Competition versus cooperation: How technology-facilitated social interdependence initiates the self-improvement chain

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Abstract

Consumers are increasingly using technologies such as wearables or mobile apps to achieve their self-improvement goals. Such technologies often contain features that enable social interdependence among users (competition or cooperation) to support them in improving their engagement, performance, and well-being (life satisfaction and personal growth). However, the critical question remains: does competition or cooperation best serve users in attaining these self-improvement goals? Evidence from an online experiment and a field study reveals that competition is more effective in driving performance and personal growth, while cooperation is superior in terms of behavioral engagement and life satisfaction. Furthermore, the results indicate that the effects are mediated by strive for success and fear of failure, two counteracting psychological processes. While competition is the stronger trigger for both pathways, downstream effects vary depending on the self-improvement goal considered. This research thus provides insights into whether and how users can best realize their self-improvement goals using technologies that include social features.

Keywords: Competition; Cooperation; Engagement; Well-being; Self-improvement; Transformative service research

1. Introduction

The pursuit of self-improvement is booming more than ever. A fast-growing number of people engage in activities such as learning, exercising, and healthy eating to increase their performance in the respective areas and ultimately enhance their well-being (Brand Minds, 2019; Devezer et al., 2013; Etkin, 2016). To achieve such self-improvement goals, they increasingly rely on technologies such as wearables or mobile apps. For example, in 2018 over 78% of U.S. adults had used at least one fitness app (Statista, 2018). These technologies often employ features that facilitate social interdependence among users through competitive (e.g., who runs the most miles in a week) or cooperative tasks (e.g., all participants must run a combined 100 miles; Huang, 2018). The reason for enriching self-improvement technologies with such features seems clear: by leveraging the social nature of human beings, these technologies seek to nudge people toward continuous engagement, performance, and well-being.

Competition and cooperation are both thought to stimulate behavioral engagement (e.g., Deutsch, 1949b; Leclercq et al., 2018), performance (e.g., Stanne et al., 1999), and well-being (e.g., Tjosvold et al., 2008). However, empirical findings regarding their impact on well-being are scarce and studies have found differences between their effectiveness when it comes to behavioral engagement and performance in various situations, such as contributing to school-construction projects or playing motor skill–improving computer games (Kistruck et al., 2016; Peng & Hsieh, 2012). Given that the findings remain inconclusive (i.e., some results favor cooperation, while others favor competition), it is critical to examine which type of social interdependence best facilitates the attainment of self-improvement goals. Answering this question is key, as it is because of such goals that most users turn to self-improvement technologies in the first place (Anderson et al., 2013).

To address this important gap, we investigate whether competition or cooperation in the context of self-improvement technologies is more effective in helping users to achieve their personal goals (i.e., behavioral engagement, performance, and well-being). We do so by developing a self-improvement chain framework that integrates social interdependence theory (Deutsch, 1949a; Johnson & Johnson, 2005) and achievement goal theory (Atkinson & Litwin, 1960; Elliot & Church, 1997). Based on the nature of social interdependence inherent in competitive versus cooperative goal structures (Johnson & Johnson, 2005), we predict different outcomes for different goals. Specifically, we consider two opposing psychological paths triggered by social interdependencies: a positive path operating though strive for success and a negative path operating through fear of failure. Our results reveal that competition not only arouses strive for success more effectively than cooperation does but also elicits greater fear of failure. Furthermore, strive for success has a stronger impact on performance and personal growth, while fear of failure affects behavioral engagement and life satisfaction to a greater degree. Hence, the relative strengths of the two indirect paths jointly determine whether a more competitive or cooperative goal structure will be superior for a specific self-improvement goal.

This work offers three main contributions. First, our study contributes to the literature on the user-related impact of engaging and goal-supporting technologies. Surprisingly, little empirical research has been conducted to compare competition and cooperation in terms of downstream consequences such as user behavior and well-being (for a notable exception with regard to engagement and performance, see Kistruck et al., 2016; Peng & Hsieh, 2012). We add to existing literature by developing an integrative framework that links competitive (vs. cooperative) goal structure with self-improvement goal attainment through different goal orientations: strive for success and fear of failure. The two studies discussed within lend support for our framework and

demonstrate that there is no silver bullet for users seeking to attain their self-improvement goals. While competition is more effective in enhancing performance and personal growth, cooperation is superior in terms of behavioral engagement and life satisfaction.

Second, the current study contributes to strengthening the paradigm of transformative service research, a movement that mainly focuses on well-being outcomes related to service usage (Anderson et al., 2013). Our research is the first to link competition and cooperation with both subjective and psychological well-being (Diener, 1984; Ryff, 1989), and our findings emphasize the need to consider the two perspectives jointly. We observe a dialectical tension between competition and cooperation with respect to well-being. Depending on whether a user's focal goal is life satisfaction (subjective well-being) or personal growth (psychological well-being), he or she should opt for services that either establish a cooperative structure or leverage competition, respectively. These insights are relevant for policy makers, as they underline the importance of tracking consumer goals and governing technology design and usage accordingly.

Third, we contribute to the pressing question of how to spark shifts in behavior (White et al., 2019). We demonstrate that social interdependence structures trigger behavioral change in the form of increased engagement, which then serves to achieve further self-improvement goals such as increased performance and well-being. In doing so, we also add to the literature on the individual-level psychological processes that drive behavioral engagement (Hollebeek et al., 2019; van Doorn et al., 2010), pointing out that the achievement goal orientations that emerge when users experience social interdependence—namely strive for success and fear of failure as opposing paths—directly influence behavioral engagement. We emphasize in particular that negative emotions (i.e., fear of failure) can erode engagement—an important insight given that

previous engagement literature has largely focused on positively valenced drivers (Brodie et al., 2011; Hollebeek et al., 2019).

The remainder of the paper is organized as follows. We begin by reviewing the literature on self-improvement goals and social interdependence structures, as well as empirical results from studies that have linked the two. From these literature insights, we develop hypotheses regarding how competition versus cooperation affects self-improvement goal attainment through strive for success and fear of failure. Through two studies—an online experiment and a field study across various self-improvement contexts—we test which social interdependence structure offers better support in reaching the different personal goals. The article concludes with a discussion of the theoretical and practical implications of the findings.

2. Theoretical background

2.1. Self-improvement goals

Many people engage with self-improvement technologies to pursue meaningful life goals (Chan & Briers, 2019; Huang, 2018). For example, they may use the Fitbit app to help achieve their objectives of exercising regularly in order to be fit and happy with themselves. In this paper, we conceptualize three distinct self-improvement goals: (1) behavioral engagement, (2) performance, and (3) well-being. While well-being can be seen as a terminal goal in the self-improvement chain, behavioral engagement and performance are not only ends in themselves but also instrumental to improving well-being (for a discussion on instrumental and terminal goals, see Riediger & Freund, 2004; Rokeach, 1973).

Behavioral engagement refers to the level of effort and attention one devotes to carrying out an activity (Curran et al., 2013). In marketing, engagement typically focuses on a customer's

motivationally driven, volitional investment of knowledge, skills, and equipment into interactions with service systems (Hollebeek et al., 2019; Pansari & Kumar, 2017). Technological systems in particular are thought to attract engagement behaviors (Kumar et al., 2019; Weiger et al., 2019). In the context of self-improvement technologies, behavioral engagement captures how invested a user is in initiating and executing self-improvement activities while using said technologies (Gonida et al., 2009).

Broadly speaking, performance concerns the results of behavior, based on judgmental and evaluative processes (Campbell et al., 1993; Sonnentag & Frese, 2005). Thus, while behavioral engagement captures a user's level of investment in executing certain activities, performance represents its outcomes. In the present context, these outcomes are the results of completed self-improvement-related tasks.

The literature on well-being distinguishes two perspectives: subjective and psychological well-being (Deci & Ryan, 2008; Ryan & Deci, 2001; Ryff, 1989). Subjective well-being has been defined as "a person's cognitive and affective evaluations of his or her life as a whole" (Diener et al., 2009, p. 187). This perspective is therefore concerned with subjective evaluations of life satisfaction (Diener, 1984). Another literature stream—popularized by Ryff (1989) and Ryan and Deci (2001)—focuses on psychological well-being. Ryff (1989) argued that concentrating on subjective well-being alone is insufficient and should be complemented with a focus on optimal human functioning as a consequence of realizing one's full potential. The extent to which individuals make use of their own potentials reflects their personal growth (Ryff, 1989). As self-improvement technologies are designed to facilitate personal growth through autonomous pursuit of certain activities, this psychological aspect of well-being must be considered in parallel to subjective well-being.

In summary, we focus on two aspects of well-being as terminal self-improvement goals, namely life satisfaction and personal growth. These two goals are influenced by two instrumental self-improvement goals: behavioral engagement and performance. Taken together, these goals form the self-improvement chain facilitated by technologies such as fitness or learning apps (see Figure 1). In the following section, we explore how such technologies are designed to support users in their pursuit of self-improvement.

[Insert Figure 1 about here]

2.2. How competition and cooperation influence the pursuit of self-improvement goals

2.2.1. Competition and cooperation as social interdependence structures

Self-improvement technologies often employ social interdependence structures (Koivisto & Hamari, 2019) to foster engagement through elements such as contests (e.g., "Run the most miles in a week!") or team challenges (e.g., "Reach the target of 100 miles in a week for a group of five runners!"). Compared to individualistic structures (e.g., the app tracks run distance and speed), social structures create interdependence during goal pursuit whereby personal outcome is affected by other users' actions (Deutsch, 1949a; Johnson & Johnson, 1989). Social interdependence theory distinguishes two types of interdependence: competition and cooperation (Johnson & Johnson, 2005).

