she did an 'okay' job instead of 'not so good' by completing half of the given cards. Similarly, if a child received all three cards and completed the first and the second puzzles but couldn't complete any half of the third puzzle model, she would have thought that she did an 'okay' job by completing slightly more than half of all the given puzzle models in total. Therefore, the current study applied a more sensitive evaluation of performance, based on how many cards the child has received in total. In summary, each child must have accurately completed the first (easy) card to continue the task, but for further evaluation, how many cards they received was important to detect what constitutes a good, an okay, or a not-so-good performance.

When coding responses only for the second question ("Did you think anything was hard?" If no, "Why not?" If yes, "Why? What would have made it easier?"), the third question ("Would these puzzles be hard for another kid your age? Why/why not?"), and the fourth question ("How did you know if you were getting the puzzles right?"), the response of the child was evaluated to determine whether the actual performance in the video recording matches the response. If, for example, the child indicated that nothing was hard, but their reactions to the puzzle showed that apparently there were parts that they found

difficult, they were given a score of ‘0’ for this part of the question. However, their final response was determined based on the follow-up explanation of why they found the puzzle easy or difficult. If the child provided a metacognitive explanation (e.g., “I focused on the task”), they got a score of ‘1’ for that part and a total score of ‘1’ for the entire question. More examples of statements of declarative Mc can be seen in Table 5.6 (see Appendix F for examples of answers to all questions). After the interview, the child was thanked for sharing their thought about the puzzles.

Table 5.6. Examples of declarative metacognition

Questions	**Not at all metacognitive (0 point)**	**Partially metacognitive (1 point)**	**Metacognitive (2 points)**
Question 1: Do you think you did a good job, an okay job, or not so good of a job on the puzzles?	"I was great because I am always better at things" (despite they performed a not-so-good performance)	"I was good, I don't know"	"I did it okay, we learn very interesting things here (kindergarten), so it could be because of that. I should have focused more"
Question 2: Did you think anything was hard?	"No" (although they displayed behaviors indicating there are parts they found difficult)	"Yes"	"Yes, I should have been done the top of the puzzle first"
Question 3: Will the puzzle be harder/easier when you're older?	"No"	"It would be difficult because these are very difficult"	"It would be easier because I will learn a lot and be able to do everything"
Question 4: Would these puzzles be hard for another kid your age?	"It would difficult because they are older than me"	"It would have been easier because everyone can do these"	"It would have been average because mine turned out to be average"
Question 5: How did you know if you were getting the puzzles right?	"Because I know"	"I thought about it"	"I looked at the picture"
Question 6: Would these puzzles be easier for Gogi or you?	"For Gogi"	"For me"	"It would be difficult for Gogi because he lives in space and doesn't have a teacher, so he doesn't know much"
Question 7: What should Gogi do if s/he is having trouble with the puzzle?	"She (Gogi) should know"	"She might try"	"She should gather a little bit of attention, then think, and then do it"

5.3. Procedure

A quiet, distraction-free classroom environment was selected for data collection. After taking informed consent from a parent (see Appendix B), individual interviews were conducted with the children. During data collection, there were two researchers present in the classroom, the author served as the interviewer and a second researcher was responsible for organizing the research materials. The participants did not receive any reward in exchange for their participation. After establishing an initial rapport with the child, the social problem-solving task and the metacognition task were given in a counterbalanced order. The scenarios in the social problem-solving task were also counterbalanced. The duration of the data collection process was approximately 20 - 25 minutes per child. Following the completion, the child was thanked.

5.4. Design

The design of the current study was correlational. Both the total score and each component of declarative Mc and procedural Mc were the independent variables. The dependent variables were the scores of compromising solutions and the scores of submissive/self-serving strategies.

5.5. Data Analytic Strategy

The statistical software Jasp Team (2023) was used to conduct all statistical analyses. First, descriptive statistics were conducted to examine the characteristics of all independent and dependent variables. Second, Pearson (Bivariate) Correlation Analyses were conducted to examine the associations between the components of procedural metacognition, declarative metacognition, and social problem-solving strategies. Finally, hierarchical regression analyses were conducted to determine whether procedural metacognitive skills and declarative metacognition skills significantly predicted the outcome variables of social problem-solving strategies.

6. RESULTS

6.1. Assumption Testing

A total of 30 children participated in this study. Prior to conducting the analyses, the frequency of all variables was assessed in order to identify any missing values. Some of the parents (n=6) did not complete the demographic information and 1 child did not want to respond to the Metacognitive Knowledge Interview.

Assumptions of regression were checked and the sample was found to meet the assumptions of linearity, multicollinearity, and homoscedasticity (Tabachnick & Fidell, 2013). However, the assumption of normality was not met as the data distribution of some variables exhibited positive and negative skewness. The regression analysis was performed without removing the outliers for two reasons. Firstly, the variables under study were measured qualitatively. Due to the presence/absence ("1"/ "0") system of coding, it is not appropriate to assess or expect a normal distribution of qualitative data. Qualitative data is categorical in nature, and its analysis focuses on identifying patterns, themes, and meanings rather than evaluating distributional properties (Moustakas, 1994). Secondly, some researchers caution against applying traditional transformation techniques to non-normally distributed data, as transforming variables may lead to data that is challenging to interpret (Tabachnick & Fidell, 2013).

To test Hypothesis 1 and Hypothesis 2, hierarchical regression analyses were conducted per each component of declarative Mc and procedural Mc. Before running the regression, the demographic information was checked in order to control any effect of the demographics on the dependent variable. However, although there were significant correlations between some of the demographic variables and the independent variables, there was not any significant association between the demographics and the dependent variables, namely compromising strategies and submissive/self-serving strategies. Therefore, for the sake of preserving the power of the predictor on the dependent variable (Becker, 2005), the demographics were not included in the model. In the first step of the hierarchical regression, only age was entered to demonstrate how age is related to the development of metacognition in this sample. Next, in the second step, the predictor variable was entered while controlling

the effect of age. In the next section, the descriptive statistics and the bivariate correlations between the variables were presented.

6.2. Descriptive Statistics

Prior to hypothesis testing, the means, standard deviations, minimum and maximum scores, and frequencies of variables were calculated. Table 6.1 shows the characteristics of the components of procedural Mc. Table 6.2 shows the characteristics of the components of social problem-solving strategies across scenarios.

Table 6.1 Characteristics of the components of procedural metacognition

Components of procedural metacognition	**Mean**	**SD**	**Min**	**Max**
Monitoring behaviors				
Checking	4.20	1.73	2	9
Reviewing	0.73	1.01	0	3
Evaluation	2.87	2.52	0	11
Clarification	0.10	0.31	0	1
Control behaviors				
Looking for the piece	6.00	1.39	3	8
Changing puzzle construction	1.00	1.02	0	4
Planning	0.03	0.18	0	1
Sorting	0.07	0.25	0	1
Failure of monitoring behaviors				
Using others for monitoring	0.47	0.63	0	2
Distraction	0.10	0.31	0	1
Failure of control behaviors				
Unsuccessful Change	2.33	1.21	0	5
Repetition	1.20	2.04	0	7
Asking the researcher	0.60	1.22	0	5
Goal neglect	0.10	0.40	0	2
Finishing error	0.93	1.20	0	5

Table 6.2. Characteristics of the components of social problem-solving

Scenarios	Mean	SD	Min	Max
Scenario 1				
Compromising solutions	0.50	0.63	0	2
Submissive/Self-serving solutions	1.03	0.71	0	2
Scenario 2				
Compromising solutions	0.86	0.93	3	4
Submissive/Self-serving solutions	0.40	0.67	0	2
Scenario 3				
Compromising solutions	0.96	0.99	0	5
Submissive/Self-serving solutions	0.10	0.40	0	2
Total				
Compromising solutions	0.77	0.64	0	3.33
Submissive/Self-serving solutions	0.51	0.40	0	1.66

Pearson bivariate correlation coefficients of all variables (declarative metacognition (knowledge of people, task, and strategies), procedural metacognition (monitoring, control, failure of monitoring and failure of control), social problem-solving strategies (compromising strategies and submissive/self-serving strategies), and demographic variables were presented in Table 6.3. Additionally, the Pearson correlations between declarative metacognition and social problem-solving, and between procedural metacognition and social problem-solving across scenarios were presented in Table 6.4 and 6.5, respectively.

