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Social Opportunities or Barriers to Metacognition: A Case Study of Social Factors for Pre-Service Teachers' Metacognition

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Abstract: This mixed method case study examined potential influences of social agents or immediate environments on individuals' metacognition. Via quantitative methodologies, 122 pre-service teachers' metacognition was measured by the Turkish Metacognitive Awareness Inventory, and metacognitive components did not show any variations across majors, locations of previous studies, the highest degree of education in the family, frequently communicated friends, and regions. Regression analyses revealed that friends were a significant predictor for metacognition. Also, focus group interviews were analyzed thematically via deductive codes regarding the theory of metacognition. Findings confirmed that friends may support individual metacognition at all levels, metacognitive knowledge, regulation, and experiences through cooperation, modeling, reflections, discussions, feedback, and peer evaluation. Pre-service teachers' engagement on the social media may also support their regulatory strategies due to models' task performances or by their reflecting upon those performances. Teachers and family may support metacognitive knowledge, specifically career goals via expectations, anecdotes, and experiences. On the other hand, schools and the Turkish culture may impose some limitations on the youth, and they may engage in reflection and self-questioning to manoeuvre negative experiences or conflicts. Thereby, cross-national and longitudinal studies are highly suggested to explicate the social foundations of metacognition.

Keywords: Family, friends, metacognition, school, social media, teachers, the Turkish culture.

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Introduction

Metacognition, "a fundamental characteristics of human cognition" (Lories et al., 1998, p.1), pertains to thinking about cognitions (Flavell, 1979). While cognitions are "merely the act of knowing" (Curwen et al., 2010, p.383), metacognition pertains to an awareness and regulation of cognitions (Lories et al., 1998; Nelson, 1996). Individuals use cognitions to make progress and metacognition for the effectiveness of cognitions "through the actions of and interactions among" (Flavell, 1979, p. 906) metacognitive knowledge, metacognitive experiences, goals and tasks, as well as metacognitive strategies.

Metacognition, however, might not always be executed, properly. Garner and Alexander (1989) argued that "both children and adults often fail to monitor their cognitions" (p.144) or faulty monitoring or control over cognitions may occur frequently (Efklides, 2014). Veenman et al. (2006) made a categorization of metacognitive competence that may help explain this phenomenon. Some individuals may be competent with metacognitive acts; however, there may be individuals who suffer from availability or production deficiency. Availability deficiency pertains to insufficient metacognitive competencies at one's disposition; whereas, production deficiency pertains to one's failure of using metacognitive competencies at their disposition due to various factors such as task difficulty, anxiety, lack of motivation, inability to see the relevance of metacognition in a specific situation, or value of task completion over effective performance (Garner & Alexander, 1989; Veenman et al., 2006).

Problem of the Study

A considerable number of individuals might suffer from metacognitive deficiency. However, numerous studies provided evidence that learners can pick up metacognition when trained for so (e.g., Anastasiou & Griva, 2009; Branigan & Donaldson, 2020; Pintrich, 2002; Schraw, 1998; Tanner, 2012; Zohar & Ben David, 2009).

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For the effectiveness of metacognition instruction, trainers' competency with metacognition and its pedagogies needs recognition. Findings reported that teachers' awareness and instructional competence with metacognition may not be sufficient (e.g., Bolhuis & Voeten, 2001; Curwen et al., 2010; Erdağı Toksun & Toprak, 2019; Fisher, 2002; Girgin & Şahin, 2020; İnce & Duran, 2013; Kerndl & Aberšek, 2012; Ozturk, 2017; Perry et al., 2008; Sulak & Behriz, 2018; Thomas & Barksdale-ladd, 2000; Yemenici & Ulu, 2020). Indeed, teachers who are highly metacognitive might incorporate metacognition into their instructional design (Ozturk, 2017, 2018). Also, instructional practices may induce metacognitive components after teachers are given opportunities to polish their pedagogies of metacognition (Curwen et al., 2010; Meijer et al., 2013; Ozturk, 2017).

Other few studies also highlighted that metacognitive experiences might be an ignored facet of research (Efklides, 2014; Meijer et al., 2013). That is, extant studies almost always focus on metacognitive knowledge and metacognitive regulation (Efklides, 2014) although metacognitive experiences might mediate metacognitive knowledge and strategies in an intellectual personal space (Efklides, 2008). Still, individuals may not be always responsive to such highly intellectual instances (Branigan & Donaldson, 2020). Although classroom teachers may offer practices for metacognitive experiences, learners may not be motivated to engage in those activities because they are not interested in the topic (Branigan & Donaldson, 2020). Individuals may also restrain from metacognitive acts because they are tiresome and time consuming (Ozturk, 2019).

Rationale of the Study

The present study builds on the following questions; if classroom instruction may not promise much for learners' development of metacognition, how do some individuals *still* manage to develop metacognitive competencies? Are there any instances where other social agents or stimulus in the immediate environment can create metacognitive experiences for individuals' metacognition development, if at all?

Metacognition training studies imply that metacognition might have a social dimension and it can sometimes be acquired even without direct instruction (Garner & Alexander, 1989). Indeed, a "vast majority of students spontaneously pick up metacognitive knowledge and skills to a certain extent from their parents [and] peers" (Veenman et al., 2006, p. 9), and some students may grow up with ample *opportunities* in their environment for acquiring metacognition (Veenman et al., 2006). That is, metacognition may develop over individual-environment interactions (Dinsmore et al., 2008) where social context may frame and influence individuals' metacognition (Hadwin & Oshige, 2011). Therefore, understanding the potentials of social factors (i.e., agents and environments) is important to understand and support metacognition development.