Competition exists when individuals' goal achievements are conflicting (Deutsch, 1949a). For example, individuals regard themselves as being in competition with other users if a task goal can only be achieved by one person (Johnson & Johnson, 2005). A competitive structure promotes oppositional interaction whereby users seek an outcome that is personally beneficial without considering the needs of others.

Cooperation exists when individuals' goal achievements are compatible (Deutsch, 1949a). In such situations users view themselves as working together to achieve a common goal, which can only be reached by supporting one another (Johnson & Johnson, 2005). A cooperative structure promotes interaction whereby users assist and encourage one another while trying to consider the needs of all members equally (Johnson & Johnson, 1989).

2.2.2. Literature review

We focus on competition and cooperation among individuals in goal-related situations to test whether a competitive or cooperative goal structure is more effective in supporting self-improvement goal attainment. Some research has already been conducted to understand the relationships between competition or cooperation and behavioral engagement, performance, and well-being (e.g., Deutsch, 1949b; Lu & Argyle, 1991; Murayama & Elliot, 2012). Table 1 gives an overview of the studies that include both competition and cooperation as well as at least one of the previously mentioned self-improvement goals.

Concerning behavioral engagement, both competition and cooperation appear to exert positive influences (Leclercq et al., 2018), albeit with conflicting findings regarding which of the two drivers boasts a bigger impact. While Peng and Hsieh (2012) noted that a cooperative goal structure led to greater effort in game play settings, Kistruck et al. (2016) found that competitive goal structures led to higher engagement levels in resource-scarce environments. Still other studies detected no significant difference between the effects of competitive and cooperative goal structures on behavioral engagement (Deutsch, 1949b; Morschheuser et al., 2019).

In terms of competitive and cooperative goal structures' influence on performance, prior research revealed that competition has a positive impact on performance (De Dreu, 2007; Kistruck et al., 2016). Yet most studies that have compared the two effects have found no

evidence for any performance-related differences (Deutsch, 1949b; Goldman et al., 1977; Peng & Hsieh, 2012; Tauer & Harackiewicz, 2004).

Very little empirical attention has been paid to the effects of competition and cooperation on well-being, let alone the comparison of the two social interdependence structures. There is some support for the idea that both competition and cooperation are positively associated with subjective well-being (Standage et al., 2005; Tjosvold et al., 2008). Although competition is often labeled as destructive and seen as inferior to cooperation in terms of well-being (Johnson & Johnson, 2005), Standage et al. (2005) emphasized that task-involving competition where each participant focuses on doing his or her best affects well-being similar to cooperation.

[Insert Table 1 about here]

From the literature review, three factors emerged that may play an important role in determining whether competition or cooperation is better for achieving self-improvement goals. First, the context in which people try to achieve their goals under social interdependence is significant. While competition could be the stronger driver of engagement and performance in skill-oriented environments (Johnson & Johnson, 1974; Kistruck et al., 2016), cooperation seems to have the upper hand in environments where executing skills is not of primary concern (Morschheuser et al., 2019; Peng & Hsieh, 2012). Second, whether competition is constructive is also of consequence. Competition is perceived as constructive and thus beneficial for goal pursuit if people perceive efficacy in completing a task; participation in the competition is worthwhile above and beyond winning; all participants have a reasonable chance to win; and there are clear and specific rules, procedures, and criteria for winning (Deutsch, 1949a; Johnson & Johnson, 2005; Stanne et al., 1999; Tjosvold et al., 2003). Third, the task assigned in the interdependence situation determines whether competition or cooperation leads to better results.

The more likely it is that the task can be mastered alone, the more likely it is that competition will result in a stronger performance (Johnson & Johnson, 1974; Stanne et al., 1999).

Considering these three factors in the context of self-improvement technologies, we first note that users are primarily oriented toward skill development itself rather than external perceptions. Second, self-improvement technologies provide feedback about the activities performed and—through standardization of the rules and processes—all users have an equal chance to excel, thereby paving the way for competition to be perceived as constructive. Third, the technologies assign goal-related tasks, which can be achieved or mastered alone with the support of the technology (e.g., subtasks and hints in an app). Hence, it appears that in the context of self-improvement technologies, either competition or cooperation could reasonably outperform the other when it comes to personal goal attainment. Moreover, in their meta-analysis of the relation between competition and performance, Murayama and Elliot (2012) highlighted the importance of considering opposing psychological processes to understand how this social interdependence structure affects downstream consequences. We therefore include the role of opposing achievement goal orientations in our framework to determine whether competition or cooperation is superior for self-improvement goal attainment.

2.3. Hypothesis development

2.3.1. Overview

Against the background of inconsistent findings paired with a marginal focus on directly comparing competitive and cooperative goal structures, it seems imperative to examine their relative effects. The results of previous research cannot satisfactorily answer the key question of which social interdependence structure exerts a relatively stronger influence on personal goal attainment; this holds especially true in the context of self-improvement technologies. We

develop a theoretical framework (see Figure 2) that links social interdependence structures with self-improvement goal pursuit. We argue that distinct interdependence structures (i.e., competition or cooperation) implement different settings that shape the attainment of the instrumental goals of behavioral engagement and performance—and subsequently the terminal goals of subjective well-being (i.e., life satisfaction) and psychological well-being (i.e., personal growth)—by guiding users' achievement goal orientations. We elaborate on these processes in the subsequent sections.

[Insert Figure 2 about here]

2.3.2. The mediating role of achievement goal orientations

Murayama and Elliot (2012) demonstrated that competition (compared to no competition) simultaneously triggers desires and fears concerning success and failure, two important concepts of achievement goal theory. Achievement goal theory provides a framework for studying the opposing types of achievement goal orientations that involve approach and avoidance (Atkinson & Litwin, 1960; Elliot & Church, 1997; McClelland et al., 1953). An approach orientation focuses on performing well compared with others and is experienced as strive for success: the desire for competence, accomplishment, and superior performance (Atkinson, 1957; McClelland et al., 1953). An avoidance orientation, on the other hand, is concerned with eschewing the appearance of incompetence and performing poorly relative to others (Elliot & Church, 1997; Elliot & Harackiewicz, 1996). This orientation is captured by fear of failure: the motivation to prevent oneself from experiencing the shame or embarrassment that is triggered by lack of achievement (Atkinson & Litwin, 1960; Elliot & Reis, 2003). Goal orientations that are set by self-improvement technologies establish a mental framework of how individuals interpret, evaluate, and act in pursuit of a task (Dweck & Leggett, 1988). We therefore posit that the

contextual view of achievement goal orientation can provide a powerful theoretical lens for understanding why and how such technologies influence behavioral engagement, performance, and well-being.

Beyond the impact of achievement goal orientations on the self-improvement chain, we know that the successful pursuit of one's own goals plays an important role in self-determination. In this vein, self-concordance theory—building from and extending Ryan and Deci's (2000) self-determination theory—contends that attaining an immediate personal goal can be instrumental for well-being (Sheldon & Elliot, 1999). This implies that competitive and cooperative goal structures affect well-being to the extent that they contribute to the immediate personal goal attainment of engagement and performance. Thus, in addition to strive for success and fear of failure, behavioral engagement and performance serve as mediators on the path from competition versus cooperation toward well-being. In the following, we specify this path, including the development of propositions regarding whether competition or cooperation should have a stronger relative effect.

2.3.3. Linking social interdependence structures with achievement goal orientations

While both cooperation and competition can increase strive for success and fear of failure, there are several arguments for competition being the stronger driver of both orientations. In a cooperative goal structure, users work together to achieve a common goal and, depending on the specific activity, substitute for one another's actions to a certain degree. As a consequence, users enter an equalitarian mindset and feel joint responsibility for overall team achievement (Johnson & Johnson, 2010). However, reduced individual accountability might limit a user's desire to contribute to team performance (Johnson & Johnson, 2005). In contrast, in competitive settings, users compare their performance with that of other users, suggesting that relative performance is

paramount (Heidemeier & Bittner, 2012). It thus follows that users in competition strive to boost their own success (Johnson & Johnson, 2010). Competition not only emphasizes outperforming others but is also paired with an inherent uncertainty of what is necessary to win (as users lack knowledge of others' future performance; Johnson & Johnson, 1989; Liu et al., 2013). Hence, we expect competition to be a stronger driver of strive for success than cooperation is.

With regard to fear of failure, it must be acknowledged that in cooperative settings, a user's performance affects the outcomes of all collaborators; in a certain way, users are responsible for their collaborators' welfare (Matsui et al., 1987). Because performing poorly and thus failing others has negative emotional consequences (Johnson & Johnson, 2005), cooperative settings are generally thought to incite fear of failure. However, cooperation also involves mutual assistance and exchange of resources among users, which fosters a certain degree of trust (Johnson, 2003) that can act as a buffer to prevent fear of failure from escalating. In contrast, competitive settings focus explicitly on the results of an activity; poor performance and lagging behind others can cause embarrassment or shame (Heidemeier & Bittner, 2012; Johnson & Johnson, 2010). Combined with the high degree of uncertainty surrounding the performance of competitors, we expect competition to prompt greater fear of failure than cooperation does.

In sum, in competitive (vs. cooperative) goal structures, a user's own performance is always key, but there is high uncertainty about the level of performance needed to succeed. Therefore, though both competitive and cooperative goal structures should increase strive for success and fear of failure compared to individualistic conditions, competition may trigger particularly high degrees of both achievement goal orientations. From this, we next formulate hypotheses regarding the relative effects of competitive (vs. cooperative) goal structure on self-improvement goal attainment.