Table 6.3. Bivariate correlations between independent and dependent variables

variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Declarative McK	—																
2. Knowledge of people	0.72***	—															
3. Knowledge of task	0.84***	0.39*	—														
4. Knowledge of strategy	0.92***	0.54**	0.68***	—													
5. Procedural McK	0.23	-0.03	0.33	0.21	—												
6. Monitoring	0.00	-0.10	0.06	0.02	0.82***	—											
7. Control	0.25	0.09	0.29	0.22	0.78***	0.56**	—										
8.Failure of prosedural McK	-0.33	0.01	-0.46*	-0.31	-0.70***	-0.25	-0.38*	—									
9. Failure of monitoring	-0.23	-0.13	-0.29	-0.16	-0.28	-0.17	-0.32	0.21	—								
10. Failure of control	-0.28	0.05	-0.40*	-0.27	-0.64***	-0.22	-0.30	0.97***	-0.05	—							
11. Compromising strategies	0.55**	0.56**	0.32	0.52**	0.08	0.02	0.10	-0.08	-0.15	-0.04	—						
12. Submissive/self-serving strategies	-0.24	-0.27	-0.19	-0.18	-0.12	-0.02	-0.16	0.13	0.54**	0.00	-0.38*	—					

13. Age	0.54**	0.51**	0.42*	0.45*	-0.19	-0.39*	-0.12	-0.13	-0.13	-0.10	0.11	-0.18	—		
14. Gender	-0.15	-0.13	-0.11	-0.15	0.06	0.09	-0.11	-0.12	-0.27	-0.05	-0.15	-0.19	-0.14	—	
15. Mother education	0.17	0.35	-0.02	0.14	0.12	0.04	0.42	0.10	-0.03	0.11	0.30	0.15	-0.06	-0.10	—
16. Father education	0.28	0.26	0.17	0.27	0.56**	0.35	0.64**	-0.30	-0.18	-0.27	0.27	-0.03	-0.06	-0.14	0.72*** —
17. Family s.e.s	-0.08	-0.03	-0.05	-0.09	0.31	0.16	0.53*	-0.07	-0.10	-0.05	0.00	0.05	-0.17	-0.13	0.66*** 0.78*** —

Note. *$p < .05$; **$p < .01$. child gender was coded as 1 = girls, 2 = boys.

Table 6.4. Bivariate correlations between declarative metacognition components and strategies

Scenarios	People	Task	Strategies	Total
Scenario 1				
Compromising solutions	.29	-.08	.10	.10
Submissive/Self-serving solutions	-.17	-.07	-.06	-.11
Scenario 2				
Compromising solutions	**.48****	**.41**	**.47****	**.45****
Submissive/Self-serving solutions	.17	-.20	-.10	-.27
Scenario 3				
Compromising solutions	**.43***	.25	**.46****	**.53****
Submissive/Self-serving solutions	.16	-.19	-.10	-.07
Total				
Compromising solutions	**.55****	.32	**.52****	**.55****
Submissive/Self-serving solutions	-.27	-.19	-.18	-.24

Note. *$p < .05$; **$p < .01$.

Table 6.5. Bivariate correlations between procedural metacognition components and solutions.

Scenarios	Monitor	Control	FoM	FoC	PM	FPM
Scenario 1						
Compromising solutions	-.01	-.19	.13	.08	.11	-.11
Submissive/Self-serving solutions	-.12	-.22	**.42***	.15	-.25	.25
Scenario 2						
Compromising solutions	.15	.15	-.15	.07	.11	.03
Submissive/Self-serving solutions	-.14	-.05	**.50****	-.22	-.05	-.09
Scenario 3						
Compromising solutions	-.08	.14	-.20	-.17	.10	-.22
Submissive/Self-serving solutions	.18	-.03	.22	-.04	.08	.02
Total						
Compromising solutions	.02	.10	-.15	-.04	.08	-.08
Submissive/Self-serving solutions	-.02	-.16	**.54****	-.00	-.12	.13

Note. FoM, failure of monitoring; FoC, failure of control; PM, procedural metacognition total score; FPM = failure of procedural metacognition total score; *$p < .05$; **$p < .01$.

6.3. Hierarchical Regression Analysis for Declarative Metacognition

To test Hypothesis 1a, hierarchical multiple linear regression analysis was run to understand whether declarative metacognition predicts the generation of compromising strategies. Separate hierarchical models were run for each component, and the total score of declarative metacognitive knowledge was the main predictor of compromising strategies. At first, linear regression analysis was conducted without controlling for age, since age was not significantly associated with the dependent variable, compromising strategies. The total score of declarative Mc significantly predicted the total score for compromising strategies (β = 0.55, t = 3.39, p = .002) accounting for 27% of the variance (R^2 = 0.27, F (1, 27) = 11.53, p = .002). When controlled for age, the total variance increased up to 30% (R^2 = .30, F (2, 26) = 6.99, p = .001), although age was not significantly predicted the generation of compromising strategies. The association between declarative Mc and compromising strategies became stronger, demonstrating a suppressor effect of age on the dependent variable. However, in each model, the age of the child was entered as a control variable in the first step to demonstrate its potential influence on the predictive associations. In the second step of each model, the main variable was entered. In total, 4 separate analysis was performed.

Declarative Mc scores (β = 0.69, t = 3.68, p = .001) significantly predicted compromising strategies (R^2 = .30, F (2, 26) = 6.99, p = .004) accounting for 30% of the total variance beyond the effect of age. Knowledge of people (β = 0.68, t = 3.70, p = .001) significantly predicted the generation of compromising strategies beyond age (R^2 = .30, F(2, 26) = 7.06, p = .004), accounting for 30% of the total variance.

Knowledge of the task (β = 0.34, t = 1.64, p = .11) did not significantly predict the generation of compromising strategies controlling for age (R^2 = .04, F (2, 26) = 1.50, p = .024). Knowledge of strategies (β = 0.59, t = 3.19, p = .004) significantly predicted the generation of compromising strategies beyond age (R^2 = .24, F (2, 26) = 5.30, p = .012). The details of the results can be seen in Table 6.6.

Table 6.6. Declarative metacognition as the predictor of compromising strategies

	B	SE	β	t	p	R^2	Δ R^2	F	Δ F
Declarative Metacognition									
Model 1						-0.03	0.01	0.30	-
Age	0.01	0.01	0.10	0.55	0.59				
Model 2						0.30	0.34	6.99	13.54
Age	-0.02	0.01	-0.27	-1.42	0.17				
Declarative metacognition	0.05	0.01	0.69	3.68	**.001****				
Knowledge of people									
Model 1						-0.03	0.01	0.30	-
Age	0.01	0.01	0.10	0.55	0.59				
Model 2						0.30	0.30	7.06	13.68
Age	-0.02	0.01	-0.24	-1.32	0.20				
Knowledge of people	0.16	0.04	0.68	3.70	**.001****				
Knowledge of task									
Model 1						-0.03	0.01	0.30	-
Age	0.01	0.01	0.10	0.55	0.59				
Model 2						0.03	0.09	1.50	2.69
Age	0.00	0.01	-0.04	-0.18	0.85				
Knowledge of task	0.06	0.04	0.34	1.64	0.11				
Knowledge of strategies									
Model 1						-0.03	0.01	0.30	-
Age	0.01	0.01	0.10	0.55	0.59				
Model 2						0.23	0.28	5.30	10.19
Age	-0.01	0.01	-0.15	-0.86	0.39				
Knowledge of strategies	0.08	0.02	0.59	3.19	**.004***				

Note. *$p < .05$; **$p < .01$.

To test Hypothesis 1b, hierarchical multiple linear regression analysis was run to understand whether declarative metacognition predicts the generation of submissive/self-serving strategies. Similarly, as introduced above, the same procedure was followed for all models. Separate hierarchical models were run for each component and the total score of declarative metacognitive knowledge was the main predictor with submissive/self-serving strategies as the dependent variable. Age was once again included as a control variable in the analysis to examine its relationship with the associations although the results indicated that age did not have any suppressor effects and did not significantly predict the number of submissive/self-serving strategies. Subsequently, the main variable was entered in the second step. In total, 4 separate analysis was performed.

The total score of declarative Mc (β = -0.19, t = -0.84, p = .41) did not significantly predict the generation of submissive/self-serving strategies beyond age (R^2 = -.01, F (2, 26) = 0.89, p = .43). Knowledge of the people (β = -0.23, t = -1.03, p = .32) did not significantly predict the generation of submissive/self-serving strategies beyond age (R^2 = .01, F (2, 26) = 1.07, p = .36).

