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Exploring evolutions in reciprocal peer tutoring groups' socially shared metacognitive regulation and identifying its metacognitive correlates

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ABSTRACT

The present study contributes to the emerging research on socially shared metacognitive regulation (SSMR). It investigates which regulation behaviour (i.e. particular skills and low- versus deep-level regulation) is associated with a socially shared regulation focus and identifies time-bound evolutions in individually-oriented metacognitive regulation, co-regulation, and SSMR. More specifically, higher education reciprocal peer tutoring (RPT) groups are studied. All sessions of a semester-long RPT-intervention of five randomly selected RPT-groups were videotaped (70 h of recordings). Time-bound evolutions are studied by means of mixed models for logistic regression analysis allowing change points, whereas binary logistic regressions are used to examine the relation between RPT-groups' socially shared regulation focus and their regulation skills and approaches. The results indicate that RPT-groups demonstrate a significant positive evolution in SSMR and tutee-prompted co-regulation, and a significant negative evolution in tutor-prompted co-regulation. Their socially shared regulation focus is particularly correlated with orientation, monitoring, and deep-level regulation.

1. Introduction

New perspectives on metacognition centre on peers' social interactions during collaborative learning as contextual facilitators when fostering metacognitive regulation (Hadwin, Järvelä, & Miller, 2011; Vauras & Volet, 2013). Conceptual peer discussions, shared knowledge construction, and joint problem solving prompt students to reflect upon their comprehension and to coordinate the collaborative learning process, directly addressing their metacognitive regulation. Collaborative learning groups should, however, not only be considered as facilitative contexts to model, internalise, train, and refine one's metacognitive regulation, they also represent unique social systems, eliciting regulation activities at different levels of social interaction (Iiskala, Vauras, Lehtinen, & Salonen, 2011; Järvelä, Järvenoja, Malmberg, & Hadwin, 2013). During collaborative learning, one peer can, for example, take a more instructive role to guide the metacognitive regulation of another peer, resulting in co-regulation of learning (Grau & Whitebread, 2012; Hadwin, Wozney, & Pontin, 2005; Volet, Summers, & Thurman, 2009). Furthermore, multiple collaborating peers can jointly assume responsibility for the group's learning and interdependently regulate the collaborative learning process towards shared learning goals (Iiskala et al., 2011; Järvelä et al., 2013; Rogat & Linnenbrink-Garcia, 2011). Such socially shared metacognitive regulation (SSMR) is considered the most profound mode of social regulation (Hadwin et al., 2011; Vauras & Volet, 2013) and contributes to an important extent to successful collaborative learning (Iiskala et al., 2011; Volet, Vauras, & Salonen, 2009). Despite growing consensus about the importance of SSMR, research regarding collaborative learners' regulation at the interpersonal level is limited and mainly focuses on either empirically validating the differentiation between self and social forms of metacognitive regulation (e.g. Grau & Whitebread, 2012; Iiskala et al., 2011; Volet, Summers et al., 2009), or unfolding the methodological challenges encountered when identifying episodes of SSMR (e.g. Perry & Winne, 2013; Vauras & Volet, 2013). The present study extends prior research by investigating whether particular metacognitive regulation skills and low- versus deep-level approaches to regulation stimulate/hamper collaborative learning groups' adoption of a socially shared focus when regulating their learning. More specifically, the metacognitive regulation behaviour

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of reciprocal peer tutoring (RPT) groups in higher education is studied. Additionally, this study provides an in-depth analysis of time-bound evolutions regarding RPT-groups' adoption of individually-oriented metacognitive regulation, co-regulation, and SSMR. By unravelling the correlates of RPT-groups' SSMR and portraying developmental data on how SSMR unfolds over time, the current study provides an innovative scope in the metacognition research (Molenaar & Järvelä, 2014; Perry & Winne, 2013; Volet, Vauras et al., 2009).