2.3.4. Competition (vs. cooperation) and behavioral engagement

Given the previous argument that competition (vs. cooperation) simultaneously triggers two distinct achievement goal orientations we expect that it influences behavioral engagement through two different paths. Strive for success makes achieving a goal seem more attractive and has therefore been posited to increase engagement (Hollenbeck & Klein, 1987). Hence, strive for success will manifest in high anticipation of task accomplishment and users will exhibit increased behavioral engagement toward goal achievement (Steers, 1975). In contrast, situations where potential failure is exposed to others can lead to avoidance and an urge to escape the situation (Elliot & Thrash, 2004). This means that experiencing fear of failure prior to or during a task is likely to cause decreased engagement, protecting oneself from a painful situation of shame and embarrassment (Elliot & Church, 1997; Elliot & Thrash, 2004). In sum, we argue that social interdependence activates two opposing paths with counteracting effects on engagement. Specifically, we expect that the effect of social interdependence structures on behavioral engagement is mediated in parallel by strive for success as a positive path and fear of failure as a negative path.

Theoretically, if the indirect effect of competition (vs. cooperation) on engagement through strive for success is smaller than its indirect effect through fear of failure, behavioral engagement will be lower (higher) in a competition (cooperation) setting. We expect the negative path—fear of failure—to reveal a greater effect because in the context of self-improvement technologies, competition compared with cooperation facilitates fear of failure to a relatively stronger degree than it does strive for success. This is because cooperation structures reveal one's individual contribution to the common goal for oneself (Chan & Briers, 2019), making each user accountable for success much like in a competitive setting (Johnson & Johnson, 2005) and

thereby reducing the difference between competition and cooperation in triggering strive for success. In contrast, the explicit display of one's achievements compared to others in competition settings makes failure more prominent than in cooperation settings. Hence, the difference between competition and cooperation in strive for success should be less distinct than the difference in fear of failure.

In addition, although strive for success increases the anticipation of goal achievement and thus promotes the user's activity engagement (Steers, 1975), fear of failure may operate even more strongly to undermine engagement efforts as a self-protection function (Elliot & Church, 1997). Fear of failure should have a stronger relation to (dis)continued engagement with an activity, as merely interacting with a self-improvement technology (e.g., using the Fitbit app) already generates quantitative feedback about the activity (i.e., users are always evaluated) and thus fosters an urge to shun the situation. Combining a stronger effect of competition (vs. cooperation) on fear of failure than on strive for success and a stronger effect of fear of failure (than strive for success) on engagement, competition should result in less behavioral engagement than cooperation does.

H_1: The negative indirect effect of competition (vs. cooperation) on behavioral engagement is greater than its positive indirect effect.

2.3.5. Competition (vs. cooperation) and performance

Increased engagement is not only desirable in itself but is also expected to lead to improved performance (e.g., running regularly typically leads to being physically fitter; Silver et al., 2006). This relationship is also implied by self-concordance theory, whereby sustained effort affects task goal attainment (Sheldon & Elliot, 1999). As strive for success is characterized by doing well in comparison to others, it may affect performance directly beyond enhancing engagement

(Elliot & Church, 1997). In contrast, fear of failure as an avoidance orientation has been shown to have a direct negative effect on user performance (Elliot & Church, 1997; Silver et al., 2006). Akin to a self-fulfilling prophecy, people who expect to fail will often do so (Onatsu-Arvilommi & Nurmi, 2000). In addition, the more that users fear failure, the less they will engage to boost their performance or outperform others; and thereby minimize their efforts and stop working on their skill development which then also leads to reduced performance (Elliot & Harackiewicz, 1996; Silver et al., 2006). In sum, we posit that the effect of a competitive (vs. cooperative) goal structure on performance is sequentially mediated by achievement goal orientation (i.e., strive for success and fear of failure) and behavioral engagement.

Regarding the relative strength of the positive and negative effects, we expect a greater magnitude of the positive path. While we predicted a stronger effect for the path through fear of failure than strive for success when it comes to behavioral engagement (H_1), the relationship should be reversed for performance. This is because users with an approach orientation are focused on outperforming others and excel (Hansemark, 1998). By comparison, fear of failure should have a weak direct effect on performance because although users might diminish their efforts to increase performance, they will not actively sabotage it (Elliot & Thrash, 2004). Hence, we suggest that the positive indirect effect of competition (vs. cooperation) through strive for success on performance surpasses the negative indirect effect operating through fear of failure. Therefore, a competitive (vs. cooperative) goal structure should lead to greater performance.

H_2: The positive indirect effect of competition (vs. cooperation) on performance is greater than its negative indirect effect.

2.3.6. Competition (vs. cooperation) and subjective well-being

The preceding sections outline the paths from a competitive (vs. cooperative) goal structure to performance (involving strive for success, fear of failure, and behavioral engagement). Drawing from self-concordance theory (Sheldon & Elliot, 1999), we expect that performance then drives subjective well-being (i.e., life satisfaction). This would imply that the positive path of competition versus cooperation is relatively stronger than the negative path. However, achievement goal orientations are likely to directly influence life satisfaction by shifting attention to anticipated emotions. With high strive for success users concentrate on the positive consequences of accomplishment (Atkinson, 1964) but fear of failure is expected to exert a negative influence: focusing on possible negative outcomes generates negative emotions such as anxiety, which should hamper subjective well-being (Berger & Freund, 2012; Elliot & Church, 1997).

We expect the relative effect of competition (vs. cooperation) on life satisfaction to be negative. We know that losses loom larger than gains (Kahneman & Tversky, 1979); likewise, the anticipation of negative emotions from failure should be more impactful than that of positive emotions from succeeding (Gilovich & Medvec, 1995). Therefore, we propose that the negative indirect effect of competition through fear of failure on life satisfaction is stronger than the positive effect through strive for success. Consequently, a competitive (vs. cooperative) goal structure should lead to reduced life satisfaction.

H_3: The negative indirect effect of competition (vs. cooperation) on life satisfaction is greater than its positive indirect effect.

2.3.7. Competition (vs. cooperation) and psychological well-being

In line with the previous argumentation based on self-concordance theory (Sheldon & Elliot, 1999), we assume that good performance, caused by behavioral engagement, leads to skill development and thus psychological well-being (i.e., personal growth; Hollebeek et al., 2019). Additionally, strive for success may directly promote a feeling of personal growth through positive attitude and the motivation to accomplish something. Furthermore, we argue that fear of failure has only a minor negative impact on personal growth. The widely accepted notion that one can personally grow from failure (Birkinshaw & Haas, 2016; Shepherd, 2003) means that merely being afraid to fail will not necessarily reduce perceived personal growth—unlike its effect on life satisfaction. Hence, a competitive (vs. cooperative) goal structure should lead to enhanced personal growth.

H_4: The positive indirect effect of competition (vs. cooperation) on personal growth is greater than its negative indirect effect.

3. Study 1: The relationship between social interdependence structures and behavioral engagement

3.1. Study goal

The purpose of Study 1 was to investigate the relationship between social interdependence structures and behavioral engagement. Because competition and cooperation are two types of interdependence that trigger opposing achievement goal orientations (see Section 2.3.3), we were primarily interested in determining which type results in greater behavioral engagement and therefore compared their effects.

3.2. Method

Study 1 employed an experiment to investigate whether competition or cooperation is the stronger facilitator of behavioral engagement. To answer this research question, we tested the proposed competing indirect effects through strive for success and fear of failure as well as their relation (H_1).

3.2.1. Design, sample, and procedure

To test hypothesis 1, we used a one-factorial (competition vs. cooperation vs. no social interdependence) between-subjects design. We collected data through an online experiment distributed via university channels and across social media. As an incentive for taking part, four vouchers worth a total of $200 were raffled among all participants. We received 274 responses. To ensure more accurate and powerful tests, we used common data-cleansing procedures to remove systematic error variance and random noise (Meyvis & Van Osselaer, 2018). This resulted in the exclusion of 32 respondents from further analysis and an effective total of 242 participants (67% female, M_{age} = 24 years).

In the experiment, participants were introduced to self-developed scenarios involving a fictitious crowdsourcing app called SelectedLinks (designed after the existing Pocket app). The app allows users to share links to articles on various topics and evaluate those submitted by others in terms of fit with subject matter to determine the top three articles for each topic. Afterward, participants registered themselves with a username to try out the app and were randomly assigned to one of three scenarios: competition, cooperation, or no social interdependence structure. In the competition scenario, participants were presented with nine links shared by other users on the topic of current sports events and were instructed to select the three articles that best fit the topic, based on their titles. They were also informed that the same

task had been assigned to four other users and that all users would be ranked in a leaderboard according to how many of the articles they chose were actually in the top three. The cooperation scenario was identical to the competition one, except participants were told that they were given the task together as a team with four other users and that they would receive collective feedback with the group's combined number of correct selections. The last scenario with no social interdependence structure served as a control group. Here participants were given the same task as in the other scenarios, but they were not briefed about other users or given any feedback regarding their selections. After performing the task but before receiving feedback (to rule out responses biased by participants' task performance), participants were asked to answer questions concerning their strive for success, fear of failure, behavioral engagement, and several control variables (e.g., demographics and affective social identity).

3.2.2. Scenario checks

At the end of the questionnaire, we asked participants to answer manipulation checks and a question about scenario realism. To check the manipulation of the social interdependence structures, we adapted items from Gerpott et al. (2018, see Appendix A). The results indicate that the manipulation worked well. Competition was perceived as significantly higher in the competition scenario than in the other two ($M_{competition}$ = 4.40, $M_{cooperation}$ = 2.55, $M_{no\_social\_interdependence}$ = 2.74; $F(2, 239) = 42.68$, $p < .001$), while cooperation was perceived strongest in the cooperation scenario ($M_{competition}$ = 3.54, $M_{cooperation}$ = 4.48, $M_{no\_social\_interdependence}$ = 3.45; $F(2, 239) = 12.13$, $p < .001$). Furthermore, participants found the app context realistic ($t(241) = 2.57$, $p < .01$) and we found no differences between the competition, cooperation, and control scenarios in terms of realism ($F(2, 239) = 1.83$, $p > .05$; "I believe that SelectedLinks

could be a real-life app"). In addition, there was no significant difference in interest in the chosen topic of sports across groups ($F(2, 239) = 0.39$, $p > .05$; "I am interested in sports").