Knowledge of the task (β = -0.13, t = -0.60, p = .56) did not predict the generation of predicting submissive/self-serving strategies beyond the influence of age (R^2 = -.02, F (2, 26) = 0.71, p = .50). Knowledge of strategies (β = -0.11, t = -0.53, p = .60) did not significantly predict the generation of submissive/self-serving strategies beyond age (R^2 = -.02, F (2, 26) = 0.67, p = .52). The details of the results can be seen in Table 6.7

Table 6.7. Declarative metacognition as the predictor of submissive/self-serving strategies

	B	SE	β	t	p	R^2	Δ R^2	F	Δ F
Declarative Metacognition									
Model 1						0.003	0.04	1.09	-
Age	-0.01	0.01	-0.20	-1.04	0.31				
Model 2						-0.01	0.03	0.89	0.70
Age	0.00	0.01	-0.10	-0.42	0.67				
Declarative metacognition	-0.01	0.02	-0.19	-0.84	0.41				
Knowledge of people									
Model 1						0.003	0.04	1.09	-
Age	-0.01	0.01	-0.20	-1.04	0.31				
Model 2						-0.001	0.03	1.07	1.05
Age	0.00	0.01	-0.08	-0.37	0.71				
Knowledge of people	-0.05	0.05	-0.23	-1.03	0.32				
Knowledge of task									
Model 1						0.003	0.04	1.09	-
Age	-0.01	0.01	-0.20	-1.04	0.31				
Model 2						-0.02	0.01	0.70	0.35
Age	0.00	0.01	-0.14	-0.68	0.50				
Knowledge of task	-0.02	0.04	-0.13	-0.60	0.56				
Knowledge of strategies									
Model 1						0.003	0.04	1.09	-
Age	-0.01	0.01	-0.20	-1.04	0.31				
Model 2						-0.02	0.01	0.67	0.28
Age	-0.01	0.01	-0.15	-0.68	0.50				
Knowledge of strategies	-0.02	0.03	-0.11	-0.53	0.60				

Note. *$p < .05$; **$p < .01$.

6.4. Hierarchical Regression Analysis for Procedural Metacognition

To test Hypothesis 2a, at first, linear regression analysis was conducted to examine whether procedural Mc predicts compromising strategies. The analysis was run without controlling for age, since age was not significantly associated with the dependent variable, compromising strategies. The total score of procedural Mc did not significantly predict the total score for compromising strategies (β = .08, t(1, 28) = 0.42, p = .67), (R^2 = .01, F (2,27) = 0.32, p = .00). When controlled for age, the total variance increased up 3% (R^2 = .03, F (2,27) = 0.32, p = .59), although age was not significantly predicted the generation of compromising strategies. The association between procedural metacognition and compromising strategies exhibited a stronger relationship, indicating a minor suppressor effect of age on the dependent variable.

Hierarchical multiple regression analyses were conducted to examine whether procedural metacognition predicts the generation of compromising strategies while controlling for the effects of age. Therefore, in each model, the age of the child was entered as a control variable in the first step to demonstrate its potential influence on the predictive associations. In the second step of each model, the main variable was entered. As outlined above, separate models were created for each component of procedural Mc. The total score of both procedural metacognition and failure of procedural metacognition was the main predictor with compromising strategies as the dependent variable.

The total score of procedural Mc (β = 0.11, t = 0.54, p = .59) did not significantly predict compromising strategies beyond the effect of age (R^2 = -0.05, F (2, 27) = 0.33, p = .73). Monitoring scores (β = 0.08, t = 0.39, p = 0.70) did not significantly predict the generation of compromising strategies beyond the influence of age (R^2 = -0.05, F (2, 27) = 0.25, p = .78).

Control scores (β = 0.12, t = 0.62, p = .54) did not significantly predict the generation of compromising strategies beyond the influence of age (R^2 = -0.05, F (2, 27) = 0.37, p = .70). The total scores of failure of procedural Mc (β = -0.07, t = -0.34, p = .74) did not significantly predict the generation of compromising strategies beyond the impact of age (R^2 = -0.06, F (2, 27) = 0.23, p = .79).

The failure of monitoring scores (β = -0.14, t = -0.72, p = .48) did not yield a significant improvement in predicting compromising strategies beyond the influence of age (R^2 = -0.04, F (2, 27) = 0.44, p = .65). The failure of control scores (β = -0.03, t = -0.16, p = .87) did significantly predict the generation of compromising strategies beyond the influence of age (R^2 = -0.06, F (2, 27) = 0.19, p = .83). The details of the results can be seen in Appendix G.

Following the same procedure, to test Hypothesis 2b, the same independent variables were entered to test whether they predict the generation of submissive/self-serving strategies. Similarly, to check for the possible suppressor effect of age on the predicted associations, linear regression analysis was conducted without controlling for age since age was not significantly associated with the dependent variable, submissive/self-serving strategies. The total score of procedural Mc did not significantly predict the total score for submissive/self-serving strategies (β = -.12, t(1, 28) = -0.63, p = .53) (R^2 = .01, F (2,27) = 0.32, p = .53). When controlled for age, the total variance did not significantly increase (R^2 = -.02, F (2,27) = 0.41, p = .59), but the association between procedural metacognition and submissive/self-serving strategies got stronger, indicating a minor suppressor effect of age on the dependent variable.

Hierarchical multiple regression analyses were conducted to examine whether procedural metacognition predicts the generation of submissive/self-serving strategies while controlling for the effects of age. As outlined above, separate models were created for each component of procedural Mc. The total score of both procedural metacognition and failure of procedural metacognition was the main predictor with submissive/self-serving strategies as the dependent variable.

The total score of procedural Mc (β = -0.16, t = -0.84, p = 0.41) did not significantly predict the generation of submissive/self-serving strategies beyond the effect of age (R^2 = -0.01, F (2, 27) = 0.82, p = 0.45). Monitoring scores (β = -0.11, t = -0.52, p = .61) did not significantly predict the generation of submissive/self-serving strategies beyond the influence of age (R^2 = -0.03, F (2, 27) = 0.60, p = .56).

For control, the addition of control scores (β = -0.19, t = -1,00, p = .32) did not significantly predict the generation of submissive/self-serving strategies beyond the influence of age (R^2 = -0.001, F (2, 27) = 0.98, p = .39). The total scores of failure of

procedural Mc (β = 0.11, t = 0.57, p = .58) did not significantly predict the generation of submissive/self-serving strategies beyond the impact of age (R^2 = -0.03, F (2, 27) = 0.62, p = .54).

The failure of monitoring scores (β = 0.52, t = 3.23, p = .003) significantly predicted the generation of submissive/self-serving strategies beyond the influence of age (R^2 = 0.25, F (2, 27) = 5,86, p = .008). The failure of control scores (β = -0.02, t = -0.13, p = 0.90) did significantly predict the generation of submissive/self-serving strategies beyond the influence of age (R^2 = -0.04, F (2, 27) = 0.47, p = .63). The details of the results can be seen in Appendix H. Overall, the summary of the hypotheses and results can be seen in Table 6.8.

Table 6.8. Summary of hypotheses and results

Hypotheses	**Results**
H1a. Higher (vs. lower) levels of declarative McK are related to higher compromising strategies.	supported
H1b. Higher (vs. lower) levels of declarative McK are negatively related to submissive/self-serving strategies.	not supported
H2a. Higher (vs. lower) levels of procedural McK (monitoring and control behaviors) are related to higher compromising solutions.	not supported
H2b. Higher (vs. lower) levels of failure of procedural metacognition are related to higher submissive and self-serving strategies.	partly supported

7. DISCUSSION

The overarching purpose of the research presented here was to apply a metacognitive perspective on the social problem-solving strategies of preschoolers. This study sought to understand how metacognitive abilities, including both declarative and procedural Mc, predict whether children could solve the social dilemmas between peers with compromising or submissive/self-serving solutions. There were meaningful associations between components of both declarative (knowledge of people, task, and strategies) and procedural Mc (monitor and control) and the number of both compromising or submissive/self-serving solutions, though not entirely hypothesized. The study's findings contribute to previous literature by providing novel evidence on i) which components of both declarative and procedural metacognition predict the generation of compromising vs. submissive/self-serving solutions, and ii) and by gaining new understanding into the emergence of metacognition in young children and the overall structure and interrelationships between different metacognitive processes. The results will be discussed in detail below.

The initial bivariate correlations showed different associations between the variables under study. Unexpectedly, there was a small and statistically insignificant positive correlation between declarative metacognition and procedural metacognitive skills. This result could be interpreted as consistent with the study conducted by Marulis and Nelson (2021), which found evidence that metacognitive knowledge (of people, tasks, and strategies) and metacognitive skills (monitoring and control) are related to each other but distinct in predicting executive functioning in preschoolers. In a similar sense, it can be inferred that social problem-solving strategies are not equally associated with these two related but distinct constructs. Hence these different components might play out differently in the social problem-solving realm, too, leading us to conclude that although declarative and procedural metacognition shares a common sense of interrelatedness, the assessment tools in this study (ProMeta and McKI) elicited unique aspects of early Mc.

Speaking to the bivariate correlations of declarative Mc, all of the components of declarative metacognition (knowledge of people, task, and strategies) were significantly correlated with each other. The total score of declarative metacognition was associated with the generation of compromising strategies, but not of submissive/self-serving strategies.

Among the components of declarative metacognition, only the knowledge of the *task* correlated negatively with the total score of failure of procedural metacognitive skills.

Regarding the bivariate correlations of procedural Mc, the positive components of procedural metacognitive skills, namely monitoring, and control, were moderately and significantly correlated with each other in the expected positive direction. Furthermore, the overall score of procedural metacognitive abilities exhibited a negative strong association with failure of procedural metacognition, ranging from .65 to .70. Only the failure of monitoring was positively correlated with the generation of submissive/self-serving strategies.