Hypothesis and Research Question

Hadwin et al. (2011) stated that the way individuals "come to understand theory, content, learning strategies, and themselves as learners is deeply rooted in the contexts in which they learn" (p.241). Moreover, Sternberg (1997) highlighted that "we perceive certain styles of interactions with others and with things in the environment to be more rewarded than others, and we probably gravitate towards [them]" (p. 99). Thereby, it may be that thinking styles are social constructs and children internalize many of the observed attributes (Sternberg, 1997) such as metacognition (Zhang, 2010). Indeed, while Jost et al. (1988) argued that "content and origins of metacognition are inherently social" (p.137), Heyes et al. (2020) argued that metacognition may be acquired through cultural learning and it is "made fit for purpose by cultural selection; acquired through cultural learning and rendered adaptive by a process of natural selection acting on the culturally learned variants" (p. 351). Regarding the potentials of socio-cultural environments, this study aims to investigate the *opportunities* for individuals' metacognition development. To this end, this study will elaborate on the following question:

- How do social agents (i.e., family members, friends, and teachers) or immediate environments (i.e., the Turkish culture, social media, and school) help develop metacognition, if at all?

Literature Review

Metacognition Theory

Flavell (1979) argued that cognitions can be controlled through the actions and interactions of metacognitive knowledge, metacognitive strategies, and metacognitive experiences. Metacognitive knowledge pertains to one's knowledge about self, task demands and goals, as well as strategies. Metacognitive knowledge is considered as a part of one's belief system and most of the time, it is derived from earlier experiences (Veenman et al., 2006). Still, it may be modified, continuously (Efklides, 2009). This is because individuals may continuously engage in and reflect upon metacognitive experiences regarding familiarity, expectations, and assumptions (Flavell, 1979).

Metacognitive experiences, on the other hand, are self-initiated acts (Aşık & Erkin, 2019) that "pertain to any intellectual enterprise" (Flavell, 1979, p.906). They "are the interface between the person and the task" (Efklides, 2008, p.279) and influenced by one's awareness, feelings, estimation, judgements, and online task specific knowledge (Efklides, 2008;

Pimvichai et al., 2019). During metacognitive experiences, highly conscious thinking is stimulated, and individuals practice metacognitive strategies “consciously and purposefully” (Efklides, 2009, p.79). To this end, metacognitive strategies are volitional (Veenman et al., 2006), and they pertain to planning cognitions for task demands or goals, monitoring the process and regulating strategies for the goals or task completion, and evaluating the efficiency of the process, performances, and outcomes.

Social Metacognition

Jost et al. (1988) stated that metacognition is “a part and parcel of the social world” (p.151). Although social selves and individuals are perceived distinct, social influences may define conditions for tasks and their performance standards, and they may also provide feedback and modeling (Hadwin & Oshige, 2011). In this sense, “what we think about thinking and how we interpret our momentary feelings and sensations has much to do with our own personal and family experiences, the social groups to which we belong, ongoing social situations, and cultural backgrounds” (Jost et al., 1988, p.151). As individuals are sensitive to the various demands of the immediate socio-cultural situations, they “possess long-term beliefs about” (Jost et al., 1988, p. 148) strategies that can still be also altered through social influences or interpersonal context (Jost et al., 1988). In this sense, Jost et al.'s (1988) arguments may relate to Bandura's (1977) social cognitive theory (SCT) which was later adapted for self-regulated learning (SRL) by Zimmerman (2000). Bandura explains that learning emerges via the dynamic interplay among personal, behavioral, and environmental influences (1977, 1986). That is, individuals can learn new skills by observing, encoding, retaining, and retrieving others' behaviors, efforts, and consequences of those (O'Donnell et al., 2007).

Fox and Riconscente similarly noted that self-regulatory acts may be a reflection of “language-based social interactions with others” (2008, p.383). They developed an interpretive framework based on the theories of James, Piaget, and Vygotsky regarding the perspectives of the Self and introspection, the other, object and peer-level interactions, as well as the agency of language, respectively. That is, one gets to know and control the Self as a thinker and actor by escaping the boundaries of the Self. One can construct his internal environment by referring to the external world where he meets other Selves and by internalizing “the language-based interactions as the medium by which behavior is controlled and consciousness and abstraction achieved” (Fox & Riconscente, 2008, p.387). Panadero and Järvelä (2015) also emphasized that individuals can construct knowledge and develop skill during language-based interactions. Afterwards, they transit to independent use of metacognition.

Recently, socially shared metacognition or social metacognition has been the focus of research (Panadero & Järvelä, 2015). Social metacognition is an extension of individual metacognition into social interactions where group members impact one another's knowledge and actions (Chiu & Kuo, 2010; Iiskala et al., 2011). It is an act of interdependent or collectively shared collaborative higher order thinking that occurs when groups construct shared task perceptions and goals, plan, align monitoring, control, regulate perceptions, knowledge, and actions, as well as establish a shared evaluation of progress or performance (Iiskala et al., 2004; Järvelä et al., 2013; Panadero & Järvelä, 2015).