3.2.3. Measures

We measured all items on seven-point Likert scales (1 = "strongly disagree" and 7 = "strongly agree") and adapted three items each to capture strive for success (Lang & Fries, 2006) and fear of failure (Conroy et al., 2002). To grasp behavioral engagement, we adapted three items by Cheung et al. (2011) and Hollenbeck et al. (1989). Cronbach's alphas confirm high reliability for all constructs ($\alpha \geq .83$), and all factor loadings were significant ($p < .001$; see Appendix A for items, alphas, and loadings). Moreover, the average variance extracted (AVE $\geq .63$) and composite reliability (CR $\geq .83$) suggest that convergent validity and reliability requirements were met (Fornell & Larcker, 1981). To control for within-group variance and eliminate confounds, we included affective social identity [ASI] because it can influence the involvement in app communities (Chiu et al., 2013). We also controlled for narcissism [NAR] because it may explain differences in the statements about strive for success and fear of failure (Konrath et al., 2014). All items are stated in Appendix A.

3.2.4. Model

We adopted seemingly unrelated regressions (SUR) to jointly test our hypothesis and avoid a potential violation of the assumption of independent observations and standard error inflation (Zellner, 1962). Moreover, SUR allows for the simultaneous estimation of direct and indirect effects in our model in order to assess mediation effects (Preacher & Hayes, 2008). Our model estimates three equations concurrently, with the first two representing the mediator models (strive for success [SFS] and fear of failure [FOF] as dependent variables) and the last one representing the engagement model (behavioral engagement [ENG] as the dependent variable):

(1) $SFS_i = \beta_0 + \beta_1 COMP_i + \beta_2 ASI_i + \beta_3 NAR_i + \varepsilon_{1i}$,

(2) $FOF_i = \gamma_0 + \gamma_1 COMP_i + \gamma_2 ASI_i + \gamma_3 NAR_i + \varepsilon_{2i}$, and

(3) $ENG_i = \delta_0 + \delta_1 SFS_i + \delta_2 FOF_i + \delta_3 COMP_i + \delta_4 ASI_i + \delta_5 NAR_i + \varepsilon_{3i}$,

where COMP refers to competition (cooperation as the reference category), while ε_{1i}, ε_{2i}, and ε_{3i} refer to the error terms of subject *i*.

3.3. Results

First, we compared the control group of no social interdependence with the competition and cooperation groups in terms of the effect on behavioral engagement. The results indicate that the social interdependence structures result in increased behavioral engagement ($M_{social\_interdependence}$ = 4.20, $M_{no\_social\_interdependence}$ = 3.83; $t(242) = 1.91$, $p < .05$). For further analyses we only used the groups with social interdependence structures, comparing competition with cooperation.

Table 2 provides the results of the SUR, which show positive and significant effects of competition (vs. cooperation) on strive for success ($\beta_1 = 0.59$, $p < .01$) and fear of failure ($\gamma_1 = 0.83$, $p < .001$). Strive for success ($\delta_1 = 0.29$, $p < .001$) has a positive and significant effect on behavioral engagement, while fear of failure ($\delta_2 = -0.27$, $p < .001$) has a negative effect.

To test the indirect effects of competition (vs. cooperation) on behavioral engagement through strive for success and fear of failure, we employed a bootstrapped SUR (5,000 draws), building on an empirical sampling distribution of the indirect effects (Zhao et al., 2010). We estimated the indirect effects using the products-of-coefficient approach which results in bias-corrected and accelerated bootstrapped confidence intervals for each indirect effect that can then be used for hypothesis testing (Hayes, 2009). Results of this analysis are summarized in Table 3 and offer support for the proposed effects of social interdependence structures on behavioral engagement. Specifically, the results reveal that competition (vs. cooperation) has a significant

positive indirect effect on engagement that is mediated by strive for success ($\beta_1\delta_1 = 0.17$, 95% confidence interval [CI] = 0.05, 0.39). The results also confirm that competition has a significant negative indirect effect on engagement that is mediated by fear of failure ($\gamma_1\delta_2 = -0.23$, 95% CI = −0.41, −0.10).

[Insert Tables 2 & 3 about here]

Hypothesis 1 proposes that the relative indirect effect of competition (vs. cooperation) on behavioral engagement is negative. To test this hypothesis, we extended the analytical procedures outlined by Goh et al. (2013). Using the results presented in the previous subsection, we calculate the ratio of the negative indirect effect (through fear of failure) and the positive indirect effect (through strive for success) on behavioral engagement. Formally,

(4) $\text{RIE}_{\text{ENG}} = \frac{|\gamma 1 \delta 2|}{|\beta 1 \delta 1|} * 100 - 100,$

where RIE_{ENG} is the ratio of competition's (vs. cooperation's) indirect effects on behavioral engagement.

In support of H_1, the results indicate that the negative indirect effect of competition (through fear of failure) on behavioral engagement is of greater magnitude (+31%) than the positive indirect effect.

3.4. Discussion

The findings of Study 1 reveal that competition and cooperation as social interdependence structures have differential effects on behavioral engagement. While both resulted in increased behavioral engagement compared to a control group with no social interdependence structure, a cooperative goal structure resulted in the greatest behavioral engagement. Second, the results indicate that this outcome is caused by the simultaneous activation of two opposing paths. While competition (vs. cooperation) increases both strive for success and fear of failure, the former has

a positive effect on behavioral engagement while the latter exerts a negative effect. The ratio of positive and negative indirect effects of the comparison of competition and cooperation is negative, which indicates a superior positive effect of cooperation on engagement.

Study 1 laid the groundwork for our understanding of the self-improvement chain by revealing behavioral engagement as a function of self-improvement systems. To examine additional effects for performance and well-being, in Study 2 we conducted a field survey among users of real-life apps in various contexts highly relevant for self-improvement.

4. Study 2: The relationship between social interdependence structures, engagement, performance, and well-being

4.1. Study goal

The objective of Study 2 was to replicate the results from Study 1 and investigate the relationship between social interdependence structures, performance, and well-being, in terms of both life satisfaction and personal growth. Because competition results in less behavioral engagement than cooperation does (see Study 1) and engagement is instrumental for enhancing performance and achieving the ultimate goals of well-being (Sheldon & Elliot, 1999), we examine whether and how competition (vs. cooperation) results in increased or decreased performance (H_2), life satisfaction (H_3), and personal growth (H_4).

4.2. Method

We conducted an online field survey to collect data from actual users[1] of six apps across three contexts: education, fitness, and nutrition. We chose these contexts because they not only

[1] Actual users spent a significant amount of time using a specific app to perform an activity with high relevance for their lives. This enabled us to track consequences of app use (and their respective social interaction structures) on performance and well-being.

represent areas in which people set goals to improve themselves but also are directly related to well-being. The first criterion for the selection of focal apps in each context was that they have at least one design element that promotes competition (e.g., a ranking of users based on their achievements within the app community) or cooperation (e.g., team challenges in which users complete a shared task). Most of the apps have elements that can induce both competition and cooperation, but they differ in number and type. The second criterion was app popularity (over 10 million downloads each in Apple's App Store and the Google Play Store) as well as good ratings in the stores (at least four out of five stars). According to these criteria, we selected the following six apps: Duolingo and QuizClash! for the education context, Freeletics and Fitbit for the fitness context, and MyFitnessPal and Yazio for the nutrition context.

4.2.1. Data collection and sample

To target actual users of the focal apps, we developed an online questionnaire that we distributed across social media channels and online communities directly related to one of the apps or the respective context (Wolf et al., 2020). Four vouchers worth a total of $200 were raffled among all participants to increase response rates. We collected data from 811 respondents who had been using one of the focal apps for at least four weeks. Responses from participants who did not complete the survey or answered click-through questions incorrectly were removed from further analysis, resulting in an effective sample of 728 respondents (71% female, $M_{age} = 31$) across the three contexts: 261 in education, 244 in fitness, and 223 in nutrition.

The structure of the survey was as follows: First, respondents chose one of the six apps based on prior use experience. They then answered questions related to the app (e.g., app version), their app usage during the preceding four weeks, and their performance regarding the focal tasks. Then, participants stated the extent to which they perceived the app tasks to be

competitive and cooperative. Afterward, they rated their strive for success and fear of failure when using the app. In the final section, participants completed a portion related to life satisfaction, personal growth, and further control variables (e.g., brand attitude and narcissism).

4.2.2. Measures

We applied the same scales as in Study 1 but measured behavioral engagement by asking respondents to state their actual app usage during the previous four weeks, based on the internal app statistics or histories. Using three items from Greguras and Diefendorff (2010), we measured performance over the course of those four weeks. To measure life satisfaction and personal growth, we adapted three items each (Diener et al., 1985; Ryff, 1989). We adapted four items each to capture perceived competition and cooperation (Gerpott et al., 2018). Again, Cronbach's alphas confirm acceptable reliability for all constructs ($\alpha \geq .83$) and all factor loadings are significant ($p < .001$; see Appendix A for items, alphas, and loadings). Furthermore, the required convergent validity and reliability are satisfied (AVE $\geq .55$, CR $\geq .83$; Fornell & Larcker, 1981). In addition, we evaluated discriminant validity using Fornell and Larcker's (1981) test, which revealed that all square roots of the AVEs are greater than the correlations between the corresponding constructs and all other constructs.

For all subsequent analyses, we centered constructs directly related to the app or the app context (competition, cooperation, strive for success, fear of failure, app usage, and performance) on their respective app's mean to rule out the possibility of systematic differences in effect sizes across apps. Furthermore, we created the independent variable competition emphasis [COM] by subtracting the perceived cooperation from the perceived competition, based on the concept of competitive psychological climate (Brown et al., 1998).