7.1. The Association Between Declarative Metacognition and Social Problem Solving

In the context of Hypothesis 1, it was investigated whether the metacognitive knowledge of people, task, and strategies predict social problem-solving. Hierarchical regression analyses showed that irrespective of age, the total score of declarative metacognition made a reliable contribution to the prediction of producing compromising solutions to social dilemmas across scenarios, supporting Hypothesis 1a. In other words, independent of age (51 to 70 months), it was more likely for preschoolers to offer a compromise to peer disagreements if the children are aware of and able to verbalize their metacognitive processes. There are potential explanations for why declarative Mc is a significant predictor of producing compromising solutions to social conflicts.

First, the knowledge of *people* in this study refers to the ability to understand and reflect on one's own and others' cognitive processes in relation to a particular puzzle task. For example, the interview question "Would these puzzles be hard for another kid your age? Why?" requires the children to make comparisons between their own skills and those of other children to anticipate their performance and justify their reasoning with metacognitive terms such as "They would do it like mine because we both learned how to do it already". For another example, the question "Do you think you did a good job, an okay job, or a not-so-good job on the puzzles? Why?" requires the children to observe their own performance and to justify it with terms such as "I should have looked more and try more pieces to do it better". Making such comparisons would align with the conceptualizations of metacognitive

knowledge as “applied ToM” (Theory of Mind; Flavell, 1979) or a precursor to later metacognition (Kuhn, 2000). The research on ToM is primarily focused on the knowledge about mental states such as intentions, desires, and beliefs of oneself and others. ToM ability comprises beliefs about differences in mental states among individuals as well as between mental states and representations of reality.

On the other hand, the primary focus of metacognitive research is on the roles of metacognitive knowledge and skills in achieving cognitive tasks, such as developing effective learning strategies. Given that offering a compromise that takes different persons' interests into consideration needs perspective-taking abilities, it could be inferred that declarative Mc is likely to be requisite for compromising solutions to disagreements. Lockl and Schneider (2006) provided empirical support for this claim that ToM performance at 4 and a half years old was a significant and crucial step of metacognitive knowledge (metacognitive vocabulary and metamemory) at three later time points (6 months, 1 year, and 1 and a half years).

Parallel with this reasoning, Efklides and Tsiora (2002) proposed that consciously expressing and being aware of metacognitive knowledge might facilitate self-awareness. The authors argue that being aware of oneself compared to others as cognitive beings not only influences one's self-awareness but also enables the understanding and prediction of others' mental states. This, in turn, has been argued to facilitate or hinder social interaction and the ability to co-regulate or interact with others.

When zooming into the link between the components of declarative metacognition and the generation of strategies for each scenario, results showed that both the knowledge of *people* and knowledge of *strategies* were significant predictors of compromising strategies for Scenario 2 (Missing Puzzle) and Scenario 3 (Swimming and Bicycle). However, these predictors did not show the significance for scenario 1. Knowledge of the *task* only predicted compromising solutions for scenario 3, but not for others. Despite being in the hypothesized directions, none of the components of declarative metacognition showed meaningful associations with producing neither compromising nor submissive/self-serving solutions to Scenario 1 (Swing and Sandcastle). On the other side, there were mostly negative associations between declarative metacognition and submissive/self-serving solutions across scenarios, though these associations did not reach significance. Therefore, Hypothesis 1b was rejected.

When the scenarios were compared in terms of the extent to which each scenario received compromising versus submissive/self-serving solutions, the descriptive analysis showed that the mean number of compromising solutions was lower and the mean number of submissive/self-serving solutions was higher in response to Scenario 1 compared to the other scenarios. These findings might indicate that Scenario 1 might limit the range of responses to more submissive/self-serving solutions. A reason for this might be that children tend to see the dilemma in more easily solvable ways by suggesting a character to find another place to make sandcastles, which is a self-serving strategy considering the playground area offers a lot of sand, exemplified by the most frequently repeated solution of "She should make her sandcastle anywhere else". The other possible explanation would be that Scenario 1 which depicts two children having struggles in a park area might not assemble a real-life scenario for participants in this study. Therefore, Scenario 2 and Scenario 3 would be more useful scenarios to be used for further studies. In summary, these findings suggest that declarative metacognitive knowledge (of people and strategies) is a distinctive factor in predicting the ability to offer a solution to a peer disagreement through a compromise, but not being negatively associated with offering solutions through submissive or self-serving ways.

7.2. The Association Between Procedural Metacognition and Social Problem Solving Strategies

Hypothesis 2 aimed to test the predictive effect of procedural metacognitive skills on social problem-solving. The predictions were largely unsupported. Higher levels of procedural metacognitive skills did not predict the generation of compromising solutions overall. The findings revealed that neither abilities of monitoring nor control predict offering compromising solutions to peer disagreement. Therefore Hypothesis 2a was rejected. However, while higher scores in procedural metacognition did not provide contributions to predicting compromising solutions, children with higher scores in failure of monitoring (distraction and using others for monitoring) significantly reported higher submissive/self-serving solutions for Scenario 2 and Scenario 3, partly supporting Hypothesis 2b. However, higher failure of control scores did not have predictive power in reporting higher submissive/self-serving solutions.

For example, findings from the present study have shown that the failure of monitoring at the procedural level was positively linked with offering submissive or self-serving strategies for peer disagreement. The components of failure of monitoring include "distraction" in the task and "using the other for monitoring". While distracted by the task, the child disengages from the task, abandons the task earlier, and drifts away into dysfunctional thoughts, whether related to the task or not. While using the other person for monitoring, the child perceives a discrepancy between what they did and the intended puzzle but does not seek help and instead looks directly at the experimenter. Thus, it could be that children who engage in higher instances of failure in monitoring a cognitive task would be more likely to approach social conflicts by giving in to the opponent or behaving in their own self-interest without much effort to reach a compromise.

One possible explanation for this finding is that when solving problems, children may not always be able to accurately identify the source of their feelings of difficulty, which is a metacognitive experience. Metacognitive experiences refer to conscious awareness and subjective feelings that individuals have when they encounter a task and engage in the processing of information associated with it (Efklides, 2006). Even when they do identify the source, the feeling of difficulty may not be solely attributed to the task's features, such as how complicated it is, but also to their own self-concept of ability (Efklides & Tsiora, 2002). Consequently, when the individual experience a strong feeling of difficulty and attribute it to their perceived lack of ability, it can hinder cognitive processing and lead to the decision to give up on the task (Efklides & Tsiora, 2002).

Building on this reasoning, a lower self-concept of ability, which reflects a diminished level of confidence in one's own abilities could potentially act as a mediating variable shedding light on the association between failure of monitoring behaviors and the tendency to generate submissive or self-serving solutions to social problems. Future research should aim to address which factors influence the development of poor metacognitive monitoring skills and explore their relationship with social problem-solving strategies (Efklides & Tsiora, 2002).

Unexpectedly, the failure of control behaviors did not predict higher submissive and self-serving solutions. It could be argued that in contrast to the failure of monitoring, failures of control behaviors (e.g., trying unsuccessful pieces or strategies, making incorrect placements multiple times, or claiming to be finished despite discrepancies) more likely

indicate the effort put into the task, although they may not lead to successful outcomes. Therefore, the failure of control behaviors would be more likely to be a result of a lack of task knowledge, compared to the number of instances of failures in monitoring during solving the task. This is supported by the significant negative association observed between the number of failure of control behaviors and knowledge of the puzzle task (e.g., whether the puzzle would be easier with the same colored puzzle pieces, bigger pieces, or more pieces). Another noteworthy point is the significant association between family socioeconomic status and the father's education with children's control behaviors during the task. Additionally, higher levels of the father's education were found to be associated with higher levels of procedural metacognition in children. This finding could be attributed to the potential advantages of higher access to materials, such as the Tangram task used in the current study, which may be afforded by families with higher socioeconomic status and education. Further studies should disentangle the particular impact of the failure of control behaviors on social problem-solving from the previous knowledge of the task being solved that some children might have limited or no prior experience or familiarity with the task.

7.3. Comparing the Roles of Declarative and Procedural Mc in Predicting Social Problem Solving Strategies

Findings from the present study have shown that social problem-solving was differently predicted by declarative Mc and procedural Mc, with declarative Mc being the strongest predictor of solving social conflicts in a way that benefits all parties involved, above and beyond age. This result can be interpreted in two ways. On one hand, it could be argued that the conscious awareness of or having the ability to articulate one’s metacognitive knowledge about people, tasks, and strategies may be particularly important for developing better social problem-solving skills compared to employing this knowledge at the procedural level. This emphasizes the importance of explicit (declarative) metacognitive processes over implicit (procedural) ones. Put simply, the children who were consciously aware of their monitoring and control processes during the task were more successful in approaching compromising ways to the conflict scenarios. There are some potential explanations for why declarative Mc emerges as a significant predictor of generating compromising solutions to social problems compared to procedural Mc.