Social metacognition may help distribute metacognitive demands, increase the visibility of agents' metacognition, improve individual cognition, promote reciprocal scaffolding, and enhance motivation of the agents (Chiu & Kuo, 2010). Chiu and Kuo (2010) stated that during collaborative work, the cognitive load decreases because individuals share responsibilities depending on needs and skills. In such groups, multiple group members can observe, control, and evaluate one another's progress and performances. Moreover, during such collaborations, individuals may invite others to communicate their thoughts which may be expressed through words, actions, mimics, or body language. As cognitive and metacognitive processes become visible, metacognitive evaluation may be facilitated. That is, individuals can help each other detect correct ideas or flaws and recognize problems or difficulties via disagreements and questions. Moreover, individuals can focus on a subset of task demands; thereby, distractions or mistakes can be reduced and problem solving effectiveness and efficiency may increase (Chiu & Kuo, 2010, p.5). It is also possible that individuals' questions, disagreements, evaluations, and feedback may help the agents to see their limitations, build shared knowledge, and expand their understanding of problem solving. Furthermore, social metacognition may also aid to enhance motivation and emotional support because while individuals work with others, they may feel less anxious to fail and got more scaffolding to manage difficulties (Chiu & Kuo, 2010).

Current Study: Suprapersonal Decision Making

The current study is positioned between individual metacognition and social metacognition. Indeed, it may fall in the area of suprapersonal decision-making where there is little attempt to bridge those theories that “move along the ontological continuum from regulation in mind of an individual” through social regulation (Hadwin & Oshige, 2011, p. 242). Suprapersonal decision making enables individuals to “broadcast and sharing of otherwise private mental states with others” (Heyes et al., 2020, p. 351). The focus of this study may also relate to co-regulation which pertains to a temporary condition where others help the self with the emergence of individual metacognition (Hadwin et al., 2011; Järvelä et al., 2013; Lobczowski et al., 2021). Indeed, it is a jointly negotiated transitional process that may mimic zone of proximal development (Hadwin & Oshige, 2011; Panadero & Järvelä, 2015).

Research may mostly focus on either individual or social metacognition. However, social metacognition in research usually initiated by the experts and similarly, interventions are designed by others. That is, although metacognition pertains to the self, others decide how one should become self-regulated. The framework developed for this study, on the other hand, proposes that individuals' awareness of needs, difficulties, conflicts, or interests may initiate metacognitive experiences where one can turn to other social agents in the socio-cultural environment for help or s/he may be provided valuable insights for thinking. Adapting the fundamental notions of social cognitive theory (SCT; Bandura, 1977, 1986), self-regulated learning (Zimmerman, 2000), and social constructivism (Vygotsky, 1978), this framework may situate co-regulation in the socio-cultural developmental trajectory of individual metacognition.

As previously suggested by Hadwin and Oshige (2011), self-regulation may be socially influenced, and it may begin with modeling, verbal descriptions, social guidance, and feedback. In this sense, the framework (Figure 1) designed to explain that suprapersonal decision making or co-regulation may mimic observational learning (Bandura, 1977). While the following figure presents a progress through 4 stages, Vygotsky's (1978, 1987) principles are merged within each stage. In this framework, social interactions pertain to various forms of expert behaviors (i.e., modeling, prompting tools), reinforcement (i.e., direct, vicarious, and self-reinforcement), as well as novices' shared- or co-regulation. Language, on the other hand, pertains to forms of speech (i.e., egocentric, social, and inner) and the language of thinking (Tishman & Perkins, 1997).

The first stage pertains to attention. When the socio-cultural environment presents novices a stimulus, external reinforcement, and scaffolding or cues for their needs, interests, conflicts, problems, or plans, they may pay attention to the other social agent performing a strategic process where metacognitive regulation is implemented. Indeed, as Chiu and Kuo (2010) argued, social metacognition can facilitate individual metacognition when individuals tackle with diverse perspectives (i.e., socio-cognitive imbalance or conflicting ideas), get social feedback, or recognize others' metacognition. That is, *others* in Bandura's theory might undertake the facilitative role helping novices to practice metacognitive acts in the zone of proximal development (ZPD). Especially at the retention and reproduction stages, co-regulation experiences might prominently help novices improve or test their metacognitive knowledge, and practice metacognitive strategies in a safe and cooperative environment. These guided practices may also provide novices with scaffolding and various forms of reinforcement to help them practice thinking dispositions.

Other can also utilize the language of thinking to talk about their minds, thinking, and products of thinking such as ideas, claims, theories, and decision making. They may also use the language of thinking to help regulate thinking because it simultaneously provides the concepts and guides for thinking. Using the language of thinking may also create opportunities for intersubjectivity which involves "sharing rationales and explanations of plans, goals, and activities in the common regulatory space" (Hadwin & Oshige, 2011, p. 249). In time, as individuals gain expertise with their metacognitive acts (i.e., the actual development level; ADL), inner speech (Vygotsky, 1978, 1987) may take over control. Thereby, self-reinforcement (Bandura, 1977) may occur more frequently. That is, learners, who have acquired the community's language of thinking, developed an awareness of self, tasks, and strategies, as well as scaffolded for strategic acts, can finally adopt habits of metacognition.

