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ORIGINAL PAPER

Less Frequent but Equally Useful: Social and Temporal Comparisons in Light of Mindfulness and Self-Compassion

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Abstract

Objectives Social and temporal comparisons are ubiquitous and considered important sources of an individual's self-knowledge. Yet, comparisons are inherently evaluative and may result in negative affective consequences. In contrast, mindfulness and self-compassion are characterized by a present-moment, non-evaluative, and accepting stance toward the self and one's experiences and are associated with numerous positive psychological health indicators. This study innovatively examined the associations of mindfulness and self-compassion with frequency and perceived utility of social (i.e., with others) and past-temporal (i.e., with the past self) comparisons across different life domains.

Method In a binational online study, we examined the associations between mindfulness, self-compassion, and comparisons across five different domains (i.e., extraversion, emotional stability, appearance, professional success, and private life) in a gender- and age-diverse sample at two measurement points 6 months apart ($N_{T1}=615$, $N_{T2}=310$, 18–84 years, 51.5% female).

Results Results of multiple regression analyses indicated that the more mindful or self-compassionate individuals were, the less they compared themselves with others or their past self (across domains $\beta=-0.25$ to -0.51; all p-values <0.001). Contrary to our expectations, the overall pattern of results suggests that mindfulness and self-compassion were generally not significantly associated with perceiving comparisons as less useful (after family-wise error correction; $\beta=-0.04$ to -0.14; all p-values ≥ 0.008).

Conclusions The findings suggest that comparisons, when done mindfully and self-compassionately, can be a valuable source of information for self-knowledge. At the same time, mindfulness and self-compassion may buffer against negative affective outcomes of comparison processes.

Preregistration This study is preregistered on the Open Science Framework: https://osf.io/6hfb2.

Keywords Social comparison · Temporal comparison · Mindfulness · Self-compassion

As humans, we frequently compare ourselves with others or with past versions of ourselves across a range of dimensions, for example, how successful we are compared to our colleagues or how athletic we were (or were not) in younger years. While there are many standards individuals can compare to, social comparisons (i.e., with others) and past-temporal comparisons (i.e., with the past self) are among the most prevalent standards people use for comparisons (Morina, 2021). Moreover, comparisons can occur with regard to nearly every human characteristic. Common dimensions along which people tend to compare themselves include professional performance, physical appearance, personality traits, and their personal life (Wheeler & Miyake, 1992; Wilson & Ross, 2000).

Comparisons are ubiquitous and considered to fulfill the fundamental need for self-knowledge (Buunk & Gibbons, 2007; Festinger, 1954), serving as "reference frames in evaluating attributes that constitute the self" (Morina, 2021,

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p. 1281). Moreover, research suggests that self-assessment, self-improvement, or self-enhancement motives may be other important drivers for comparisons (Morina, 2021; Sedikides & Strube, 1997; Wayment & Taylor, 1995).

Accordingly, comparisons are evaluative in nature (Gerber et al., 2018): Individuals use comparisons to determine whether someone else or a past version of oneself is relatively "better," "equal," or "worse" (Morina, 2021; Wilson & Ross, 2000). Some comparisons result in beneficial outcomes (Gerber et al., 2018). For example, individuals may use downward comparisons (i.e., to worse-off comparison standards) to feel better about themselves (e.g. "I am more athletic than I used to be", i.e. self-enhancement; Wayment & Taylor, 1995). Or they may compare to better-off standards (e.g., comparing to a more successful colleague) in order to initiate self-improvement motivation (Morina, 2021; Wayment & Taylor, 1995). Yet, results from a recent ecological momentary intervention study suggest that the positive effects of upward social comparison on motivation are of rather short duration and negative consequences prevail, such as negative affect and lower goal approach (Diel et al., 2024).

Comparisons often happen automatically or involuntarily (Buunk & Gibbons, 2007; Gilbert et al., 1995), and the adequacy of comparison outcomes is rarely questioned or contextualized (Djikic & Langer, 2007). This may substantially impact an individual's self-concept (Morina, 2021): Two recent meta-analyses indicate that most social comparisons are upward, result in less favorable self-evaluations, and are therefore accompanied by negative consequences such as negative emotions or a deflated sense of self-worth (Gerber et al., 2018; McComb et al., 2023). Similarly, upward temporal comparisons led to less positive self-concepts in students (Vogel et al., 2020; Wolff et al., 2018), and adolescents (Gürel et al., 2022).