Firstly, as outlined previously, ToM skills would act more likely as a precursor to discern the differences between the cognitive states of individuals as well as the conscious awareness of the effective strategies to navigate a task. Secondly, According to Efklides and Tsiora (2002), it was suggested that actively verbalizing and being conscious of one's metacognitive knowledge could enhance self-awareness, which in turn has been argued to foster improved social interaction. This kind of reasoning would also explain the positive and significant association between the failure of monitoring behaviors and the utilization of submissive/self-serving strategies in solving a peer conflict. High failure of monitoring would be associated with lower self-awareness, and in turn, lower metacognitive knowledge and skills.

Thirdly, one could argue that preschoolers may have more difficulty verbalizing their metacognitive knowledge than operating. This could be because the process of articulating their cognitive processes relies on their verbal skills (Shamir et al., 2009). Declarative Mc is stored in memory and is also affected by cognitive processes of language and memory. Therefore, it would be reasonable for future research to disentangle the potential effects of ToM, memory, and language skills on social problem-solving for thoroughly addressing the processes underlying why declarative Mc is a more strong predictor of offering compromising ways to peer disagreements.

7.4. Strengths and Limitations of the Study

This study has several notable strengths worth mentioning. Firstly, to the best of current knowledge, this study is the first that explicitly tested the effects of metacognitive abilities on social-problem solving strategies across preschool years. It includes both procedural and declarative aspects of metacognition in its examination of social problem-solving strategies. By systematically observing and matching metacognitive behaviors in one of their natural settings (classrooms) with children's declarative metacognitive knowledge, the study provides a comprehensive understanding of metacognition.

Secondly, the study's findings are significant as they establish an empirical connection between metacognition and social problem-solving. This novel contribution adds to the existing body of knowledge and enhances our understanding of the relationship between these two constructs, specifically in Turkey's context.

Thirdly, the study employs qualitative methods, allowing for a more nuanced exploration of young children's metacognitive knowledge, skills, and social problem-solving strategies (Moustaka, 1994). The use of categorization systems for all variables under study further enriches the analysis, providing valuable insights into the intricacies of children's metacognitive abilities. The ProMeta, developed for this study, offers a systematic categorization system for detecting monitoring, controlling, and failures in monitoring and control behaviors related to the Tangram Task, which is an easily accessible and user-friendly task. Future studies can utilize this categorization system to measure the metacognitive behaviors of young children. Additionally, hypothetical scenarios were developed to gain deeper insights into how young children generate compromising solutions in situations where both parties have valid and justifiable desires, instead of one side victimizing the other. It highlights that children encounter not only aggressive attacks but also situations where they need to seek balanced approaches rather than solely defending their rights against aggressive attempts.

It is important to consider certain limitations when interpreting the findings of this research. First, the sample size was limited to 30 children, due to the high demand of observational studies (e.g., Pieng and Okamoto, 2020). Research with larger sample sizes is needed to provide further evidence of these associations.

Secondly, the participants in the current study were not heterogenous and nationally representative, since they were from a smaller city with a lower-than-average reach to high-quality educational facilities. Thirdly, since the current study investigates a topic that is in its infancy, more research is needed to provide further evidence on these associations.

7.5. Future Directions

The results of this study serve as an initial step in establishing the relationship between metacognitive abilities and effective social problem-solving. For instance, although several interviews conducted with children yielded assessments supporting the utilization of their metacognitive skills in generating solutions to problems in their environment, this relationship has not been empirically and systematically established (Plociennik, 2017; 2018; 2020).

Children who demonstrated awareness of their metacognitive processes and were able to articulate them during cognitive tasks also exhibited a tendency to analyze and consider both perspectives in a peer disagreement, seeking common ground between the parties involved. Firstly, future research should aim to investigate the extent to which preschool children can employ metacognitive skills in each step of social problem-solving, using a more structured framework such as Crick and Dodge's (1994) social information processing framework which includes a) identifying the problem, b) seeking solutions, c) generating alternative solutions, d) evaluating their effectiveness, e) selecting the best solution, and f) assessing the outcome. Furthermore, it would be valuable to examine the specific components of metacognitive abilities that play a significant role and how they interact with each other within each step of social problem-solving. Taking this structured approach will provide a deeper understanding of these associations and contribute to the existing knowledge in this field.

Second, future research might benefit from observing young children in their real-life social conflicts to more thoroughly illuminate the associations between metacognitive knowledge and skills other than asking them to respond to hypothetical conflict situations. Revealing these associations in an observational study would be promising.

Third, future studies should investigate the relationship between metacognition and social problem-solving abilities through sequential models rather than relying solely on correlational methods. The use of correlational methods allows for the assessment of both the overall frequency of occurrence and the rate of occurrence per minute of various behavioral events (Kuvalja et al., 2014). On the other side, sequential methods are useful to identify the temporal aspects of a sequence of procedural metacognitive behaviors and identify significantly recurring patterns within them (e.g., commonly co-occurring behaviors; Kuvalja et al., 2014). For example, a child would exhibit an array of monitoring behaviors without effectively implementing control strategies on a problem-solving task. In this situation, it is important to recognize that higher monitoring behaviors alone may not contribute to the task's success. Hence, employing sequential methods has been found to offer a more effective approach to capturing the complexity of metacognitive behaviors, such as understanding their interrelationships (e.g., co-occurrence of specific monitoring and control behaviors) and how they contribute to the manifestation of successful metacognitive behaviors (Kuvalja et al., 2014).

Fourthly, further research is required to develop a context-sensitive tool that can effectively assess the metacognitive development of Turkish preschoolers. For instance, the current sample of children predominantly viewed self-talk during the puzzle-solving task as an unhelpful strategy, whereas the majority of the adult participants in the original study from the United States rated the strategy as beneficial. The responses of the adult participants in the original study were used as the standard for evaluating children's responses (Marulis et al., 2016). it is important to acknowledge that there may be cultural variations in the utilization of metacognitive strategies. Currently, there is limited research on the specific cultural and context-dependent factors that influence early metacognitive development in this population. Therefore, the development of a suitable assessment tool that considers these factors would greatly contribute to our understanding of metacognition in Turkish preschoolers.

Lastly, regarding the demographic characteristics of the children, it is important to note that only the father's education level emerged as a significant predictor of control behaviors and monitoring behaviors, while the mother's education level did not show a significant association. These findings suggest that the father's educational background may play a more prominent role in shaping children's metacognitive abilities at the procedural level. However, further research with larger sample sizes that are nationally representative is necessary to gain a deeper understanding of the potential effects of socioeconomic status and education on different aspects of metacognition in children. By including a more diverse range of participants, more robust and generalizable findings could be obtained to assist intervention programs.

7.6. Practical Implications

Preschoolers engage in several naturally occurring metacognitive behaviors throughout the day, especially during collaborative group work and peer-tutored models of teaching (Whitebread et al., 2007). The comprehensive and impactful C.Ind.Le project conducted by Whitebread and his colleagues (2007, 2009) aimed to investigate extensive evidence on the early stages of metacognitive development by observing and coding several verbal and non-verbal behaviors of 1440 3-5-year-old children in their natural settings, i.e. classrooms. Their findings demonstrated the critical importance of preschool years for the early emergence of Mc and the potential for interventions during these years to improve

children's metacognitive abilities. For example, higher metacognitive skills were a protective factor for children at risk for developing learning difficulties by positively predicting higher pre-academic skills (Marulis, 2014). For another example of the importance of early developing abilities on later performance, Lockl and Schneider (2006) found that children who developed the theory of mind at an early age displayed an enhanced understanding of mental vocabulary (e.g., "think", "guess", "remember") and improved performance in a metamemory interview conducted 2 years later. This interview presents scenarios, such as remembering to take a pretzel for lunch to the kindergarten, and aims at assessing the children's capability to generate and evaluate memory-related strategies for remembering the items in the given scenarios.

Similarly, incorporating a metacognitive approach into interventions aimed at enhancing the social skills of young children during peer conflicts in the preschool years is expected to lead to improved social competence. Further interventions and training programs should be designed to encourage children to articulate, compare, and evaluate their ideas in both cognitive and social tasks to make them more aware of what they think and do during problem-solving, whether it involves finding compromising solutions to conflicts with peers or solving puzzle tasks. Furthermore, the utilization of peer groups as a means to enhance metacognitive abilities holds promise. Research by Shamir et al. (2009) suggests that children demonstrate higher levels of metacognitive behaviors when they are instructed to assist same-age peers in problem-solving tasks, as compared to individual learning situations. Therefore, interventions and training programs could be designed to incorporate group settings where children are encouraged to apply, articulate, and discuss potentially successful strategies for resolving peer conflicts. By fostering such interactions, children can improve their metacognitive knowledge and skills.

7.7. Conclusion

In order to navigate social situations effectively, it is necessary to generate solutions to conflicts that satisfy both our own desires and those of others which nourishes benefits for interpersonal outcomes (Fenning et al., 2011). These solutions should involve a compromise between conflicting interests. This research offers insights into the early years' Mc and effects on social problem-solving, and how they function together throughout development to shed light on future theoretical discussions and practical implementations.