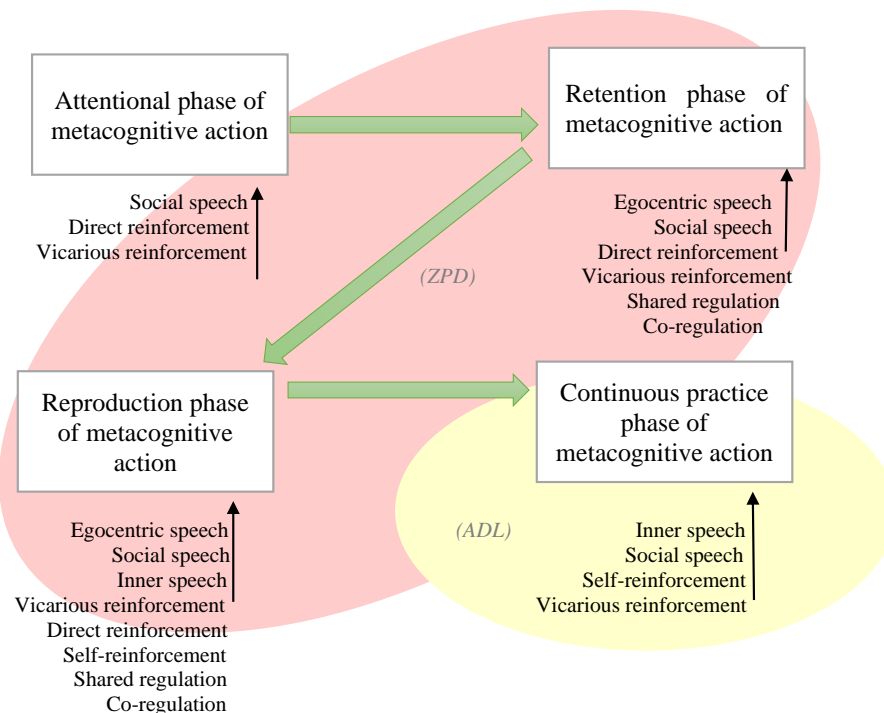


Figure 1. Social Elements for Individual Metacognition

Methodology

Research Design

This study represents a mixed method case study that recognizes the impacts of cultural learning and explores social potentials for individual metacognition. Heyes et al. (2020) argued that individuals from western individualistic cultures (e.g., the USA, New Zealand) may express their thoughts or decisions more confidently than the ones in Eastern, group-oriented cultures. Heyes et al. (2020) relates those findings to social interactions that encompass initiation, scaffolding, and feedback to thinking or training of the individuals for metacognition. As the context of this study is situated in between; that is, the Turkish culture is one of those encompassing western and eastern patterns, development of individual metacognition in this case may reflect unique patterns.

Participants

Participants for quantitative data were recruited via convenience sampling method. At the time of the study, I taught a methodology class to pre-service teachers at a state university in the western Turkey. I invited sophomores to the study after giving them brief information about metacognition and the purpose of the study.

122 pre-service teachers completed the Turkish Metacognitive Awareness Inventory (TMAI) and 52, 47, and 23 studied at the department of English language teaching (ELT), Early childhood education (ECE), and Special education (SE), respectively. They completed their previous studies in a town ($N=52$), village ($N=51$), metropole ($N=10$), and city ($N=9$). They came from different regions of Turkey, mostly from the Aegean ($N=46$), the Mediterranean ($N=23$), the Southeastern Anatolia ($N=17$), and the Eastern Anatolia ($N=14$). The percentage of other regions were small; the Marmara ($N=9$), the Central Anatolia ($N=7$), and the Black Sea region ($N=6$). Moreover, those participants come from families whose at least one member held a degree at college ($N=74$), high school ($N=27$), graduate school ($N=9$), primary school education ($N=8$), and middle school education ($N=4$) levels. The participants also frequently communicated with friends from school ($N=88$), neighborhood ($N=17$), students' club ($N=14$), and dormitory ($N=3$).

Moreover, seven pre-service teachers joined the focus group interviews voluntarily. Of those, four studied in the department of ECE, and 3 studied at the ELT department. Three of the participants were male and four were female. They grew up in the western part of the country. The highest education level in their families changed from primary school to college.

Data Collection Tools

This study employed two data collection tools: surveys and semi-structured interview questions. The Turkish Metacognitive Awareness Inventory (TMAI), whose original was developed by Schraw and Dennison (1994), was used for participants' metacognition. The TMAI was adapted to Turkish by Akın et al. (2007), and they found a high correlation ($r=.93$) between the Turkish and original scale. Internal consistency of the inventory was .95, and item-total correlations ranged from .35 to .65. The test-retest reliability coefficient was .95. In this study, metacognitive knowledge and regulation subscales produced an $\alpha.85$ and $\alpha.91$, respectively. The correlation between them was strong and significant, $r=.80$, $p < .01$.

The participants were also asked to rate the influences of social agents and immediate environments on their metacognition development. They rated these factors on a 10-point scale ranging from 1 (almost no support) to 10 (supported a lot). The scale included the following variables: family, teachers, friends, the Turkish culture, social media, school environment, and other potential factors, which was optional to answer.

Moreover, 4 semi-structured focus group interviews that lasted 45-50 minutes were conducted with volunteer pre-service teachers. Indeed, those interviews may be metacognitive experiences on metacognition because pre-service teachers stated that they had to think deeply about how previous social agents or immediate environments help them develop or suppress metacognition. Pre-service teachers mostly referred to their high school experiences while they thought about the interview questions.

During the first meeting, friends' contribution to metacognition was discussed via the following questions: (1) Did your friends ever create experiences where you need to think carefully and highly consciously about your cognitions, if at all? (2) How did your friends help you improve your knowledge about yourselves, learning strategies, various task demands or goals, if at all? (3) How did your friends help you practice setting goals, analyzing task demands, monitoring cognitions, regulating strategies, and evaluating task performances or goal-attainment, if at all? Family and Turkish culture as well as teachers and school environment were discussed during the second and third meetings, respectively. During the last meeting, social media was discussed for its potentials on metacognition development. As in each meeting almost same questions with a replacement of the agent and/or the immediate environment were discussed, another sample question from the second meeting reads as whether family members or school characteristics have ever created experiences where they need to think carefully and highly consciously about one's cognitions, if at all.