We used the same control variables as in Study 1—affective social identity [ASI] and narcissism [NAR]—while also incorporating user- and app-specific control variables. First, we included network size [NWS] (i.e., the number of people users are connected with in the app) as well as perceived social support [PSS], which can influence both involvement in app communities and well-being (Chiu et al., 2013). Furthermore, we controlled for brand attitude [BAT], length of app use [LAU], self-improvement category ([EDU] for education and [NUT] for nutrition with fitness as reference category), and the use of the premium version of the app [PRE], as all these variables can affect users' engagement, performance, and well-being (Wolf et al., 2020; see Appendix A for the specific items).

4.2.3. Model

Consistent with Study 1, we chose SUR to test our hypotheses. Equations 5 and 6 represent the mediator models (strive for success [SFS] and fear of failure [FOF] as dependent variables), while Equations 7–10 represent the behavioral engagement, performance, and well-being models (behavioral engagement [ENG], performance [PER], life satisfaction [LSF], and personal growth [PEG] as the dependent variables). The model simultaneously estimates the six equations:

(5) $SFS_i = \eta_0 + \eta_1 COM_i + \eta_2 EDU_i + \eta_3 NUT_i + \eta_4 PRE_i + \eta_5 LAU_i + \eta_6 NWS_i + \eta_7 ASI_i + \eta_8 PSS_i + \eta_9 BAT_i + \eta_{10} NAR_i + \epsilon_{1i}$,

(6) $FOF_i = \theta_0 + \theta_1 COM_i + \theta_2 EDU_i + \theta_3 NUT_i + \theta_4 PRE_i + \theta_5 LAU_i + \theta_6 NWS_i + \theta_7 ASI_i + \theta_8 PSS_i + \theta_9 BAT_i + \theta_{10} NAR_i + \epsilon_{2i}$,

(7) $ENG_i = \iota_0 + \iota_1 SFS_i + \iota_2 FOF_i + \iota_3 COM_{i+} + \iota_4 EDU_i + \iota_5 NUT_i + \iota_6 PRE_i + \iota_7 LAU_i + \iota_8 NWS_i + \iota_9 ASI_i + \iota_{10} PSS_i + \iota_{11} BAT_i + \iota_{12} NAR_i + \epsilon_{3i}$,

(8) $PER_i = \kappa_0 + \kappa_1 ENG_i + \kappa_2 SFS_i + \kappa_3 FOF + \kappa_4 COM_{i+} \kappa_5 EDU_i + \kappa_6 NUT_i + \kappa_7 PRE_i + \kappa_8 LAU_i + \kappa_9 NWS_i + \kappa_{10} ASI_i + \kappa_{11} PSS_i + \kappa_{12} BAT_i + \kappa_{13} NAR_i + \epsilon_{4i}$,

(9) $LSF_i = \lambda_0 + \lambda_1 PER_i + \lambda_2 SFS_i + \lambda_3 FOF + \lambda_4 COM_i + \lambda_5 EDU_i + \lambda_6 NUT_i + \lambda_7 PRE_i + \lambda_8 LAU_i + \lambda_9 NWS_i + \lambda_{10} ASI_i + \lambda_{11} PSS_i + \lambda_{12} BAT_i + \lambda_{13} NAR_i + \epsilon_{5i}$, and

(10) $PEG_i = \nu_0 + \nu_1 PER_i + \nu_2 SFS_i + \nu_3 FOF + \nu_4 COM_i + \nu_5 EDU_i + \nu_6 NUT_i + \nu_7 PRE_i + \nu_8 LAU_i + \nu_9 NWS_i + \nu_{10} ASI_i + \nu_{11} PSS_i + \nu_{12} BAT_i + \nu_{13} NAR_i + \epsilon_{6i}$,

where COM refers to competition emphasis (perceived competition – perceived cooperation), while ϵ_{1i}, ϵ_{2i}, ϵ_{3i}, ϵ_{4i}, ϵ_{5i}, and ϵ_{6i} refer to the error terms of subject *i*.

4.3. Results

Table 4 presents the direct effects estimated by the SUR. The results show positive and significant effects of a competition emphasis on strive for success ($\eta_1 = 0.10$, $p < .01$) and fear of failure ($\theta_1 = 0.11$, $p < .01$). Strive for success ($\iota_1 = 0.52$, $p < .05$) has a positive and significant effect on behavioral engagement, while fear of failure ($\iota_2 = –0.66$, $p < .01$) has a negative and significant effect on behavioral engagement. Performance is positively affected by strive for success ($\kappa_2 = 0.20$, $p < .001$) and behavioral engagement ($\kappa_1 = 0.04$, $p < .001$) but also negatively affected by fear of failure ($\kappa_3 = –0.08$, $p < .01$). Furthermore, the findings indicate that strive for success ($\lambda_2 = 0.09$, $p < .05$) and performance ($\lambda_1 = 0.13$, $p < .001$) have significant positive effects on life satisfaction. In contrast, life satisfaction is significantly negatively affected by fear of failure ($\lambda_3 = –0.14$, $p < .001$). Last, personal growth is positively and significantly affected by strive for success ($\nu_2 = 0.31$, $p < .001$) and performance ($\nu_1 = 0.13$, $p < .001$), while fear of failure exhibits no significant effect on personal growth ($\nu_3 = −0.02$, $p > .05$).

[Insert Tables 4 & 5 about here]

4.3.1. Test of hypothesis concerning behavioral engagement

We evaluated our indirect effects hypotheses using the same approach as in Study 1. The results offer support for all proposed indirect effects (see Table 5). Specifically, in replicating Study 1's

findings, the results confirm that competition emphasis has a significant positive indirect effect on engagement that is mediated by strive for success ($\eta_1\iota_1$ = 4.98,[2] 95% CI = 0.57, 13.30). Likewise, competition emphasis has a significant negative indirect effect on engagement that is mediated by fear of failure ($\theta_1\iota_2$ = –7.38, 95% CI = –16.18, –2.01).

To test H_1, we proceeded as in Study 1. Formally,

(11) $RIE_{ENG} = \frac{|\theta 1\iota 2|}{|\eta 1\iota 1|} * 100 - 100,$

where RIE_{ENG} is the ratio of competition emphasis' indirect effects on behavioral engagement.

In support of H_1 and in line with Study 1, the results show that the negative indirect effect of competition emphasis on behavioral engagement through fear of failure is of greater magnitude (+48%) than the positive indirect effect through strive for success.

4.3.2. Test of hypothesis concerning performance

Competition emphasis exhibits a significant positive indirect effect on performance mediated by strive for success ($\eta_1\kappa_2$ = 1.94, 95% CI = 0.62, 4.12) and by the combined path of strive for success and engagement ($\eta_1\iota_1\kappa_1$ = 0.20, 95% CI = 0.03, 0.57). The results also show that competition emphasis has a significant negative indirect effect on performance that is mediated by fear of failure ($\theta_1\kappa_3$ = –0.93, 95% CI = –2.22, –0.20) and by the combined path of fear of failure and engagement ($\theta_1\iota_2\kappa_1$ = –0.29, 95% CI = –0.70, –0.08).

Our approach for examining H_2 was to compute the ratio of the positive indirect effects of competition emphasis on performance (through strive for success and behavioral engagement) and the respective negative indirect effects (through fear of failure and behavioral engagement). Formally,

[2] All effect values, standard errors, and intervals of the bootstrapped indirect effect estimates are multiplied by 100 for easier reporting.

(12) $\mathrm{RIE_{PER}} = \frac{|\eta 1\kappa 2\,|+|\eta 1\iota 1\kappa 1|}{|\theta 1\kappa 3|+|\theta 1\iota 2\kappa 1|} * 100 - 100,$

where $\mathrm{RIE_{PER}}$ is the ratio of competition emphasis' indirect effects on performance.

Confirming H_2, the results indicate that the positive indirect effect of competition emphasis on performance through strive for success and behavioral engagement is of greater magnitude (+75%) than the negative indirect effect through fear of failure and behavioral engagement.

4.3.3. Test of hypothesis concerning life satisfaction

We found that competition emphasis has a significant positive indirect effect on life satisfaction mediated by strive for success ($\eta_1\lambda_2$ = 0.86, 95% CI = 0.17, 2.23); the combined path of strive for success and performance ($\eta_1\kappa_2\lambda_1$ = 0.18, 95% CI = 0.03, 0.54); and the combined path of strive for success, engagement, and performance ($\eta_1\iota_1\kappa_1\lambda_1$ = 0.02, 95% CI = 0.00, 0.07). Furthermore, competition exhibits a significant negative indirect effect on life satisfaction mediated by fear of failure ($\theta_1\lambda_3$ = –1.62, 95% CI = –2.25, –0.58); the combined path of fear of failure and performance ($\theta_1\kappa_3\lambda_1$ = –0.09, 95% CI = –0.28, –0.01); and the combined path of fear of failure, engagement, and performance ($\theta_1\iota_2\kappa_1\lambda_1$ = –0.03, 95% CI = –0.09, –0.00).

To test H_3, we computed the ratio of competition's negative indirect effects on life satisfaction (through fear of failure, engagement, and performance) and its positive indirect effects on life satisfaction (through strive for success, engagement, and performance). Formally,

(13) $\mathrm{RIE_{LSF}} = \frac{|\theta 1\lambda 3|+|\theta 1\kappa 3\lambda 1|+|\theta 1\iota 2\kappa 1\lambda 1|}{|\eta 1\lambda 2\,|+|\eta 1\kappa 2\lambda 1|+|\eta 1\iota 1\kappa 1\lambda 1|} * 100 - 100,$

where $\mathrm{RIE_{LSF}}$ is the ratio of competition emphasis' indirect effects on life satisfaction.