Given these findings, two critical questions arise: First, can individuals consciously control their use of comparative information, especially when comparisons often occur automatically and involuntarily outside experimental contexts? And second, can individuals deliberately deploy comparisons to achieve neutral or even beneficial outcomes, or at least gain accurate self-knowledge as Festinger (1954) suggested 70 years ago?

One promising approach to addressing these questions may lie in the research on mindfulness and self-compassion. Potentially, mindfulness and self-compassion allow individuals to consciously choose accurate information for self-evaluation, acquire self-knowledge, and inspire self-improvement, and autonomous motivation more sustainably (Breines & Chen, 2012; Carlson, 2013; Djikic & Langer, 2007; Donald et al., 2020; Leary et al., 2007). Moreover, mindfulness and self-compassion may enable individuals to more consciously decide when to consider or disregard comparison information, to discern which comparison information is useful, and how to deal with, and integrate comparison information into their self-evaluation.

Contrary to the evaluative nature of comparisons, mindfulness is inherently non-evaluative. While there is an ongoing debate on one single definition, most researchers agree that mindfulness contains two main aspects: (i) attention and awareness of the present moment and (ii) a non-judgmental, accepting quality about the nature of this attention (Van Dam et al., 2018). Mindfulness is closely linked with self-compassion, but while mindfulness entails an impartial focus on the present moment, self-compassion explicitly promotes a benevolent focus on the self, especially regarding perceived flaws (Neff, 2003). Both, mindfulness and self-compassion, and practices aimed at enhancing them, have been associated with numerous positive psychological, cognitive, emotional, and behavioral outcomes (e.g., Farb et al., 2014; Ferrari et al., 2019; Keng et al., 2011; Neff, 2023; Singer & Engert, 2019; Tomlinson et al., 2018; van Vugt, 2015; Zessin et al., 2015).

Research on the association between mindfulness, self-compassion, and comparisons is relatively scarce, with most studies focusing on *social* comparisons. These studies suggest that mindfulness and self-compassion are negatively associated with social comparison orientation (Egan et al., 2021; Gu et al., 2022; Neff & Vonk, 2009). No research has examined the association with *temporal* comparisons, but it seems reasonable to assume that the findings for social comparisons extend to temporal comparisons as well, given that all comparisons are evaluative and may consequently lead to negative affective reactions (Buunk & Gibbons, 2007; Wolff et al., 2018).

Several mechanisms of mindfulness and self-compassion may facilitate different processing of self-evaluative information and therefore explain the negative association. First, a mindful and self-compassionate awareness enables individuals to quickly and consciously notice arising internal thoughts and emotions, allowing for quicker and more comprehensive information processing (Carlson, 2013). Second, this awareness creates a space between a stimulus (e.g., a sensation, thought, or action of another person) and an individual's response to it (Bernstein et al., 2015; Ludwig et al., 2020; Vago & Silbersweig, 2012). This allows individuals to consciously decide *how* to evaluate and respond to their experience rather than reacting automatically (cf. Teper et al., 2013). Third, mindfulness and self-compassion may generally alter how evaluative information is perceived, selected, and processed. According to the mindful social comparison theory (Djikic & Langer, 2007), mindful comparisons, as opposed to automatic, mindless comparisons, encourage an understanding of one's own and others' thoughts and behaviors as complex, context dependent, and evolving. Moreover, mindful and self-compassionate

individuals potentially process information less defensively (Djikic & Langer, 2007; Terry & Leary, 2011), promoting a healthy self-focus, which is central to acquiring self-knowledge (Carlson, 2013; Morin, 2017).

Numerous empirical studies support these mechanisms, suggesting that mindfulness and self-compassion are associated with increased awareness and cognitive-regulation capacities, such as executive cognitive control (Cásedas et al., 2020; Ferrari et al., 2019; Finlay-Jones, 2017; Im et al., 2021; Tang et al., 2015; van Vugt, 2015). They are also linked to improved emotion- and self-regulation (Ferrari et al., 2019; Finlay-Jones, 2017; Tang et al., 2015), including less emotional lability, higher emotional differentiation (Hill & Updegraff, 2012), improved negative affect regulation (Leyland et al., 2019; Yip & Tong, 2021), and reduced repetitive negative thinking after negative performance feedback (Blackie & Kocovski, 2018, 2019). And last, individuals with higher levels of mindfulness and self-compassion evaluated themselves more positively and accurately during self- and performance evaluations (Langer et al., 2010; Leary et al., 2007), and could better regulate feelings of embarrassment, humiliation, guilt, and failure (Leary et al., 2007).

