When being worse helps: The influence of upward social comparisons and knowledge awareness on learner engagement and learning in peer-to-peer knowledge exchange

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ABSTRACT

Providing learners with awareness of a learning partner's knowledge supports knowledge exchange. However, such knowledge awareness enables social comparison. Because people strive for positive self-evaluation, we propose that less knowledgeable learners who rely on social comparisons for self-evaluation will be motivated to increase their engagement in response to awareness of a more knowledgeable learning partner's knowledge. We tested our hypothesis in two experiments in which we staged a cooperative learning task, assessed participants' predisposition to social comparison, manipulated participants' awareness of learning partner knowledge, and observed the consequences for participants' engagement and learning outcomes. In both experiments, knowledge awareness helped learners match their explanation requests to a learning partner's superior knowledge. At the same time, less knowledgeable learners motivated to engage in social comparisons showed better learning engagement and learning outcomes as a result of knowledge awareness. Understanding and managing this interaction of knowledge awareness and social comparisons has the potential to improve peer-to-peer knowledge exchange.

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1. Introduction

Knowledge exchange between peers is prevalent at all levels of education (Johnson, Johnson, & Smith, 2007). Such exchange can enhance learning by creating socio-cognitive conflicts in learners confronted with different opinions or knowledge levels than their own (Doise & Mugny, 1984). The resolution of such conflicts, in turn, creates more elaborate knowledge structures (Fischer, Bruhn, Gräsel, & Mandl, 2002). Knowledge exchange is facilitated by externalization of knowledge differences, internalization of shared knowledge, as well as knowledge elaboration and elicitation (Fischer et al., 2002; King, 1992; Webb, 1989; Webb & Palincsar, 1996).

Less knowledgeable learners especially benefit from knowledge exchange if they request and receive explanations that fit their learning needs (Crommelinck & Anseel, 2013). However, learners often do not spontaneously seek and provide effective help (Cohen, 1994; Fischer & Mandl, 2005; Kreijns, Kirschner, & Jochems, 2003; Pelgrim, Kramer, Mokkink, & van der Vleuten, 2012). One reason for such difficulty is that people are generally biased in their inference of another person's knowledge; people tend to assume that another person's knowledge is similar to their own (Fischer et al., 2002). Such problems are exacerbated if social and contextual cues that naturally occur in face-to-face interactions, for example nodding and rapid verbal exchanges, are missing, as in computer-supported learning settings (e.g. Clark & Brennan, 1991; Janssen, Erkens, Kanselaar, & Jaspers, 2007; Kiesler, Siegel, & McGuire, 1984; Kraut, Fussell, Brennan, & Siegel, 2002). Consequently, people might fail to request explanations appropriate to a learning partner's knowledge level and might thus fail to elicit satisfying feedback (Birch & Bloom, 2007; Camerer, Loewenstein, & Weber, 1989; Fussell & Krauss, 1992; Nickerson, 1999; Pelgrim et al., 2012; Wittwer & Renkl, 2008).

Studies of computer-supported collaborative learning suggest a way to overcome these difficulties — making learners aware of

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what each learning partner actually knows. We term this state of understanding *knowledge awareness* (Sangin, Molinari, Nüssli, & Dillenbourg, 2011). Once established, knowledge awareness enables learners to better match explanation and help-seeking to a partner's knowledge level and facilitates better learning outcomes (e.g. Bodemer & Dehler, 2011; Dehler, Bodemer, Buder, & Hesse, 2011; Sangin et al., 2011). In fact, one advantage of computer-supported collaborative learning over face-to-face collaborative learning is that knowledge awareness can be explicitly fostered through visual displays of learning partner knowledge (Bodemer & Dehler, 2011; Dehler et al., 2011). With such explicit support, learning through well-structured computer-supported collaboration has the potential to surpass face-to-face contexts (Buder, 2007; Dehler et al., 2011).

To date, however, investigations of the social effects of knowledge awareness on learning are scarce. In one investigation of these social effects, Ray and colleagues found that knowledge awareness enables learners to draw social comparisons (Ray, Neugebauer, Sassenberg, Buder, & Hesse, 2013). If learners know what knowledge their learning partner possesses, they can use him or her as a standard to evaluate their own abilities and attributes (Bandura & Jourden, 1991; Collins, 1996; Festinger, 1954; Muller & Fayant, 2010; Tesser & Cornell, 1991; Ray et al., 2013). In their investigation, Ray et al. (2013) focused on more knowledgeable learners' motivation to communicate knowledge to a less knowledgeable learning partner.

In this work, we develop the idea that knowledge awareness enables social comparison by focusing on less knowledgeable learners. Specifically, we investigate how knowledge awareness impacts less knowledgeable learners' motivation to make use of information provided by a more knowledgeable learner. We pursue this investigation in the context of peer help-seeking via computer supported knowledge exchange.