Consistent with H_3, the negative indirect effect of competition emphasis on life satisfaction through fear of failure, behavioral engagement, and performance is of greater magnitude (+64%) than the positive indirect effect through strive for success, behavioral engagement, and performance.

4.3.4. Test of hypothesis concerning personal growth

Competition emphasis shows a significant positive indirect effect on personal growth mediated by strive for success ($\eta_1\nu_2$ = 2.97, 95% CI = 0.96, 5.74); the combined path of strive for success and performance ($\eta_1\kappa_2\nu_1$ = 0.26, 95% CI = 0.07, 0.68); and the combined path of strive for success, engagement, and performance ($\eta_1\iota_1\kappa_1\nu_1$ = 0.03, 95% CI = 0.00, 0.09). The results reveal no significant effect of competition emphasis on personal growth mediated by fear of failure ($\theta_1\nu_3$ = –0.28, 95% CI = –1.18, 0.29) but indicate a significant negative indirect effect of competition on personal growth mediated by the combined path of fear of failure and performance ($\theta_1\kappa_3\nu_1$ = –0.12, 95% CI = –0.35, –0.03) and the combined path of fear of failure, engagement, and performance ($\theta_1\iota_2\kappa_1\nu_1$ = –0.04, 95% CI = –0.11, –0.01).

To verify H_4, we computed the ratio of competition's positive indirect effects on personal growth (through fear of failure, engagement, and performance) and its negative indirect effects on personal growth (through strive for success, engagement, and performance). Formally,

$$(14)\quad RIE_{PEG} = \frac{|\eta 1\nu 2|+|\eta 1\kappa 2\nu|+|\eta 1\iota 1\kappa 1\nu 1|}{|\theta 1\kappa 3\nu 1\,|+|\theta 1\iota 2\kappa 1\nu 1|} * 100 - 100,$$

where RIE_{PEG} is the ratio of competition emphasis' indirect effects on personal growth.[3]

Confirming H_4, the results indicate that the positive indirect effect of competition emphasis on personal growth through strive for success, behavioral engagement, and performance exceeds the negative indirect effect through fear of failure, behavioral engagement, and performance by a factor of 20.[4]

[3] Please note that the indirect effect of competition emphasis on personal growth through fear of failure is not included in the calculation as it is non-significant.

[4] The magnitude of the effect is +1,916%, which is a result of the non-significant direct effect of fear of failure on personal growth (see Table 4).

Furthermore, there are significant effects for some of the controls. First, regarding the specific self-improvement category, the estimation suggests that the apps in the education category stimulate a greater strive for success and behavioral engagement than those in the fitness category. However, there was no difference between the nutrition and fitness categories. Second, premium users experience less fear of failure and exhibit increased behavioral engagement in comparison to users of the free version. Third, the results indicate a significant positive relationship between app usage duration and both behavioral engagement and life satisfaction. Fourth, in terms of community, users express greater life satisfaction with increases in their network size. Furthermore, people who feel attached to or perceive social support from other users, experience enhanced strive for success but also increased fear of failure. Finally, the findings reveal that brand attitude is positively related to strive for success, behavioral engagement, performance, and personal growth.

4.4. Discussion

The main objective of Study 2 was to replicate the results of Study 1 in a non-experimental, real-life setting and extend them by investigating the effect of competition (vs. cooperation) on the entire self-improvement chain. To investigate these relationships, we conducted an online field survey collecting data from actual users of six apps from three self-improvement categories.

Study 2 offers support for the generalizability of our findings by replicating Study 1's results with existing apps across various contexts. While the results indicate that competition increases performance and personal growth more than cooperation does, cooperation exhibits a greater effect on users' behavioral engagement and life satisfaction. These findings not only complement those of Study 1 but also reveal that neither competition nor cooperation alone is the key to maximizing self-improvement goal attainment; instead, competition best supports performance

and psychological well-being, while cooperation helps users stick with an activity and boosts subjective well-being.

5. Conclusion

Consumers are increasingly seeking the support of self-improvement technologies to reach their personal goals—a trend exemplified by the 441% increase in active Fitbit users between 2014 and 2019 (Statista, 2020). But can such technologies really help users achieve their goals? And if so, how should they be designed to best support goal attainment? To address these questions, we examined how competition and cooperation—social interdependence structures implemented extensively across self-improvement technologies—affect the self-improvement chain goals of behavioral engagement, performance, and well-being (life satisfaction and personal growth). Across two studies, we found that no technology-facilitated interdependence structure enabled users to maximize their achievement of all goals simultaneously. More specifically, while competitive goal structures might push users to enhanced performance and personal growth, cooperative goal structures are preferable for increasing behavioral engagement and life satisfaction. These results can be explained by the structures' activation of two counteracting paths—strive for success and fear of failure—that drive users to approach some goals but avoid others even more. Our findings have important implications for theory and practice, which we discuss next.

5.1. Research implications

Our findings are relevant for service technology research in general and transformative service research in particular (Anderson et al., 2013). First, although self-improvement technologies are designed to provide value for their users and help them achieve their goals, there is surprisingly

little marketing literature on whether such technologies in fact do so and how. Though most self-improvement technologies implement social interdependence structures (Huang, 2018), they generally tend to focus on one. This implies that potential users must decide whether competitive or cooperative tasks would be more effective for attaining their personal goals.

Second, by placing our study in the context of self-improvement technologies, where users utilize standardized support systems that help them focus on improving skills, we complement prior work on social interdependence (Deutsch, 1949b; Johnson & Johnson, 2005). We emphasize three factors—task environment, task structure, and task interdependence—that determine how users perceive social interdependence structures and thus form behaviors and outcomes. Variations in these factors may explain why some studies find competition to be as fruitful as or even superior to cooperation in terms of goal attainment (e.g., Goldman et al., 1977; Kistruck et al., 2016), despite the latter generally being portrayed as more beneficial (Johnson & Johnson, 2005). If the task environment is more skill-oriented, competition is constructive, and participants can complete the tasks independently, then competition and cooperation structures could be equally supportive of goal attainment. These conditions are met for the case of self-improvement technologies: users voluntarily select apps to learn or improve their skills and the technology standardizes the process of achieving user goals with the support of the technology alone. Hence, we suggest that technologies can facilitate constructive competition, thus minimizing the dark sides and increasing the bright sides of competition (Reeve & Deci, 1996). Our findings support this conclusion, as competitive goal structures lead to better performance and personal growth than cooperative goal structures do, while cooperation is still superior when it comes to engagement and life satisfaction.

Third, our research contributes to transformative service research (Anderson et al., 2013) by considering users' subjective and psychological well-being as the terminal goal of the self-improvement chain. By revealing that competitive and cooperative goal structures affect life satisfaction (subjective well-being) and personal growth (psychological well-being) differently, our findings reinforce Ryff's (1989) claim that capturing subjective well-being is not enough to understand people's overall well-being. This difference between subjective and psychological well-being is further supported through the opposing psychological paths triggered by social interdependence. The varying strength of their effects on subjective and psychological well-being indicate that in the case of self-improvement technologies with competition or cooperation, one is not likely to optimally satisfy both forms of well-being.

Fourth, by drawing on achievement goal theory (Elliot & Church, 1997; McClelland et al., 1953), we empirically demonstrate that social interdependence structures simultaneously initiate two rival psychological paths in the self-improvement chain. Hence, people experience approach and avoidance tendencies concurrently when using self-improvement technologies. Reinforcing the findings of Murayama and Elliot's (2012) meta-analysis on the relation between competition and performance, we emphasize that both achievement goal orientations must be considered with every social interdependency. Therefore, future research should explicitly account for this inherent dialectic instead of focusing on a single achievement goal orientation or neglecting them altogether.

Indeed, the inconclusive findings of previous research regarding downstream consequences of social interdependence structures (e.g., Kistruck et al., 2016; Peng & Hsieh, 2012) might be the result of neglecting goal orientation as a key mechanism. Our results reveal that in the context of self-improvement technologies, the opposing psychological paths are triggered, but

strive for success (achievement approach orientation) is particularly strongly related to performance and personal growth, while fear of failure (achievement avoidance orientation) has a pronounced impact on engagement and life satisfaction. Thus, the joint consideration of both paths is necessary to identify which of the opposing paths has more sizeable downstream effects across different contexts.

Our insights also highlight the power of psychological orientation for guiding one's behavior and responses in competitively or cooperatively structured tasks. The way people orient themselves in such a situation (fearful or striving) has a considerable impact on their behavior and accordingly their well-being. People's subjective well-being suffers when they fear failure and view a situation in a negative light; priming competitiveness in such contexts would further fuel this negativity spiral of reduced life satisfaction. This is in line with Bittner and Heidemeier (2013), who established a link between the competitive and cooperative mindsets and regulatory focus. Their results revealed that a promotion focus activates a cooperation mindset, whereas a prevention focus activates a competition mindset. However, their study also highlighted the possibility for both paths to be activated and strengthened, which we found when establishing social interdependence structures.

Finally, we contribute to the emerging literature on individual-level antecedents and outcomes of technology-facilitated engagement. Research is beginning to acknowledge the capacity of technologies to enhance individual-level resource development and interpersonal cocreation (Hollebeek et al., 2019; Kumar et al., 2019). We add to this literature by demonstrating that the potential of technology to engage users may follow a fluctuating pattern. Examining the underlying psychological processes that arise when users undertake tasks in a social context (Kannan & Li, 2017), we reveal that strive for success and fear of failure motivate

users to invest different levels of cognitive and emotional resources in engaging with technologies. It is worth noting that competition and cooperation still facilitate greater engagement compared to settings devoid of social interdependence. However, when only comparing the two, strive for success reinforces behavioral engagement and fear of failure inhibits engagement. Our findings contribute to prior engagement literature by demonstrating why customers do or do not complement physical engagement with digital, technology-driven engagement (Kumar et al., 2019; van Heerde et al., 2019) and also point to specific limitations of some engagement-facilitating technologies (e.g., Maier et al., 2015; Weiger et al., 2018). Moreover, linking technology-facilitated engagement with user well-being reveals the central role that behavioral engagement plays when it comes to achieving terminal self-improvement goals. In doing so, we provide evidence for the performance-enhancing effects of technology-facilitated engagement, which represent one of the gatekeeping functions in the self-improvement chain.