The results highlight the importance of metacognitive knowledge, the conscious expression of the child's knowledge of individual differences in cognitive processes (knowledge of people), specific demands and constraints of a task (knowledge of task), and the strategies, their efficacy, and how to employ them (knowledge of strategies) in navigating peer conflicts with compromising ways. The current thesis showed that when it comes to resolving peer conflicts through compromising approaches, the dimensions of metacognitive knowledge were found to have a greater impact compared to simply implementing successful behaviors on the task, such as organizing materials or using strategies to meet the task requirements. The findings emphasize the significance and necessity of investigating social problem-solving strategies with a metacognitive perspective.

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9. APPENDICES

APPENDIX-A. ETHICS APPROVAL FORM

ANKARA YILDIRIM BEYAZIT ÜNİVERSİTESİ (AYBÜ)
SOSYAL VE BEŞERİ BİLİMLER ETİK KURULU
PROJE ONAY BELGESİ

Ankara Yıldırım Beyazıt Üniversitesi Sosyal Bilimler Enstitüsü Genel Psikoloji bölümü öğrencilerinden Emine Zehra Kasap'ın, **Predictors of wisdom in preschoolers: Meta-cognitive abilities, counterfactual thinking and creativity** adlı araştırması değerlendirilmiştir.*(Bu kısım başvuru sahibi tarafından doldurulmalıdır)*

Proje etik açısından uygun bulunmuştur. [X]

Proje etik açısından geliştirilmesi gerekmektedir. [ ]

Proje etik açısından uygun bulunmamıştır. [ ]

AYBÜ SOSYAL VE BEŞERİ BİLİMLER ETİK KURULU KARARI (Etik Kurul tarafından doldurulacaktır)	
Araştırma kodu (Yıl – Araştırma sıra no)	2022-749
Başvuru formunun Etik Kurula ulaştığı tarih	28.02.2022
Etik Kurul Karar toplantı tarihi ve karar no	09.03.2022-04
Yer	Yıldırım Beyazıt Üniversitesi, Esenboğa Külliyesi
Katılımcılar	Formda imzası bulunan üyelerimiz toplantıya katılmıştır.

KURUL BAŞKANI VE ÜYELER:

		İMZA
Prof. Dr. Hakkı ODABAŞ	Başkan	
Prof. Dr. Mehmet Ali ZENGİN	Üye	
Doç. Dr. Behlül TOKUR	Üye	
Doç. Dr. Özge GÖKBULUT ÖZDEMİR	Üye	
Doç. Dr. Ali POLAT	Üye	
Doç. Dr. Musa ÖZTÜRK	Üye	
Doç. Dr. Ömer ASLAN	Üye	
Dr. Öğr. Üyesi Recep YORULMAZ	Üye	
Dr. Öğr. Üyesi Semih CEYHAN	Üye	
Dr. Öğr. Üyesi Keziban Büşra KAYNAK EKİCİ	Üye	
Dr. Öğr. Üyesi Gülay YAZICI	Üye	

APPENDIX-B. INFORMED CONSENT FORM

Sayın Veli,

Sizi Ankara Yıldırım Beyazıt Üniversitesi Genel Psikoloji yüksek lisans programında, Dr. Gülten Ünal'ın danışmanlığında yürüttüğüm tez çalışmama davet ediyorum. Bu araştırmada amacımız, çocuğun günlük hayatta akranlarıyla karşılaşabileceği potansiyel problemleri çözme becerisinin üstbiliş becerileriyle ne ölçüde ilişkili olduğunu anlamaktır.

Çalışma boyunca çocuklara aşina olabilecekleri çeşitli senaryolar (örn., oyununu tamamlamak için aynı yapboz parçasına ihtiyacı olan iki karakter) içeren üç adet resim gösterilecek ve senaryodaki karakterlere çözüm sunması beklenecektir. Ardından çocuklardan Tangram bulmacasını çözmeleri beklenecek, çözdükten sonra da bulmacayı çözerken hangi stratejileri kullandığına ilişkin sorular sorulacaktır. Çocukların bulmacayı çözerken hangi stratejileri kullandığını detaylı bir şekilde inceleyebilmek için ses ve görüntü kaydı alınacak ve bu kayıtlar yalnızca araştırma amacıyla kullanılacaktır.

Bu araştırma, Ankara Yıldırım Beyazıt Üniversitesi Etik Kurulu onayı ve T.C. Milli Eğitim Bakanlığı'nın ve okul yönetiminin izniyle gerçekleşmektedir. Araştırmaya katılım tamamen gönüllülük esasına dayanmaktadır. Çocuğunuz çalışmaya katılmak ya da katılmamak konusunda özgürdür. Çalışma çocuğunuz için herhangi bir istenmeyen etki veya risk taşımamaktadır. Çocuğunuzun katılımı tamamen sizin isteğinize bağlıdır. Eğer çocuğunuz çalışmaya katıldıktan sonra istediği an vazgeçmek isterse, sadece veri toplama aracını uygulayan kişiye çalışmayı tamamlamayacağını söylemesi yeterli olacaktır. Çocuğunuz çalışmaya katılmamayı veya çalışmadan ayrılmayı tercih ettiğinde, öğrencinin akademik başarısı ve okulda öğretmenleriyle olan ilişkisi etkilenmeyecektir.
Çalışmada öğrencilerden kimlik belirleyici hiçbir bilgi istenmemektedir. Cevaplar tamamen gizli tutulacak ve sadece araştırmacılar tarafından değerlendirilecektir.

Onay vermeden önce sormak istediğiniz herhangi bir konu varsa sormaktan çekinmeyiniz. Çalışma ile ilgili bizlere telefon veya e-posta ile ulaşarak soru sorabilir, sonuçlar hakkında bilgi isteyebilirsiniz.

telefon: - Psikolog Emine Zehra Kasap
e-posta:

Çalışmaya oğlum/kızım .....'ın katılmasına izin veriyorum.

APPENDIX C. PROCEDURAL METACOGNITION WITH DEFINITIONS OF CODES AND EXAMPLES

Monitoring processes with definitions of codes and examples

Monitoring Processes/Codes	**Definition**	**Examples (verbal)**	**Example (non-verbal)**
Checking card and/or pieces	The child checks the model card or piece box before putting a piece (min 4 s)	This skill might be accompanied by verbalizations such as "Let me see..." "I am looking for the green square"	The child glances directly at the model card or the pieces.
Reviewing	The child pauses for more than 4 s and looks at the model card or the puzzle pieces.	This skill might be accompanied by verbalizations.	The child glances directly at the model card or the pieces.
Clarification	The child clarifies the task demands with the researcher, before or during the puzzle.	"Will I use all the pieces?", "Shall I use rather a small triangle?" "Does it matter to put a big one instead?"	-
Evaluation	The child indicates judgment/appraisal related to constructing the puzzle.	"I did it!", "Ta Da!" "I made a mistake only in here". "It looked like a home". "I didn't attend to that one so much. Actually, these are the same" "That one is difficult, huh!", "It doesn't work because it	The child looks at a completed part of a puzzle and smiles or the child furrows their brows and frowns to indicate something is wrong with the construction.

		doesn't stick. It needs to stick".	

Control Processes with definitions of codes and examples

Control Processes	**Definition**	**Examples (verbal)**	**Example (non-verbal)**
Planning	The child makes a verbalization preceding an action and acts accordingly.	"I'm going to do the small (or top) pieces first.", "I'll find two pieces". "I am looking for the orange square, but it's not here. I will use the green squares instead".	-
Sorting, organizing, or grouping	The child attempts to organize (sort, group, arrange) something related to constructing the puzzle with or without verbalizing.	-	The child compares shapes of pieces and groups shapes together. The child moves the card before saying: "Now I can see it better!"
Looking for the piece on the box	The child has a piece of puzzle in mind which needs to be searched, searches for the puzzle and then locates the piece on the board/as a result of monitoring. The child takes a piece, decides	Child singsongs: "Yellow piece, yellow piece...." while looking through the pieces. "Square, square, little square. Oh, this is big. I need a little one".	The child scans the pieces with their hands.

	it's the wrong one and chooses the correct one.		
Result of monitoring, changes puzzle construction successfully	After making an **incorrect** placement, result of monitoring, the child makes a distinct change in their construction. The child replaces the wrongdoing in the correct way. Or, result of monitoring, the child tries a new piece or a strategy to correct the error	"Hasn't it become a bit crooked and doesn't fit properly?", "Let's turn it like this".	The child looks at the construction and moves the pieces to a broader place to see the construction better or rotates the pieces to fit them together.