During these meetings, I was a facilitator. When the interviewees commented on the questions regarding their previous experiences, I asked questions (i.e., how and when) to understand their short answers, if need be. The interviews were conducted in pre-service teachers' native language (Turkish) to help them manage the cognitive load.

Data Collection and Analyses Procedures

Data were collected online after I sent out an invitation announcement to my classes. To collect quantitative data, I employed google forms and transmitted the TMAI and social factors questionnaire online. After participants read and downloaded the consent form, they were allowed to fill in the questionnaires. Then, MANOVA tests were run to detect any potential differences in metacognition across various levels of characteristics, and multivariate multiple regression analyses were run for the predictive power of the social agents and environments on metacognition.

I also conducted the focus group interviews on Microsoft Teams. 10 pre-service teachers joined in the first session where I explained the purpose of the study and informed them that they might leave the sessions at any time when it did not resonate or made sense without any punishment or being disadvantaged. Three of them left the study during the first session. Moreover, before each session, I got the participants' consent as I recorded the audio. Also, before each session I reminded them that they had a right to leave the session at any time. The rest seven pre-service teachers joined 4 interview sessions.

Following each session, I transcribed the raw data verbatim. Then, I sent the files to the focus-group members for member-check. As all participants agreed on the content with no objections, I coded each week's content via thematic analysis. For this purpose, I analyzed data deductively. The themes (italicized) and codes were as in the following: (a) *metacognitive knowledge*: components focused during interactions and ways to improve metacognitive knowledge, (b) *metacognitive regulation*: components focused during interactions and ways to improve metacognitive regulation, and (c) *metacognitive experiences*: availability of metacognitive experiences and elements of metacognitive responsiveness. I analyzed the data at two intervals (37 days apart) to check the consistency which may correspond to reliability in the positivist realm (Noble & Smith, 2015). The analyses produced an α .92.

Findings

Variations and Social Influences on Metacognition

In this study, there were no statistical differences in participants' metacognitive knowledge (MK, $M=3.85$) and metacognitive regulation (MR, $M=3.77$) measured by the TMAI across departments, location of previous studies, the highest degree of education in the family, frequently communicated friends, and regions ($F(12, 490) = .757, p = .67, \text{Box's } M = 14$). Pre-service teachers also reported that Turkish Culture ($M=5.3$), social media ($M=6.3$), family ($M=6.3$), school ($M=6.7$), teachers ($M=7.1$) and friends ($M=7.2$) would contribute to their metacognition (**Error! Not a valid bookmark self-reference.**). There was another option where the participants could write down any other factors for metacognition (MC) development. 77 participants noted self $M=6$.

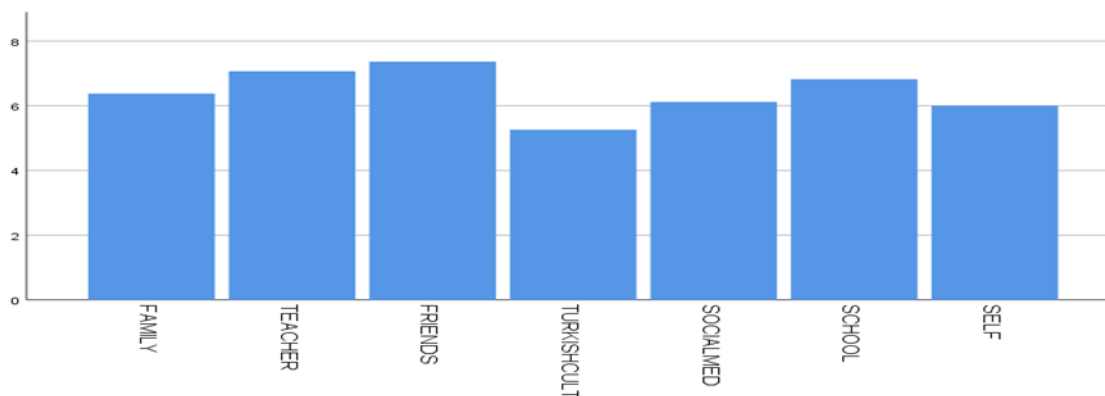


Figure 2. Influences of Social Agents and Environments on Metacognition

The correlation matrix reported that most variables were correlated to each other and MC at $p = .01$. All variables, except the Turkish culture, was correlated to MK and MR, positively, ($r(120), p < .01$); however, the Turkish culture was correlated to all social agents or the immediate environments, $p < .01$. Also, there were no correlations between family as well as teachers and social media, $p > .05$.

Table 1. Correlations for Social Agents and the Immediate Environments

	Family	Teachers	Friends	Turkish Culture	Social Media	School	MK	MR
Family	1	,409**	,374**	,229*	,133	,199*	,323**	,209*
Teachers	,409**	1	,440**	,551**	,165	,461**	,269**	,261**
Friends	,374**	,440**	1	,208*	,280**	,448**	,403**	,384**
Turkish Culture	,229*	,551**	,208*	1	,186*	,364**	,143	,146
Social Media	,133	,165	,280**	,186*	1	,203*	,257**	,236**
School	,199*	,461**	,448**	,364**	,203*	1	,297**	,298**

** Correlation is significant at the .01 level (2-tailed).

* Correlation is significant at the .05 level (2-tailed).