In the context of self-knowledge and self-evaluation, the above mentioned mechanisms and related empirical findings bear important implications for comparison processes. First, the higher availability of processed information in individuals with higher levels of mindfulness and self-compassion should reduce the number of comparisons, simply because more and different information is available in the self-evaluation process (Carlson, 2013; Djikic & Langer, 2007; Morin, 2017). Second, the created space facilitates a more conscious evaluation of the comparison information. If individuals with higher levels of mindfulness and self-compassion deem a comparison information relevant or useful, they may continue the comparison process. If a comparison information is categorized as irrelevant, unhelpful, or even detrimental, the comparison process may be terminated. This is in line with research showing that higher mindfulness was associated with less frequent use of upward social comparisons in the context of social media usage (Gu et al., 2022), and with results showing that self-compassion seems to buffer the negative effects of social comparisons on the self-image (e.g., Egan et al., 2021; Seekis et al., 2020). Potentially, more mindful and self-compassionate individuals are more likely to identify and stop unhelpful comparisons. This should, again, result in fewer comparisons overall, as well as less perceived utility of comparisons. Last, a mindful, self-compassionate approach to self-evaluation is potentially associated with less negative affective consequences relative to typical comparison outcomes in self-evaluation (Donald et al., 2020; Gerber et al., 2018; Leary et al., 2007; Ludwig et al., 2020). Consequently, mindfulness and self-compassion may be associated with more neutral or better comparison outcomes. Additionally, mindful and self-compassionate individuals may come to better comparison outcomes, because they can better deal with negative comparison outcomes (i.e., less defensive processing and better emotion regulation). That means that these individuals interpret and integrate threatening comparison information differently, resulting in neutral or positive self-evaluations.

To our knowledge, no studies have investigated yet the associations of mindfulness or self-compassion with comparison characteristics such as comparison frequency, perceived comparison utility, and perceived comparison outcome. In the present research, we focused on social and temporal comparisons across five dimensions (i.e., professional performance, physical appearance, two personality traits, and personal life), because these standards and dimensions are among the most common forms (Morina, 2021; Wheeler & Miyake, 1992; Wilson & Ross, 2000). Based on the reviewed literature, we derived the following three assumptions: First, we assumed that individuals higher in mindfulness and self-compassion may show an overall decreased tendency to engage in comparisons. They have access to more and different information for self-evaluation. Tentatively, we supposed that this relationship is stronger for social comparisons. This is, because temporal comparisons have an inherent self-focus, similar to mindfulness and self-compassion (Carlson, 2013; Neff, 2003), and inform individuals on their developmental progress (Wilson & Ross, 2001), making them more readily accessible to the individual. Therefore, we proposed the following two hypotheses: In Hypothesis 1 (H1), we assumed that higher mindfulness is associated with less frequent use of comparisons overall and less frequent use of social comparisons compared with temporal comparisons, both cross-sectionally and longitudinally. In Hypothesis 2 (H2), we suggested that higher self-compassion is associated with less frequent use of comparisons overall and less frequent use of social comparisons compared with temporal comparisons, both cross-sectionally and longitudinally.

The second assumption was that individuals higher in mindfulness and self-compassion may perceive comparisons as less useful for acquiring self-knowledge. They may be more aware of the pitfalls of comparisons, and disregard the comparison information or seek alternative sources to attain an accurate self-understanding. We had no assumptions on differences between the perceived utility of social relative to temporal comparisons. Although individuals with higher levels of mindfulness and self-compassion may compare themselves to their past self more frequently, their orientation toward the present moment and acceptance of past experiences as immutable may reduce the perceived utility of these comparisons for their current self-evaluation. Therefore, we suggested the following hypotheses: In

Hypothesis 3 (H3), we assumed that higher mindfulness is associated with less perceived utility of comparisons, both cross-sectionally and longitudinally. In Hypothesis 4 (H4), we suggested that higher self-compassion is associated with less perceived utility of comparisons, both cross-sectionally and longitudinally.