2. Theoretical underpinnings

2.1. Metacognitive regulation and collaborative learning

Metacognitive regulation refers to a set of self-regulatory skills and strategies which are used by students to actively control, coordinate, and regulate their learning (Hadwin et al., 2011; Meijer, Veenman, & van Hout-Wolters, 2006). Metacognitive regulation activities can be focussed on one's own, a collaborating peer's, or a collaborative learning group's learning process, depending on the regulative agents involved and their underlying intentions (Lajoie & Lu, 2012; Rogat & Adams-Wiggins, 2014; Volet, Summers et al., 2009). Intrinsically, metacognitive regulation concerns a highly idiosyncratic process, guided by individual learning goals and one's personal learning experiences (Brown, 1987; Hadwin et al., 2011; Schunk & Zimmerman, 2007). Nevertheless, collaborative learning contexts also invite students to collectively undertake regulation activities by projecting and transferring this individual process to other students, creating an opportunity to demonstrate metacognitive regulation at a social level (Grau & Whitebread, 2012; Hadwin et al., 2011; Molenaar & Järvelä, 2014). The present study conceptualises collaborative learning as a student-activating instructional approach, in which multiple peers or people from similar social groupings who are not professional teachers, academically work together towards a common goal (Dillenbourg, 1999; Johnson & Johnson, 1999; Topping, 2005). Particular forms of social interaction, such as asking questions, conceptually discussing learning content, providing feedback, explaining, and collectively making decisions, encourage students' active and purposeful acquisition of knowledge and skills (Hurme, Palonen, & Järvelä, 2006; King, 1998; Roscoe & Chi, 2008). Merely putting students together does, however, not guarantee successful collaboration (Dillenbourg, 1999). In contrast, maximising one's own and each other's learning requires (a) positive interdependence or peers' mutual contributions to group interactions, making students aware that peers' help is needed to achieve learning objectives; (b) individual accountability, which ensures that each collaborative learner is responsible for one's own learning and for helping peers to learn; (c) direct interactions through which collaborative learners facilitate each other's efforts to complete the academic task and achieve the group's goals; (d) social skills, which allow students to adequately interact with peers in a way that promotes communication, respectful and productive negotiation, and positive socio-emotional relations; and (e) evaluative judgements on group processes, which foster students' reflections on their own and each other's learning, aimed at optimising future collaboration (Barron, 2003; Dillenbourg, 1999; Johnson & Johnson, 1999). The open learning environment in which collaborative learners operate, additionally requires them to discuss the organisation and permanently control and coordinate their collective learning process and the joint problem solving steps they undertake (Hurme et al., 2006; Iiskala et al., 2011). In other words, successful collaborative learning also demands for and, up to some level, naturally elicits students' adoption of metacognitive regulation skills.

2.2. Metacognitive regulation skills and approaches

We distinguish orienting, planning, monitoring, and evaluating as key metacognitive regulation skills (Brown, 1987; Veenman, Elshout, & Meijer, 1997). When orienting, students engage in task analysis, which might result in becoming aware of one's task perceptions or activating one's prior knowledge (Butler, 2002; Meijer et al., 2006). Planning encompasses selecting and sequencing problem solving strategies and developing action plans (Meijer et al., 2006). Monitoring involves quality control of one's learning or problem solving, aimed at identifying inconsistencies and at optimizing task execution (Meijer et al., 2006; Webb, 2009). Comprehension monitoring refers to control activities focussing on the correctness of one's understanding (Hurme et al. 2006; King, 1998); monitoring of progress focuses on the adequateness of problem solving strategies or the quality of perceived progress (Veenman et al., 1997); whereas monitoring of collaboration is directed at individuals' participation or role taking and the collaboration in the group (King, 1998). Finally, evaluation involves learners' self-judgment upon completion of problem solving (Veenman et al., 1997). This can be directed at the learning outcomes, the problem solving process, or the group members' collaboration[1] (Butler, 2002; Meijer et al., 2006).

Given that collaborative learners' metacognitive regulation is linked to their lower versus higher-order content processing and their approach to learning (King, 1998; Roscoe & Chi, 2008; Volet, Summers et al., 2009), we distinguish low-level and deep-level metacognitive regulation (De Backer, Van Keer, & Valcke, in press). Low-level orientation is directed at exploring task demands, whereas deep-level orientation aims at processing task demands and activating prior knowledge (Butler, 2002). Low-level planning implies the development of a single action plan for problem solving, whereas deep-level planning involves selecting an approach from problem-solving alternatives (Meijer et al., 2006; Veenman et al., 1997). When students check the group's progress, collaboration, or their own or peers' understanding, they engage in low-level monitoring. Reflective comments on the quality of the group's collaboration or perceived progress and elaborative, thought-provoking inquiries imply deep-level monitoring (Chin & Brown, 2000; Roscoe, 2014). Correspondingly, low-level evaluation involves checking and commenting on either learning outcomes or process factors, whereas deep-level evaluation implies reflective judgements on both (Veenman et al., 1997).

Deep-level metacognitive regulation generally advances students' learning. Students adopting a deep-level regulation approach demonstrate profound conceptual understanding and higher levels of cognitive engagement, aimed at elaboration and meaning making (Chin & Brown, 2000; Khosa & Volet, 2014; Volet, Vauras et al., 2009). Additionally, their deep-level regulation approach benefits their learning outcomes (Rogat & Adams-Wiggins, 2014).

2.3. The social dimension in metacognition research

Traditionally, metacognitive regulation has been conceptualised and studied from an individual perspective (Grau & Whitebread, 2012; Hadwin et al., 2011; Iiskala et al., 2011). Prior research aimed at understanding processes individual learners adopt to regulate personal learning. The growing attention paid to collaborative learning in educational research, pushed the attention to the social context in which learners apply metacognitive regulation

[1] It should be noted that both monitoring of collaboration and evaluation of collaboration are only applicable in collaborative learning situations.