Multivariate regression analyses were run to examine the social agents' and immediate environments' influences on MK and MR, which were normally distributed. Multicollinearity statistics reported *VIF* values of 1.1. The model for MK ($F(6,115)=5.7, p=.001$) and MR ($F(6,115)=4.4, p=.001$) was significant. While metacognitive knowledge equaled to $2.9 + (.06*Friends) + (.03*Family)$, metacognitive regulation was $2.9 + (.06*Friends)$ ($p<.05$). Friends' and families' influence explained 20% of the variance in MK, and friends' influence explained 19% of variance in MR.

Social Opportunities and Barriers to Metacognition

Friends: Friends' influence was significant both for MR and MK. Indeed, their effect on all components of metacognitive knowledge, regulation, and experiences were nominated during the focus group interview (see Table 2). Pre-service teachers (PSTs) stated that when they cooperated with friends for various tasks, their knowledge about self, strategies, and goals increased. Furthermore, when they worked for similar goals, they employed regulatory strategies, specifically setting a goal, monitoring the processes, and regulating strategies. Because they had similar educational experiences, they discussed their knowledge and strategies. Indeed, it may be easier to "show and explain how to do something to each other" (Ö) during cooperative interactions. Also, they trusted friends' feedback with their goals, performances, and knowledge more than anyone else. This is because they had genuine and intimate relations with friends, and they did not "have a fear of rejection or humiliation as we have with families or teachers!" (E). As H. stated they "need friends' feedback because their evaluation helps evaluate myself and do the right things".

Finally, regarding metacognitive experiences or responsiveness, PSTs had discussions and reflection moments on a wide spectrum of experiences, behaviors, and ideas. During those times, they reflected on each other's ideas and behaviors, provided feedback, and made each other reflect on the reasons and/or the outcomes of their behaviors or ideas. They cared about each other's reasoning and indeed, friends were "like control mechanisms" (I).

Teachers: Pre-service teachers recognized their teachers' limited influence on MC development. MC was mostly recognized via self-knowledge and setting professional goals. The focus group participants ($N=6$) stated that teachers' personal characteristics (i.e., tolerant, understanding, open to communication and different ideas, and helpful) were important to think about and understand themselves. When their teachers provided some space to think, PSTs could do self-questioning. However, some teachers ($N=3$) might be very hostile towards different ideas and require students' faithful compliance with the norms. Also, especially when teachers threatened PSTs with low grades or failure, PSTs were not motivated to participate in classes. As one pre-service teacher (F) stated, such teachers may not "let thinking happen" in their classes.

Teachers might help PSTs set professional goals. When PSTs had negative experiences with their teachers or were exposed to hostile reactions, they thought "I will never ever be a teacher like him" (Z). There were only two PSTs who either had reflection moments about themselves and the career that they wanted to pursue with their teachers, or the teachers shared their experiences and gave them opportunities to observe professionals. Therefore, PSTs could make informed decisions.

Exams, tasks, and reflection questions were nominated for metacognitive experiences. I and E stated that when they were required to explain their rationale for their answer on the exams, they had to engage in highly conscious thinking. Moreover, Ö stated that some tasks made them feel responsible for others' learning; therefore, they had to think carefully to manage the task demands successfully. Lastly, two pre-service teachers who got teachers' help with their career planning stated that when their teachers asked some questions and when they thought about teachers' suggestions, they engaged in a deep-thinking activity.

School: Pre-service teachers described schools as conservative, disciplined, competitive, and monotonous places. They stated that there were no extra-curricular activities, and teachers did not show any effort to change it. They did not integrate any activities or classes for students' interests. The curriculum was loaded with tons of knowledge which was mostly memorized. Only one PST (E) stated that philosophy class gave them opportunities to think about concepts and reading the classics helped them recognize and discuss different perspectives.

Family: Family members helped pre-service teachers mostly with metacognitive knowledge, specifically with their professional goals. All PSTs stated that they observed family members' difficult life conditions due to their professions and engaged in self-questioning. As most PSTs ($N=5$) stated, they mediated on whether they wanted to live like their family. Their abilities or dreams mostly led them to set different career goals than their parents. Also, their parents were protective and provided "manipulative guidance" or feedback (F) for PSTs' future jobs; therefore, they chose "secure and easy jobs like teaching" (Ö) as their parents expected ($N=7$).

Regarding metacognitive regulation, all PSTs stated that when they set their career goals, families set them free to manage their learning process. Because most families ($N=5$) did not hold higher education, they could not guide, help regulate, or evaluate their children's career processes. Financial support was limited for most pre-service teachers; therefore, they had to be "on the safe-side" (Z) and did their best for their future.

Metacognitive experiences only occurred when pre-service teachers discussed their career goals with their families. The families, however, just asked what PSTs could do after they graduate. PSTs explained their career choices comparing the life conditions of teaching to their parents' jobs.

Social Media: For social media platforms, PSTs only mentioned YouTube and LinkedIn as beneficial but not the rest i.e., Twitter, Instagram, and Facebook. They stated that on YouTube and LinkedIn, they followed experts and learned strategies either by their experiences or modelling. Indeed, social media platforms also offered them opportunities to interact with the models or experts. They could "sometimes get some directions or clarification when they wrote a comment on their walls, or play the videos, again" (I). Moreover, when they were engaged in the tasks of their interest (e.g., playing ukulele, doing baskets, or drawing), they did self-assessment. Because they used strategies modelled in the videos and imitated models' processes to manage a task, performance evaluation was done in reference to the explicit standards.