Failure of monitoring and control processes with definitions of codes and examples

Lack of Monitoring and Control Processes	**Definition**	**Examples (verbal)**	**Example (non-verbal)**
Distraction (failure of monitoring)	The child seems to be distracted by the task with their own thoughts. It can be task-related but dysfunctional.	"My aunt will come today to pick me up." "Let's switch to another thing."	The child may look to another place, seems to be not interested in the task anymore. The child plays with the other pieces or drifts away in thought while saying "I don't know" although they know that they

			couldn't complete the puzzle.
Using Others for Monitoring (Failure of monitoring)	The child identifies that help is needed and something doesn't match but does not ask for anything and looks to the experimenter/or gives up without much effort.	This category of behaviors might be accompanied by verbalizations of task difficulty such as "I can't do this anymore."	-
Finishing Error (Failure of control)	The child claims to be finished although there is a major (except for minor changes) discrepancy between the puzzle they built and the model card.	"Finished!", "I am all done." This category of behavior is most clearly demonstrated through verbalizations to check for intentionality.	The child nods in response to the question: "Are you finished?"
Goal Neglect (Failure of control)	The child intentionally builds a construction that doesn't match the card.	The child says: "I will make a big robot" while collecting the biggest pieces.	To check for intentionality, this skill is primarily evidenced through verbalizations. (Exception: builds more than 2 pieces without looking at card or construction.
Repetition (Failure of control)	The child deliberately makes an incorrect placement twice or more (each repetition is counted separately).	-	Child put a piece; it does not match the one with the card. Then they remove it, then immediately selects the same

			piece or similar piece with a different color and places it in the same exact place.
Result of monitoring, the child tries an unsuccessful piece or strategy to correct the error (Failure of control)	After making an **incorrect** placement, result of monitoring, the child tries another strategy or piece than before but fails to correct the error.	-	The child reverses the previous correct action (e.g., puts a wrong piece in trying to correct the error). The child looks for an already made piece rather than combining the pieces. The child destroys everything along with the correctly constructed parts instead of solely rebuilding the incorrect part.
Asking the Experimenter (Failure of control)	Despite knowing they will not receive practical guidance from the researcher, the child asks the researcher more than once whether she is doing right or what to do next.	"Is it true?", "What will I do know?"	-

APPENDIX-D. SOCIAL PROBLEM-SOLVING SCENARIOS

Senaryo 1 (Salıncak ve Kumdan Kale)

Bu resimde iki çocuk var. Bu çocuk salıncakta sallanmayı çok seviyormuş. Salıncağa binmek için uzun zamandır salıncağın başında bekliyormuş. Sonra bir bakmış, salıncağın altındaki kumlardan kaleler yapan başka bir çocuk varmış. Eğer biri burada sallanırsa kaleler bozulabilirmiş. Bu çocuklar sence ne yapmalılar? / Onlara ne yapmalarını tavsiye edersin?

Senaryo 2 (Kayıp Yapboz Parçası)

Bu resimdeki iki çocuk yapboz parçalarından şekiller yapıyorlarmış. Bu çocuğun, yaptığı şekli tamamlayabilmesi içi arkadaşının elindeki yapboz parçasına ihtiyacı varmış. Ama, arkadaşının da aynı yapboz parçasına ihtiyacı varmış. Eğer bu yapboz parçasını verirse yaptığı evin duvarını tamamlayamayacakmış. Bu çocuklar sence ne yapmalılar? / Onlara ne yapmalarını tavsiye edersin?

Senaryo 3 (Yüzme ve Bisiklet)

Bu resimdeki iki çocuk birlikte tatile gitmişler. Birlikte oyun oynamak istemişler. Bu çocuk diğerine, “Haydi, bisiklete binelim!” demiş. Ama diğer çocuk bisiklete binmekten korkuyormuş, yüzmeyi seviyormuş. Bisiklete binmeyi seven çocuk ise yüzmekten korkuyormuş. Bu çocuklar sence ne yapmalılar? / Onlara ne yapmalarını tavsiye edersin?

APPENDIX-E. METACOGNITIVE KNOWLEDGE INTERVIEW

"Bu bulmacayı tamamlamaya çalıştığın/tamamladığın için teşekkür ederim! Şimdi seninle bu bulmaca ve bulmacayı çözerkenki düşüncelerin üzerine konuşmak istiyorum. Benim görevim çocukların nasıl öğrendikleri ve düşündüklerini öğrenmek. Sana sormak istediğim bazı sorular var. Tamam mı? (Çocuk onaylar). "Teşekkür ederim. Unutma, doğru ya da yanlış cevaplar yok. Sadece senin nasıl düşündüğünü anlamak istiyorum. En iyi cevabını vermeye çalış!"

1. **Sence bulmacayı karttaki gibi yapmaya çalışırken iyi mi yaptın, orta mı yaptın yoksa kötü mü yaptın?**

a. *(iyi derse)*: İyi yapmanı sağlamak için ne yaptın? Ne yaptın da bulmaca iyi oldu? Bulmacayı nasıl iyi yaptın?

b. (*orta ya da kötü derse)*: Daha iyi yapmanı sağlaması için ne yapardın? Ne yapsaydın bulmacayı daha iyi yapardın?

2. **Sence zor olan bir şey var mıydı?** *(hayır derse)*: "Neden hayır?"

a. *(evet derse)*: "Neden, bunu ne kolaylaştırırdı/ daha kolay yaptı?"

3. **Sen büyüdüğünde bu bulmacayı yapman daha kolay olur mu?/daha mı kolay olur yoksa daha mı zor olur?**

4. **Bu bulmacalar senin yaşındaki bir çocuk için zor olur mu? Neden/neden hayır?**
5. **Bulmacayı doğru yapıp yapmadığını nasıl anladın?**

(*Çocuğa "uzaylı" parmak kuklasını gösterin ve ekleyin)*: "Seni bir arkadaşımla tanıştırmak istiyorum. Bu kuklacığın adı "Gogi" ve o başka bir gezegenden gelmiş. Senin gibi, bir okula gitmiyormuş ve seninki gibi bir öğretmeni yokmuş. Az önce çözdüğün bulmaca gibi bulmacalar hakkında da hiçbir şey bilmiyormuş. Bu bulmacalar hakkında bir şeyler öğrenmesi için ona yardım etmek ister misin?"

6. **Bu bulmacayı yapmak Gogi için mi yoksa senin için mi daha kolay/zor olur?**
7. **Gogi bulmacayı çözerken sorun yaşarsa sence ne yapmalı?**

8. **Bulmacayı yaparken Gogi'nin kendi kendine konuşması onun işine yarar mı?**

Gogi bulmacalarla ilgili sana bazı sorular sormak istiyormuş. Tamam mı?

Gogi'yi seslendirerek çocuğa sorun:

9. **Bu bulmaca büyük parçalardan mı yoksa küçük parçalardan mı oluşsaydı daha kolay/zor olur? Neden?**
10. **Bulmacada daha fazla parça mı yoksa daha az parça mı olsa bulmaca daha kolay olur?**
11. **Eğer bütün bulmaca parçaları aynı renk olsaydı (tıpkı bu resimde olduğu gibi) bulmaca daha kolay olur muydu? Neden hayır, neden evet?**

12. **Bulmacayı yapmaya çalışmadan önce hangi parçalar birbirine uyumlu diye düşünsem bulmaca daha kolay olur muydu? Neden hayır, neden evet?**
13. **Önce ihtiyacım olan bütün parçaları toplasam, sonra bu parçaları bir araya getirsem, bulmaca böyle daha kolay olur mu? Neden olurdu? Neden olmazdı?**
14. **Bulmacayı yaparken TV izleseydin bulmaca daha kolay olur mu?**

15. **Bulmacayı yaparken gözlerimi kapatsam bulmaca daha kolay olur mu? Neden hayır, neden evet?**

Bütün fikirlerini ve nasıl düşündüğünü Gogi'yle paylaştığın için teşekkürler!