1.1. Social comparisons and knowledge awareness

Everyday social interactions provide us with opportunities to compare our accomplishments, lifestyles, or abilities with others. People's use of such comparisons in self-evaluation is extensive (Festinger, 1954). In learning settings, available comparisons differ from circumstance to circumstance. Often, a learner can select a wide variety of classmates for comparison (or avoid comparison all together) according to individual needs and momentary motivations. In cooperative learning, however, comparison options are constrained. For the duration of cooperation, learners can only compare themselves with their cooperation partner(s) or avoid comparison altogether.

When faced with a potential comparison, a learner may or may not utilize that comparison for self-evaluation. Whether a learner uses a particular comparison for self-evaluation is heavily influenced by that learner's disposition. There are stable individual differences in the tendency to engage in social comparisons for self-evaluation (Gibbons & Buunk, 1999). Some people are more predisposed than others to rely on these comparisons. The impact of such individual differences is well documented in a variety of domains, such as satisfaction with social life, burnout among nurses and relationship satisfaction (Buunk, Groothof, & Siero, 2007; Buunk, Zurriaga, & Peíro, 2010; Dijkstra, Buunk, Tóth, & Jager, 2007).

In the context of learning in social settings, this means that learners who are predisposed to rely on social comparison for self-evaluation will be more affected by constrained comparison options than will learners who are not similarly predisposed. When comparison options are unconstrained (i.e., learners with a variety of achievement levels are available to compare with), learners who

tend to rely on social comparison are free to seek comparisons that will serve their current goals most effectively. When comparison options are constrained, however (i.e., only superior or only inferior learners are available to compare with), learners predisposed to social comparison tend to utilize available comparisons even when such comparison might be counterproductive (Ray et al., 2013; Wheeler & Miyake, 1992; Wood, 1989).

The combination of learner predisposition to social comparison and constrained comparison targets has negative implications for the behavior of relatively knowledgeable learners during cooperation. Ray et al. (2013) staged a cooperative learning scenario in which participants had to study and explain a lesson on the human immune system to a less knowledgeable learning partner (actually fictitious). During this task, they manipulated knowledge awareness so that participants either became aware of their superior knowledge or did not become aware of knowledge differences. Ray et al. (2013) then observed the effects of social comparison motives and knowledge awareness on information sharing. The authors found that information sharing among learners who were predisposed to social comparison was governed by self-evaluation defense. Knowledgeable learners predisposed to social comparison reduced the amount of information they shared with their learning partner in order to preserve the flattering knowledge difference between them.

The picture that emerges from Ray et al. (2013) is thus alarming. Knowledge sharing is a crucial factor for effective peer-supported learning (O'Donnell & O'Kelly, 1994). Similarly, knowledge awareness is crucial to effective knowledge sharing (Dehler et al., 2011; Sangin et al., 2011). If the combination of knowledge awareness and social comparison undermines knowledge sharing by knowledgeable learners, then learner predisposition to social comparison appears to be a danger to successful peer-support during learning.

This conclusion would be overly simplistic, however. Comparison between one's own performance and a more knowledgeable learner can be good for learner motivation. In fact, when comparison is unconstrained, students generally seek out comparison with better performing others, even at the cost of a less positive academic self-concept (Dijkstra, Kuyper, van der Werf, Buunk, & van der Zee, 2008). Such upward comparison usually evokes the need to reduce discrepancies between one's own and the better performing other's performance and is thus motivating (Buunk, Collins, Taylor, VanYperen, & Dakof, 1990; Huguet, Dumas, Moteil, & Genestoux, 2001; Lockwood & Kunda, 1997). Furthermore, people can choose to compare upward after experiencing failure in order find hope and inspiration as well as to learn how they can improve their performance (Ybema & Buunk, 1993). Seeing another succeed can increase one's motivation to improve because it provides a sense of one's own potential.

Such benefits to upward comparison suggest that the impact of constraining comparison on less knowledgeable learners might be very different from that observed by Ray et al. (2013) with more knowledgeable learners. For less knowledgeable learners, knowledge awareness presents an upward comparison; it suggests their knowledge is lacking. If utilized for self-evaluation, an upward comparison can present a threat to self-esteem or self-evaluation, but that threat is not necessarily detrimental (Buchs & Butera, 2009; Johnson, 2012; for an overview see Wheeler, 2000). Seeing one's own potential in the higher performance of others can actually turn the threatening comparison into a positive prospect for the self. Indeed, in educational contexts, such upward comparisons usually have positive outcomes; they motivate stronger engagement in the learning process (Dijkstra et al., 2008). We thus expect that the combination of knowledge awareness and learner predisposition to social comparison will benefit learner engagement and learning outcomes among less knowledgeable learners in a