Metacognitive experiences, on the other hand, usually emerged when PSTs questioned the reliability of the posts on Instagram or Twitter and when experts offered something new. They either did research to confirm the information or reflected on experts' task management, experiences, or knowledge to reach a resolution.

Turkish Culture: The Turkish culture was defined as conservative, manipulative, restrictive, and oppressive. PSTs stated that they usually experience conflicts with their families, relatives, or the society. When there was one, they did self-questioning and realized that they did not hold similar ideas or displayed divergent behaviors that did not reflect the dominant cultural concepts, norms, traditions, and habits. Moreover, all PSTs stated that as the economy has been fluctuating and imposes financial limitations on their life, they set their goals, accordingly. That is, they decided to "go abroad after they graduate" ($N=5$) or learn different skills during their undergraduate studies ($N=6$) to earn more money than just the salary.

Metacognitive experiences usually emerged as a reaction to those conflicts or negative experiences. They thought about their negative experiences with the social agents or cultural conflicts. Therefore, they could "find some strategies [because] I want to manoeuvre my life and be free from others' standards!" (I).

Table 2. Social Factors for Metacognition

Social Factors	MK	How	MR	How	ME	How
Friends	Self-knowledge, Strategies, Task analysis, Goals.	Similar needs, interests, experiences, limitations, Close ages, Sharing knowledge and experiences, Intimate and genuine relations, Peer-evaluation, Feedback.	Goal setting, Monitoring, Regulation of strategies, Performance evaluation.	Cooperation, Modeling, Peer-evaluation, Self-evaluation, Need for friends' feedback.	Discussions and reflections on each other's ideas, behaviors, and experiences.	Share one's reasoning for others' ideas, behaviors, and experiences, Provide feedback, Make friends reflect on one's actions, Control mechanism, Genuine feedback, No fear of rejection or humiliation.
Teachers	Self-knowledge, Goals.	Teacher's questioning, Workshops or methods for thinking Teachers' personal characteristics; tolerant, understanding, helpful, Self-questioning, Reflection on one's identity, Teachers' hostile reactions to divergent thinking,	Goal setting.	Reflection activities with teachers, Teachers' experiences, Teachers' attitude towards students, Class observations, Negative feedback, Low assignment marks.	Exams, Tasks, Reflection questions.	Provide rationales for the answers on the exams, Feeling of responsibility for others' learning, Critical writing tasks, Critical questions: e.g., What would you do? Why do you think, so? Reflection on teachers' experiences.
School		Conservative, disciplined, competitive, monotonous, loaded with knowledge, Pushes students to choose available courses, No integration of students' interest in extra-curricular activities.		No extra-curricular activities, Memorization.	Classes.	Philosophy, Reading world classics.
Family	Goals, Self-knowledge.	Comparison with family members' professions and lifestyles, Protective parenting, Manipulative guidance or feedback, Self-questioning.	Goal setting.	Families' expectations with their career goals, No guidance for metacognitive regulation, Limited financial support.	Reflection on families' challenging work experiences.	Observe family members' life and work experiences, Required to share career plans with family, Compare life conditions of their prospective career and families'.
Social media	Strategies.	Experts' experiences, Experts' modeling, YouTube and LinkedIn; learning strategies.	Strategies regulation, Control the process, Performance evaluation.	Models for performances, Use and regulate strategies used by models, Check products or performances against the models.	Question the reliability of the posts or latest information.	Do research for the reliability of the post or information, Reflection on models' or experts' experiences, behaviors, and ideas.
Turkish culture	Self-knowledge.	Self-questioning due to the conflicts or negative experiences with the social agents or the cultural norms.	Goal setting.	Fluctuating economy, financial hardships, Look for ways to go abroad or earn more money than the salary.	Conflicts with the traditional social agents, Negative experiences with cultural concepts, norms, traditions, habits of the culture.	Reflection on these conflicts and/or negative experiences, Think about ways to manoeuvre their life.

Discussion

This study examined potential influences of various social agents and the immediate environments on pre-service teachers' individual metacognition development as it may have a social nature (Efklides, 2008; Fox & Riconscente, 2008; Zhang, 2010). The analyses revealed that for Turkish young adults, friends' support may help develop metacognitive competencies. While self-initiated acts on social media help develop regulatory strategies, family and teachers may support young adults with career goals. However, schools and the Turkish culture may impose some limitations on metacognition development. As Heyes et al. (2020) argued, this study also highlighted that the influences of culture may be tracked via its social agents or the environment. It may indeed impose expectations, desired behaviors, and standards as a part of the culture.

Friends was identified as a significant factor for metacognition development. Indeed, friends help each other to engage in metacognitive experiences through discussions and reflections moments on each other's behaviors, ideas, or experiences. While Veenman et al. (2006) highlighted opportunities for metacognition development, this study identified that such experiences might be driven by similar interests, needs, personal, and educational characteristics. As young adults recognize such similarities, metacognitive responsiveness might be initiated easily among friends compared to other agents. Moreover, metacognitive experiences in intimate and genuine relations may be based on trust and understanding each other's position which lead to intellectual engagement in a safe setting. On the contrary to teachers' or family's manipulative feedback or guidance as well as their expectations, young adults may accept their friends' reference points for their limitations, capabilities, or goals.