APPENDIX-F. EXAMPLES OF METACOGNITIVE KNOWLEDGE

Questions	**Not at all metacognitive (0 point)**	**Partially metacognitive (1 point)**	**Metacognitive (2 points)**
Question 1: Do you think you did a good job, an okay job, or not so good of a job on the puzzles?	"I was great because I am always better at things" (despite they performed a not-so-good performance)	"I was good, I don't know"	"I did it okay, we learn very interesting things here (kindergarten), so it could be because of that. I should have focused more"
Question 2: Did you think anything was hard?	"No" (although they displayed behaviors indicating there are parts they found difficult)	"Yes"	"Yes, I should have been done the top of the puzzle first"
Question 3: Will the puzzle be harder/easier when you're older?	"No"	"It would be difficult because these are very difficult"	"It would be easier because I will learn a lot and be able to do everything"
Question 4: Would these puzzles be hard for another kid your age?	"It would difficult because they are older than me"	"It would have been easier because everyone can do these"	"It would have been average because mine turned out to be average"
Question 5: How did you know if you were getting the puzzles right?	"Because I know"	"I thought about it"	"I looked at the picture"
Question 6: Would these puzzles be easier for Gogi or you?	"For Gogi"	"For me"	"It would be difficult for Gogi because he lives in space and doesn't have a teacher, so he doesn't know much"
Question 7: What should Gogi do if s/he is having trouble with the puzzle?	"She (Gogi) should know"	"She might try"	"She should gather a little bit of attention, then think, and then do it"

Question 8: Would it be helpful for Gogi to talk to herself/himself about the puzzle while doing the puzzle?	“It doesn't work 'cause it's just no good”	“Yes, sometimes it helps”	“It could be helpful because talking to oneself can make one feel more at ease”
Question 9: Would the puzzle be easier with bigger or smaller pieces?	“Small things are usually a bit easier”	“Bigger pieces because I enjoy them more”	“Smaller pieces tend to get the job done more quickly”
Question 10: Would the puzzle be easier with more or fewer pieces?	“It would have been easier because I gather everything at school and put it back in its place”	“Fewer pieces because fewer are always good”	“It could be both too much and too little because if there are too many, we might get tired, and if there are too few, it wouldn't be enjoyable anymore”
Question 11: If all the puzzle pieces were the same color, like in this picture will the puzzle be easier?	“It would be boring”	“Yes because you’d enjoy and spend more time”	“It would be hard 'cause there's not a lot of orange-colored pieces”
Question 12: If I think about how the pieces would fit together before I try, will the puzzle be easier?	“It would be difficult because it becomes difficult when there are too many pieces”	“It would be easier and more beautiful that way”	“It wouldn't be harder because I can find the piece I'm looking for”
Question 13: If I gather the pieces that I need first and then build the puzzle, would it be easier?	“No.”	“Maybe it could be easy”	“Yes, it would be more organized if we collect and assemble the parts”
Question 14: What if you were watching TV while you were building it, would it be easier?	“Because it isn’t”	“Yes.”	“No, that's because TV distracts our attention”
Question 15: If I close my eyes while I do the puzzle, will it be easier?	“I don’t know”	“It wouldn't work because you can't do it that way”	“It would be enjoyable, and I would like to give it a try, but I might get lost in different places”

APPENDIX-G. TABLE OF PROCEDURAL METACOGNITION AS THE PREDICTOR OF COMPROMISING STRATEGIES

	B	SE	β	t	p	R^2	Δ R^2	F	Δ F
Procedural Metacognition									
Model 1						-0.02	0.01	0.37	-
Age	0.00	0.01	0.11	0.60	0.55				
Model 2						-0.05	0.01	0.33	0.29
Age	0.00	0.01	0.13	0.69	0.50				
Procedural metacognition	0.00	0.01	0.11	0.54	0.59				
Monitoring									
Model 1						-0.02	0.01	0.37	-
Age	0.00	0.01	0.11	0.60	0.55				
Model 2						-0.05	0.00	0.25	0.15
Age	0.00	0.01	0.14	0.70	0.49				
Monitoring	0.00	0.02	0.08	0.39	0.70				
Control									
Model 1						-0.02	0.01	0.37	-
Age	0.00	0.01	0.11	0.60	0.55				
Model 2						-0.05	0.01	0.37	0.38
Age	0.00	0.01	0.13	0.67	0.51				
Control	0.02	0.04	0.12	0.62	0.54				
Failure of Procedural Metacognition									
Model 1						-0.02	0.01	0.37	-
Age	0.00	0.01	0.11	0.60	0.55				
Model 2						-0.06	0.00	0.23	0.12
Age	0.01	0.01	0.11	0.55	0.59				

Failure of procedural metacognition	-0.00	0.03	-0.07	-0.34	0.74				

Table 6.8. (cont'd)

	B	SE	β	t	p	R^2	Δ R^2	F	Δ F
Failure of monitoring									
Model 1						-0.02	0.01	0.37	-
Age	0.00	0.01	0.11	0.60	0.55				
Model 2						-0.04	0.01	0.44	0.52
Age	0.00	0.01	0.10	0.50	0.62				
Failure of monitoring	-0.08	0.11	-0.14	-0.72	0.48				
Failure of control									
Model 1						-0.02	0.01	0.37	-
Age	0.00	0.01	0.11	0.60	0.55				
Model 2						-0.06	0.00	0.19	0.03
Age	0.00	0.01	0.11	0.58	0.57				
Failure of control	-0.04	0.03	-0.03	-0.16	0.87				

Note. *$p < .05$; **$p < .01$.

APPENDIX-H. TABLE OF PROCEDURAL METACOGNITION AS THE PREDICTOR OF SUBMISSIVE/SELF-SERVING STRATEGIES

	B	SE	β	t	p	R^2	Δ R^2	F	Δ F
Procedural Metacognition									
Model 1						-0.00	0.03	0.95	-
Age	-0.01	0.01	-0.18	-0.97	0.34				
Model 2						-0.01	0.02	0.82	0.70
Age	-0.01	0.01	-0.21	-1.10	0.27				
Procedural metacognition	-0.01	0.01	-0.16	-0.84	0.41				
Monitoring									
Model 1						-0.00	0.03	0.95	-
Age	-0.01	0.01	-0.18	-0.97	0.34				
Model 2						-0.03	0.01	0.60	0.27
Age	-0.00	0.01	-0.22	-1.08	0.28				
Monitoring	-0.01	0.02	-0.11	-0.52	0.61				
Control									
Model 1						0.00	0.03	0.95	-
Age	-0.01	0.01	-0.18	-0.97	0.34				
Model 2						0.00	0.03	0.98	1.01
Age	-0.01	0.01	-0.20	-1.09	0.29				
Control	-0.04	0.04	-0.19	-1.00	0.32				
Failure of Procedural Metacognition									
Model 1						-0.00	0.03	0.95	-
Age	-0.01	0.01	-0.18	-0.97	0.34				
Model 2						-0.03	0.01	0.62	0.32

Age	-0.01	0.01	-0.17	-0.88	0.39				
Failure of procedural metacognition	0.02	0.03	0.11	0.57	0.57				

Table 6.9. (cont'd)

	B	SE	β	t	p	R^2	Δ R^2	F	Δ F
Failure of monitoring									
Model 1						0.00	0.03	0.95	-
Age	-0.01	0.01	-0.18	-0.97	0.34				
Model 2						0.25	0.27	5.86	10.46
Age	-0.00	0.01	-0.11	-0.68	0.50				
Failure of monitoring	0.29	0.09	0.52	3.23	**0.003****				
Failure of control									
Model 1						0.00	0.03	0.95	-
Age	-0.01	0.01	-0.18	-0.97	0.34				
Model 2						-0.03	0.00	0.47	0.01
Age	-0.01	0.01	-0.18	-0.96	0.34				
Failure of control	0.00	0.03	-0.02	-0.13	0.90				

Note. *$p < .05$; **$p < .01$.

CURRICULUM VITAE

EDUCATION

Ankara Yıldırım Beyazıt University — **Ankara, Türkiye**
Developmental Psychology, MA, English — 09.2020 – present
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Psychology Department, BA, English — 09.2015 – 06.2020
High Honours degree finished as 3rd at department — CGPA: 3.7/4

PUBLICATIONS

Research Articles

Ağzıtemiz, F., **Kasap, E. Z.,** Yalçınkaya Alkar, Ö. (2021) *Perceived social support and psychological well-being of visually impaired people.* Nesne Psychology Journal, 9 (20). 274-289. http://dx.doi.org/10.7816/nesne-09-20-04

Kasap, E. Z., Ağzıtemiz, F., Ünal, G. (2021). *The cognitive, mental health, and social benefits of interacting with nature.* Journal of Happiness and Health, 1(1). 16–27. https://www.journalofhappinessandhealth.com/index.php/johah/article/view/1

Kasap, E. Z., Ağzıtemiz, F., Kızıl, N., Yıldırım, A. (2018). *Understanding the nature of the relationship established with Turkish TV serial characters.* Research Studies Anatolia Journal, 1(2). 237-247. https://dergipark.gov.tr/rs/issue/38651/440515

Oral Presentations

Kasap, E. Z., Bühler, J.L. (2023). *Applying Self-Expansion Theory to Romantic Relationship Narratives: What are the Benefits?* 19th General Meeting of the European Association of Social Psychology (EASP): Krakow, Poland.

Poster Presentations

Kasap, E. Z. (2023). *Perceptions of Self-Threat: Comparing Authenticity, Humility, and Self-Esteem.* Association for Psychological Science (APS): International Convention of Psychological Science (ICPS). Brussels, Belgium.

Kasap, E. Z., Çakır, E.D., Ağzıtemiz, F. Ünal, S., Açıkgöz, B. N., Önel, D. B., Yücel E., Ünal, G. (2021). *Reaching a Balanced Self-Image: Humility and the Phenomenology of Pride and Shame Memories*. The British Psychological Society (BPS): Social Psychology Section Annual Conference. Virtual.

SKILLS

Technical:

- IBM SPSS & HAYES Process Tool
- AMOS
- JAMOVI
- Mangold INTERACT Software
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