5.2. Practical implications

Our findings provide an explanation for why self-improvement technologies such as mobile apps that enable social interdependence among users have seen an ever-increasing number of users and a high rate of permanent use, specifically in the fields of sport, nutrition, and education. Furthermore, they indicate how people can leverage technologies to continue working on their self-improvement goals in times of social distancing (e.g., during pandemics, remote work, and secluded living), when traditional means of interacting with others are infeasible. First, the results of Study 1 demonstrate that both social interdependence structures increase users' engagement goal achievements. This implies that users are well advised to adopt technologies that include either of the two social structures, leaving then significant flexibility in choice of

products and providers. However, if a user aims to maximize life satisfaction, he or she should avoid technologies boasting competitive goal structures; under this condition, a cooperative structure seems to be more effective. Cooperative goal structures reduce people's tendency to flaunt their own superiority and allay their fears of embarrassing themselves in front of others. This in turn likely promotes higher levels of self-esteem and mental health (Johnson & Johnson, 2005). In contrast, if the user prioritizes self-improvement through personal growth, he or she should make use of technologies that rely heavily on competitive goal structures. Not only are such technologies superior when it comes to performance, but they also enhance the feeling of personal growth by permitting their users to focus more on their own development.

Second, we advise policy makers and support organizations (e.g., counseling service providers, health maintenance organizations, insurance companies) to make use of social interdependence structures to encourage meaningful behavioral changes. For example, given the salutary competition effects for performance, health organizations could hold healthy lifestyle contests and award visible tags or badges to the best-performing users or publish the rankings. Encouraging people to compete for healthy lifestyle status might motivate more people to adopt healthier behavior. While competition might offer not only a significant boost to a more results-oriented performance (even more so if the superior results in comparison to reference users were public to the entire group) but also personal growth, cooperation patterns are paramount when it comes to users' continued engagement and life satisfaction. If that is the goal, organizations should assign tasks that can only be fulfilled through affiliation with and acceptance by other users and are impossible to complete alone (Johnson & Johnson, 2005; Stanne et al., 1999).

With this in mind, it becomes clear that social interdependence structures are powerful tools for nudging people toward living healthier and happier lives in a deliberate and voluntary way,

without using coercion, choice restrictions, penalties, or hard economic incentives. Such structures render potentially mundane activities more pleasurable and offer readily available benefits (e.g., sitting at the top of a leaderboard or achieving mutual goals with a community). In this sense, social interdependence structures leverage or "hack" people psychologically by transforming tasks into desirable behavior change (White et al., 2019). However, as interdependence structures not only empower users to strive for success but also generate fear of failure, people using technologies with such structures will always experience some degree of negative emotions, representing the hidden costs of such settings. Therefore, policy makers and support organizations should consider the extent to which the use of social interdependence structures—especially competition—should be promoted, particularly if subjective well-being is the public goal. Remarkably, Instagram and Facebook have been experimenting with hiding likes to help users minimize their focus on competition among them. According to a Facebook spokesperson, some consumers have suggested in interviews that hiding likes would improve their mental health (Wong, 2019). Our empirical results support this position.

Finally, our findings signal that implementing social interdependence structures is a win–win situation for users and self-improvement-technology providers and thus improves collective well-being. The results confirm the engaging effect of competition and cooperation found by prior studies (Eisingerich et al., 2019; Leclercq et al., 2018). For technology providers, particularly those offering free-to-use apps, increased engagement promises increased advertising revenue (Schumann et al., 2014). As behavioral engagement thus represents an admirable goal for both sides, providers should rely on social interdependence structures, offering various tasks with competition and cooperation settings to allow for the differing effects on users' well-being goals. This would grant users the chance to self-select tasks and better

support their individual goal pursuit without losing consumers who dislike either competition or cooperation with other users.

5.3. Limitations and further research

The limitations of our research highlight avenues for further research. First, to increase external validity and consider developments over time, future research could observe the relationship between social interdependence structure and self-improvement goals over extended periods (i.e., exceeding the four weeks used in this study) and record its evolution over several measurement points. Second, as we focus on competition and cooperation as social interdependence structures, it would be useful to examine whether its combination—coopetition—follows different patterns in supporting the attainment of self-improvement goals. Furthermore, other social interactions such as exchange or conflict can emerge in this context and may also influence users' behavior in the context of self-improvement technologies. Similarly, it would also be interesting to develop knowledge on other dimensions of well-being, such as social well-being (Keyes, 1998). Third, apps in the self-improvement categories of education, fitness, and nutrition. Although all apps include social interdependence structures, our participants generally did not perceive them as being overwhelmingly strong—most likely because the apps also contain individualistic tasks to make entry and use as convenient as possible. In this regard, a study with apps boasting only social interdependence structures could demonstrate the strength of the relationship even better. Finally, there may exist situational and personality differences in user preferences which could affect the relationship between the social interdependence structures and users' self-improvement goals.

Appendix A. Constructs and measures for Study 1 and Study 2

		Factor loadings	
Constructs (variable notation)	**Measures**	**Study 1**	**Study 2**
Social interdependence structures			
Competition[a] (Gerpott et al., 2018) α = .88	When using and performing tasks of [App], …		
	… I compete with others.		.875
	… I compete with other users for goal achievement.		.891
	… I can only achieve my desired results if other users are less successful.		.824
	… the achieved results cannot satisfy me and other users at the same time.		.750
Cooperation[a] (Gerpott et al., 2018) α = .83	When using and performing tasks of [App], …		
	… I cooperate with others.		.701
	… other users and I have a common goal.		.709
	… my results should be similarly satisfying for me and for other users at the same time.		.827
	… my goal achievement depends on supporting activities of other users.		.722
Psychological processes			
Strive for success (SFS) (Lang & Fries, 2006) α = .89 (.86)	The tasks of [App] …		
	… encourage me to find out how good I am.	.895	.812
	… animate me to work on a solution immediately.	.875	.804
	… cause me to challenge my capabilities.	.773	.846
Fear of failure (FOF) (Conroy et al., 2002) α = .83 (.89)	When I am failing at the tasks of [App], …		
	… it is embarrassing if others are there to see it.	.830	.823
	… I worry about what others think about me.	.751	.896
	… I worry that others may think I am not trying.	.791	.832
Behavioral engagement (ENG)			
Engagement (Cheung et al., 2011; Hollenbeck et al., 1989) α = .85	I am strongly committed to pursuing the tasks of [App].	.739	
	I am willing to do a lot to solve the tasks of [App] well.	.852	
	I am willing to put forth a great deal of effort in performing the [App] tasks.	.843	
Frequency of use	How many days in the past four weeks have you used [App]?[b]		
Performance (PER)	In the last four weeks …		
(Greguras & Diefendorff, 2010) α = .90	… I made considerable progress with the [App] tasks.		.812
	… I did very well on [App]'s tasks.		.842
	… I met the requirements for [App]'s tasks very well.		.799

	… I mastered everything I was assigned in [App]'s tasks very well.	.868
Well-being		
Life satisfaction (LSF) (Diener et al., 1985) α = .89	In most ways my life is close to my ideal.	.795
	The conditions of my life are excellent.	.932
	I am satisfied with my life.	.832
Personal growth (PEG) (Ryff, 1989) α = .88	I am interested in activities that will expand my horizons.	.736
	When I think about it, I really improved much as a person over the years.	.950
	For me, life has been a continuous process of learning, changing, and growth.	.829
Controls		
Premium version (PRE)	Do you use the premium version of [App]?[c]	
Length of app use (LAU)	For about how many months have you been using [App]?[b]	
Network size (NWS)	I am connected or friends with many users in [App].	
Affective social identity (ASI) (Bagozzi & Dholakia, 2006)	I feel very attached to other users of [App].	
Perceived social support (PSS) (Zimet et al., 1988)	I can count on other users in [App] when things go wrong.	
Brand attitude (BAT) (Bellman et al., 2011)	I think [App] is excellent.	
Narcissism (NAR) (Konrath et al., 2014)	I am a narcissist.	

Note. Items and Cronbach's alphas of Study 2 are reported in brackets if not stated otherwise.
[a] These items were used in Study 1 only as manipulation checks.
[b] The items were measured with an open-ended question.
[c] Premium version was measured as a yes/no question.