Lastly, we assumed that individuals higher in mindfulness and self-compassion may contextualize comparison information more flexibly and therefore come to less detrimental outcomes. Alternatively, these individuals may more easily tolerate and regulate negative affect following comparisons, leading to more neutral or positive self-evaluations. In addition to the preregistered primary hypotheses (H1-H4; see https://osf.io/6hfb2; see deviations from the preregistration in Table S1 in the Supplementary Information), we therefore analyzed, in an exploratory manner, how mindfulness and self-compassion relate to the perceived comparison outcome.

Method

Participants and Procedure

Power analyses ($1-\beta=0.90$, $\alpha=0.05$) indicated that we needed 108 participants to detect an effect size of at least $f^2=0.1$. However, data were collected within a larger research project, and power analyses were based on research questions that required structural equation modeling for interaction effects. We therefore aimed for a sample of 330 participants, which would allow us to detect a small effect size ($f^2=0.03$) for our purposes. For purposes of generalizability beyond single country studies, we collected data from 330 German participants and 330 U.S. participants, respectively. Participants' data from both countries were combined for the present study's purpose. The data set, analysis code, and study materials are available at https://osf.io/f6qc8/. Along with the hypotheses, exclusion criteria, measures, analyses, and inclusion of control variables were preregistered on the OSF: https://osf.io/6hfb2. The study was approved by the Ethics Committee of the Faculty of Behavioural and Cultural Studies at Heidelberg University, Germany (Wrzus 2019 1/1).

Between August 2021 and May 2022, we collected self-report data at two time points 6 months apart from a German and a U.S. sample on the online platform Clickworker. Participants received monetary compensation for their participation (up to €13.00, approximately 15.05 USD). We aimed for an age- and gender-diverse sample: We created five age groups (18–30 years, 31–44 years, 45–58 years, 59–72 years, and 73–86 years) in the German sample, and four age groups in the U.S. sample (the last group included participants between 59–75 years). We did this separately for people who identified as either female or male which resulted in a total of 10 and 8 strata, respectively, and a total of 648 participants. These participants gave informed consent, provided sociodemographic information, and filled out the study questionnaires. After data collection, we thoroughly checked data quality. We excluded participants with suspicious response patterns as indicated by (unrealistic) speediness (< 15 min), longstrings (> 10), failed attention checks, and obvious misunderstanding or neglect of instructions. This resulted in an exclusion of 14 participants in the German sample and 19 participants in the U.S. sample.

The final sample at Time 1 (T1) consisted of 615 participants ($n_{Germany}=313$ and $n_{USA}=302$; $M_{Age}=42.3$, $SD_{Age}=14.5$, 52% female). Six months after T1, we invited the participants to fill out the same questionnaires again. At Time 2 (T2), after applying the same exclusion criteria, 310 participants provided self-report data ($n_{Germany}=229$, 26.84% dropout; $n_{USA}=81$, 73.18% dropout; $M_{Age}=45.1$, $SD_{Age}=13.9$; 53% female). Sample descriptives can be found in Table 1.

Measures

Mindfulness was measured with the 39-item Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006; Michalak et al., 2016). The FFMQ measures five facets of mindfulness, namely Observe, Describe, Act with Awareness, Non-Judge (8 items each), and Non-React (7 items). Items were answered on a 5-point Likert scale from 1 = *never or very rarely true* to 5 = *very often or always true*. Indicators for internal consistency (McDonald's ω) of all measures at T1 are depicted in Table 2 (values for T2 can be found in Table S2 in the Supplementary Information).

We preregistered the inclusion of two subscales of the Comprehensive Inventory of Mindfulness Experiences (CHIME; Bergomi et al., 2014) as an additional measure of mindfulness. Description of these subscales and results for the CHIME can be found in the Supplementary Information.

Self-compassion was measured with the 12-item short-version of the Self-Compassion Scale (Hupfeld & Ruffieux, 2011; Raes et al., 2011). The scale captures the positive dimensions of self-compassion, Mindfulness, Self-Kindness, and Common Humanity, and their negative counterparts, Overidentification, Self-Criticism, and Isolation, with two items, each rated on a 5-point scale from 1 = *almost never* to 5 = *almost always*.