When young adults engage in metacognitive experiences with their friends, basic principles of social learning theories may operate. Regarding Bandura's (1977, 1991) and Zimmerman's (2000) theories, metacognitive acts can be practiced with friends and feedback can be noted, explicitly as they do peer-evaluation. During collaborative practices, young adults may provide direct reinforcement which may initiate self-reinforcement and self-assessment afterwards. Furthermore, metacognitive experiences with friends may also pertain to Vygotsky's (1978) ZPD and scaffolding. To support each other's task management or goal-attainment, young adults may provide support to each other using the language of thinking and shared-regulation.

In addition to friends' help, young adults may, indeed, tend to improve their metacognitive competencies on their own as Veenman et al. (2006) argued. Social media may offer opportunities for metacognition. Because young adults are not restricted in their choice of content, their engagement in self-directed learning may align with their goals, needs, interests, or identity. Also, when young adults watch a competent model managing tasks, they can adopt new strategies to regulate their cognitions. They can engage in self-assessment via vicarious reinforcement and scaffolding which may sometimes be provided by experts or models. As Vygotsky's (1978, 2012) argued, language shapes thinking and when young adults are exposed to the language of thinking for task performances, they may gain dispositions of thinking in the area of interest.

Metacognitive experiences presented by teachers and families are mostly limited to career goals. Indeed, this is a typical feature of Turkish parents and teachers. As literature highlighted, many teachers might not implement pedagogies of metacognition in their classes and families might not be knowledgeable about such cognitions. It may be teachers' personal characteristics, such as being tolerant, understanding, open to communication and different ideas, and helpful that help young adults develop an understanding about themselves for career goals. Moreover, when families impose manipulative guidance or provide feedback in line with their expectations, young adults may not feel secure and confident. As young adults cannot communicate their ideas or reasoning without a fear of rejection, humiliation, or failure, they may not engage in metacognitive co-regulation with families. Although such moments might present opportunities for metacognitive experiences and metacognitive knowledge of self, power relations might suppress the youths' metacognitive responsiveness.

Indeed, Bandura's (1977, 1991) idea of vicarious reinforcement may occur during the interactions with families as well as teachers. However, such phenomenon might emerge because of negative experiences. When young adults reflect on families' or teachers' reactions and career experiences, they can interpret their thinking or the consequences of their actions. This may compensate their lack of firsthand experiences on the issues. However, they might not implement regulatory strategies because young adults may not be always responsive to the stimuli coming from those agents. Young adults may be aware of that such stimuli may be typically related to career goals or manipulative in favor of the norms.

Finally, school environments or the culture might not always promise potentials for metacognition when they offer limited opportunities for individuality. Indeed, as the Turkish culture may influence the interactions among social agents, negative experiences and conflicts may occur. Still, they lead some to understand who they are and why they react in contradiction to the norms although such mindful reactions may not be common. As a reaction to perceived negative characteristics or experiences, young adults would not recognize and engage in metacognitive experiences, even if the culture or schools presented them, at all. To engage in highly conscious thinking, the youth might need to be appreciated as individuals who have needs, interests, goals, ideas, dreams, and fears.

Conclusions

Metacognitive development might be a complex phenomenon with its interacting personal and social foundations. This study concludes that metacognitive responsiveness may be driven by individuals' ontological fundamentals including needs, interests, goals, and perceptions that help them engage in metacognitive experiences. Also, although various social agents offer opportunities for metacognitive experiences, it may be stakeholders' personal characteristics such as open-mindedness and tolerance that initiate the novices' cooperation. Having genuine relations where the youth can talk about their ideas without a fear of rejection or humiliation may facilitate their metacognition development. Moreover, the cultural norms or school standards may create barriers for intellectual diversity or metacognitive development. They may, indeed, lead to alienation. It is important to recognize that while the youth struggle with manoeuvring the sociocultural standards, they simultaneously try to build up their individuality.

Recommendations

The suggestions of this study may be categorized into two as practical and research implications. Regarding the status quo at the schools or traditions of the Turkish culture, some practices where individuals get familiarized with metacognition and its beneficiary consequences may be implicated. That is, schools may offer elective courses on thinking where students can meet needs, goals, and interests. Similarly, pre-service teacher education curriculum may cover metacognitive practices to familiarize prospective teachers with diverse thinking and help them manage conflicts. Also, families may be offered seminars or workshops where they learn how to support their children's thinking. As the agents get accustomed to metacognitive thinking and practices, the cultural patterns may change towards it.

This study also suggests conducting cross-national and longitudinal research to understand metacognitive development in different socio-cultural settings. The trends may show variations; therefore, metacognitive training practices may be adopted to the specific settings. It may be that some trainings fail in producing desirable outcomes or be insufficient in developing metacognitive competencies because the nature of the trainings may not fuse into the socio-cultural characteristics.

Limitations

In this study, data collection tools and participant recruitment methodologies may impose some limitations on the findings. Metacognition may be assessed via on-line and/or off-line measures. In this study, the TMAI and interviews are off-line measures and they may be criticized for that individuals are not required to execute metacognition for actual tasks (Veenman & van Cleef, 2019). That is, the mean scores on the TMAI may not correspond to on-line metacognitive behaviors. However, the items on the TMAI may serve as a framework for the participants to understand metacognition because all participants might not possess similar perceptions. As the arbitrary mean scores were not used to predict any performance, consequential validity may not be an issue. This study also relied on pre-service teachers' self-reports to understand the phenomena in relation to social factors. While their reports might be socially biased, it would be difficult to observe everyone's interactions with different social agents and in different environments. Participant selection criteria may also impose some limitations on the findings. That is, findings may not be generalizable to other settings because the socio-cultural characteristics of each setting may be different.

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