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Table 1. Literature overview of the effects of competition and cooperation on engagement, performance, and well-being

Article	Context	Independent variable(s)		Dependent variables				Key findings
		Competition	Cooperation	Engagement	Performance	Subjective well-being	Psychological well-being	
Leclercq et al. (2018)	Co-creation	✓	✓	Customer engagement				• Competition and cooperation increased customer engagement
Morschheuser et al. (2019)	Crowdsourcing	✓	✓	Participation				• No significant difference between competition and cooperation on participation
Kistruck et al. (2016)	Task in a resource-scarce environment	Competitive vs. cooperative goal structure		Group engagement	Goal performance			• Competition leads to higher levels of engagement and performance than cooperation
Peng and Hsieh (2012)	Computer game	Competitive vs. cooperative goal structure		Effort	Goal performance			• Cooperation leads to greater effort than competition does, but no difference in performance
Deutsch (1949b)	Puzzle	✓	✓	Interest, involvement	Task performance			• No significant difference between competition and cooperation on interest, involvement, or performance
Goldman et al. (1977)	Problem-solving task	✓	✓		Group performance			• Overall no significant difference between competition and cooperation on performance • Depending on the task, competition or cooperation leads to higher performance
Tauer and Harackiewicz (2004)	Sport	✓	✓		Performance			• No significant difference between competition and cooperation on performance
Stanne et al. (1999)	Meta-analysis	✓	✓		Performance			• Cooperation increases performance more than competition does, with the exception of appropriate competition

Table 1. (continued)

Article	Context	Independent variable(s)		Dependent variable(s)				Key findings
		Competition	Cooperation	Engagement	Performance	Subjective well-being	Psychological well-being	
Standage et al. (2005)	Physical coordination task	✓	✓			Positive & negative affect, vitality		• Task-involving competition and coopetition increases positive affect and vitality • Ego-involving competition and no competition condition lead to higher levels of negative affect
Tjosvold et al. (2008)	Workplace	✓	✓			Life satisfaction, positive life orientation		• Competition is positively correlated with life satisfaction and positive life orientation • Cooperation is positively correlated with positive life orientation but not life satisfaction
This paper	Self-improvement technologies	Competitive vs. cooperative goal structure		Behavioral engagement	Task performance	Life satisfaction	Personal growth	

Table 2. Study 1 – Results for direct effects

	Strive for success		Fear of failure		Behavioral engagement	
Independent variable	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**
Intercept	1.78***	0.27	1.40***	0.27	3.47***	0.30
Competition (0 = cooperation; 1 = competition)	0.59**	0.21	0.83***	0.21	0.29	0.21
Psychological processes						
Strive for success					0.29***	0.07
Fear of failure					−0.27***	0.07
Controls						
Affective social identity	0.53*	0.07	0.10	0.07	0.18*	0.08
Narcissism	−0.08	0.07	0.15*	0.07	−0.05	0.07
R^2	.24		.12		.21	

Note. n = 172.
* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

Table 3. Study 1 – Bootstrapped indirect effect estimates

Mediation path	**Effect**	**SE**	**LLCI**	**ULCI**
Competition → Strive for success → Behavioral engagement	0.17	0.08	0.05	0.39
Competition → Fear of failure → Behavioral engagement	−0.23	0.08	−0.41	−0.10

Note. n = 172; number of bootstrap resamples = 5,000; LLCI = 95% bias-corrected and accelerated lower-level confidence interval; ULCI = 95% bias-corrected and accelerated upper-level confidence interval.

Table 4. Study 2 – Results for direct effects

	Strive for success		Fear of failure		Engagement		Performance		Life satisfaction		Personal growth	
Independent variable	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**
Intercept	−2.45***	0.30	−0.38	0.34	−12.95***	2.03	−1.14***	0.31	4.63***	0.31	3.85***	0.03
Competition emphasis	0.10**	0.03	0.11**	0.04	0.09	0.21	0.00	0.03	0.06	0.03	0.01	0.03
Psychological processes												
Strive for success					0.52*	0.24	0.20***	0.04	0.09*	0.04	0.31***	0.03
Fear of failure					−0.66**	0.21	−0.08**	0.03	−0.14***	0.03	−0.02	0.03
Behavioral engagement (Frequency of use)							0.04***	0.01				
Performance									0.09*	0.04	0.13***	0.34
Controls												
Education category	0.30**	0.12	0.05	0.13	1.76*	0.75	0.13	0.11	−0.22	0.12	−0.05	0.10
Nutrition category	0.09	0.12	0.11	0.14	0.54	0.79	0.09	0.12	−0.08	0.12	0.02	0.11
Premium version	−0.20	0.11	−0.25*	0.12	2.24***	0.67	−0.06	0.10	0.10	0.11	0.15	0.09
Length of app use	−0.00	0.00	−0.00	0.00	0.03*	0.02	0.00	0.00	0.01*	0.00	0.00	0.00
Network size	0.16	0.04	0.00	0.04	0.29	0.23	−0.00	0.03	0.07*	0.04	0.01	0.03
Affective social identity	0.09*	0.04	0.14***	0.04	0.28	0.24	0.06	0.04	−0.01	0.04	0.01	0.03
Perceived social support	0.09**	0.03	0.13***	0.03	0.05	0.19	0.04	0.03	0.01	0.03	0.03	0.03
Brand attitude	0.35***	0.03	−0.09	0.05	1.26***	0.28	0.13**	0.04	0.05	0.04	0.19***	0.04
Narcissism	−0.00	0.03	−0.38	0.34	−0.44	0.22	0.04	0.03	−0.02	0.03	0.03	0.03
R^2	.14		.14		.13		.20		.10		.27	

Note. n = 728.
* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

Table 5. Study 2 – Bootstrapped indirect effect estimates

Mediation path	Effect	SE	LLCI	ULCI
Competition emphasis → Strive for success → Behavioral engagement	4.98	3.08	0.57	13.30
Competition emphasis → Fear of failure → Behavioral engagement	−7.38	3.54	−16.18	−2.01
Competition emphasis → Strive for success → Performance	1.94	0.85	0.62	4.12
Competition emphasis → Fear of failure → Performance	−0.93	0.49	−2.22	−0.20
Competition emphasis → Strive for success → Behavioral engagement → Performance	0.20	0.13	0.03	0.57
Competition emphasis → Fear of failure → Behavioral engagement → Performance	−0.29	0.15	−0.70	−0.08
Competition emphasis → Strive for success → Life satisfaction	0.86	0.47	0.17	2.23
Competition emphasis → Fear of failure → Life satisfaction	−1.62	0.66	−3.25	−0.58
Competition emphasis → Strive for success → Performance → Life satisfaction	0.18	0.12	0.03	0.54
Competition emphasis → Fear of failure → Performance → Life satisfaction	−0.09	0.06	−0.28	−0.01
Competition emphasis → Strive for success → Engagement → Performance → Life satisfaction	0.02	0.02	0.00	0.07
Competition emphasis → Fear of failure → Engagement → Performance → Life satisfaction	−0.03	0.02	−0.09	−0.00
Competition emphasis → Strive for success → Personal growth	2.97	1.21	0.96	5.74
Competition emphasis → Fear of failure → Personal growth	−0.28	0.36	−1.18	0.29
Competition emphasis → Strive for success → Performance → Personal growth	0.26	0.14	0.07	0.68
Competition emphasis → Fear of failure → Performance → Personal growth	−0.12	0.07	−0.35	−0.03
Competition emphasis → Strive for success → Engagement → Performance → Personal growth	0.03	0.02	0.00	0.09
Competition emphasis → Fear of failure → Engagement → Performance → Personal growth	−0.04	0.02	−0.11	−0.01

Note. n = 728; all effect values, standard errors, and intervals are multiplied by 100 for easier reporting; number of bootstrap resamples = 5,000; LLCI = 95% bias-corrected and accelerated lower-level confidence interval; ULCI = 95% bias-corrected and accelerated upper-level confidence interval.

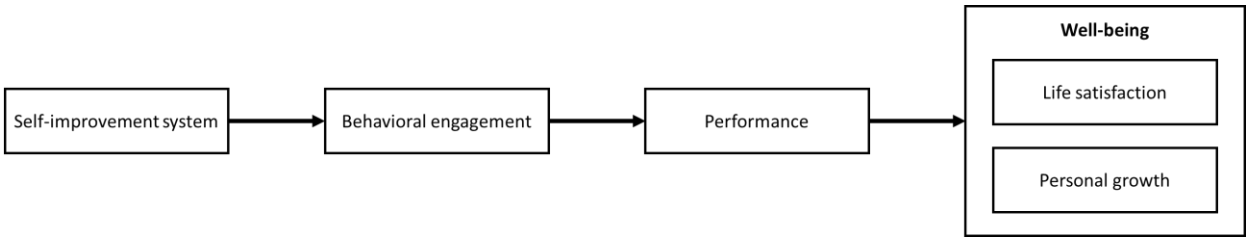

Fig. 1. The technology-facilitated self-improvement chain

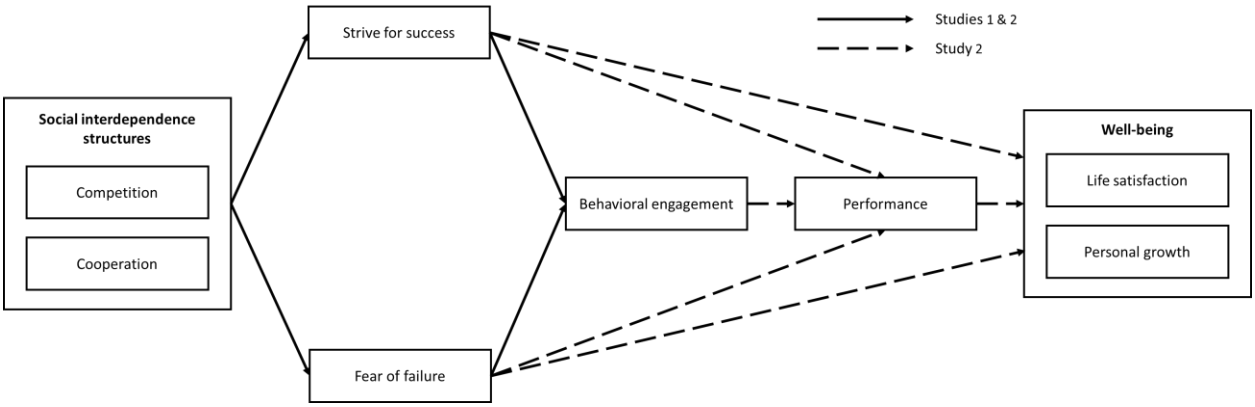

Fig. 2. Research framework: The influence of social interdependence structures on behavioral engagement, performance, and well-being