Based on previous research (e.g., Wayment & Taylor, 1995; Wilson & Ross, 2000), we developed items to measure comparison frequency, perceived comparison utility, and perceived comparison outcome in five domains: extraversion, emotional stability, appearance, professional success, and private life. For the U.S. sample, the items were translated and harmonized by the project team and then checked for spelling, grammar, and cultural appropriateness by a professional translation company.

Table 1 Sample Descriptives at T1 and T2

Variable	Overall (n_{T1} = 615; n_{T2} = 310)	Germany (n_{T1} = 313; n_{T2} = 229)	USA (n_{T1} = 302; n_{T2} = 81)
Gender T1 (% female)	51.5	49.8	52.0
Gender T2 (% female)	53.4	51.5	56.8
Age T1 (years)			
M (*SD*)	42.3 (14.47)	43.3 (14.91)	41.32 (13.94)
Md	41	42	41
Range	18–84	18–84	18–78
Age T2 (years)			
M (*SD*)	45.1 (13.93)	46.07 (14.61)	42.27 (11.39)
Md	45	47	42
Range	18–84	18–84	21–68
Prior meditation experience[a], *n* (%)	310 (50.4)	147 (47.0)	163 (54.0)
Experience in hours[a], *n* (%)			
Less than 10 hr	100 (32.3)	43 (29.3)	57 (35.0)
10–50 hr	142 (45.8)	75 (51.0)	67 (41.1)
50–100 hr	37 (11.9)	15 (10.2)	22 (13.5)
More than 100 hr	31 (10.0)	14 (9.5)	17 (10.4)
Mindfulness practice[a], *n* (%)			
Daily	19 (6.1)	4 (2.7)	15 (9.2)
A few times a week	45 (14.5)	20 (13.6)	25 (15.3)
A few times a month	73 (23.5)	35 (23.8)	38 (23.3)
Once a month	40 (12.9)	21 (14.3)	19 (12.0)
One or two times in half a year	63 (20.3)	29 (19.7)	34 (20.9)
Less than once a year	26 (8.4)	10 (6.8)	16 (9.8)
Never	44 (14.2)	28 (19.0)	16 (9.8)

Note. [a]Information on meditation experience was only collected at T1

Table 2 Bivariate Correlations of Study Variables at T1 Below the Diagonal, Retest-Reliabilities Between T1 and T2 Measures on the Diagonal

Variable	*M* (*SD*)	ω	FFMQ	SCS	Frequency			Utility			Outcome		
					Overall	Social	Temporal	Overall	Social	Temporal	Overall	Social	Temporal
FFMQ	3.28 (0.51)	0.92	0.85										
SCS	3.02 (0.69)	0.86	0.68	0.76									
Frequency	3.72 (1.02)	0.86	−0.37	−0.37	0.77								
Social	3.73 (1.12)	0.78	−0.42	−0.41	0.93	0.78							
Temporal	3.70 (1.09)	0.75	−0.27	−0.27	0.92	0.71	0.70						
Utility	3.21 (1.19)	0.87	−0.15	−0.09	0.65	0.57	0.63	0.68					
Social	2.99 (1.23)	0.78	−0.16	−0.09	0.59	0.58	0.51	0.93	0.68				
Temporal	3.43 (1.31)	0.78	−0.13	−0.07	0.61	0.47	0.66	0.94	0.73	0.61			
Outcome	2.92 (0.52)	0.73	0.27	0.42	0.00	−0.04	0.04	0.31	0.26	0.32	0.76		
Social	2.81 (0.57)	0.60	0.35	0.49	−0.06	−0.12	0.01	0.25	0.23	0.23	0.86	0.76	
Temporal	3.03 (0.62)	0.60	0.14	0.26	0.05	0.04	0.06	0.30	0.22	0.33	0.88	0.53	0.68

Note. *Nn* = 615 below the diagonal, *n* = 310 on the diagonal. FFMQ = Five-Facet Mindfulness Questionnaire; SCS = Short Self-Compassion Scale; Frequency = comparison frequency; Utility = perceived comparison utility; Outcome = perceived comparison outcome. All $r \geq |0.12|$ are significant at $p < 0.05$

For each domain, the frequency of social and temporal comparisons was assessed with one item each (e.g., "How often do you compare yourself with other people regarding your appearance?") using a 7-point bipolar scale (1 = *never*, 7 = *always*). Perceived comparison utility of social and temporal comparisons was assessed with one item each (e.g., "How useful do you find comparisons with yourself in the past regarding your private life?") using a 7-point bipolar scale with three anchors (1 = *not at all useful*, 4 = *neither/nor*, 7 = *very useful*). Perceived comparison outcome of social and temporal comparisons was measured with one item each (e.g., "How do you evaluate yourself compared with other people regarding how sociable you are?") on a 5-point bipolar scale ranging from 1 = *much less [sociable/calm/…]* to 5 = *much more [sociable/calm/…]*. This resulted in a total of 30 items, 15 items for each comparison standard (social and temporal). The mean and standard deviation for the items on dimension level (i.e., separately for social and temporal comparison frequency, perceived utility, and perceived outcome for extraversion, emotional stability, appearance, professional success, and private life) can be found in Table S3 in the Supplementary Information. Confirmatory factor analyses revealed that items loaded on assumed higher-order factors with loadings of at least 0.32 (see Table S4 in the Supplementary Information). For the current purposes, we therefore aggregated the dimensions to measure a general comparison frequency, a general perceived comparison utility, and a general perceived comparison outcome, and the same for social and temporal comparisons separately. For a comprehensive analysis of the factor structure, more information on the items on dimension level, and more details on the psychometric properties, please refer to Wrzus et al. (2024).

We included age and meditation experience as covariates because these had a significant effect on the study's main variables. Meditation experience was operationalized as a factorial variable indicating how much experience with meditation, in hours, participants had. For analysis purposes, we dummy coded this variable into two variables (i) little meditation experience (< 50 hr) versus none and (ii) some meditation experience (> 50 hr) versus none, respectively.

Data Analyses

Data were analyzed with multiple regressions using the software R (Version 4.0.5; R Core Team, 2021). We conducted the data analyses with outliers and with winsorized values ($M \pm 3$ *SD*). The analyses did not differ, therefore, we continued with winsorized outliers and report only these analyses. Family-wise error correction was applied within the same family of regressions (Bonferroni correction; new $\alpha = 0.05/6 = 0.008$).

Results

Descriptive statistics, McDonald's ω at T1, bivariate correlations at T1, and retest-reliabilities are depicted in Table 2 (values for T2 are given in Table S2 in the Supplementary Information). All associations between the study's main variables were in line with the suggested relationships. Unexpectedly, we found mean differences in mindfulness, self-compassion, comparison frequency, and perceived comparison utility between the German and U.S. samples (see Table S5 in the Supplementary Information). However, when we additionally controlled for the participants' nationality, the overall result patterns did not change (see additional analyses on OSF: https://osf.io/f6qc8/).

Dropout analyses indicated significant differences between participants who continued and discontinued participation at T2 on age, mindfulness, comparison frequency, perceived comparison utility, and perceived comparison outcome (but not on self-compassion) at T1. In summary, participants who completed both surveys were older, more mindful, compared less frequently, perceived comparisons as less useful, and perceived their comparison outcomes as worse than did non-completers (see Table S6 in the Supplementary Information).

The results of the regression analyses are depicted in Fig. 1 and Fig. 2 (as well as in Tables S7-S10 in the Supplementary Information). In line with H1, mindfulness was associated with less frequent use of comparisons overall, both cross-sectionally and longitudinally (see Fig. 1, Panel A, and Table S7). Because the 95% confidence intervals (CIs) of mindfulness regression weights for social (T1 [−0.50, −0.33], T2 [−0.52, −0.27]) compared with temporal (T1 [−0.37, −0.19], T2 [−0.37, −0.13]) comparison frequency overlapped, we could not infer that mindfulness was associated with less frequent use of social comparisons compared with temporal comparisons.

The same result pattern emerged for self-compassion. Self-compassion was associated with less frequent use of comparisons overall, both cross-sectionally and longitudinally (H2; see Fig. 1, Panel B, and Table S8). Again, both comparison standards did not seem to differ in their association with self-compassion because 95% CIs overlapped (social comparison: T1 [−0.50, −0.33], T2 [−0.63, −0.39]; temporal comparison: T1 [−0.36, −0.19], T2 [−0.41, −0.18]).

Contrary to Hypothesis 3, the overall pattern of results suggested that mindfulness was not associated with less

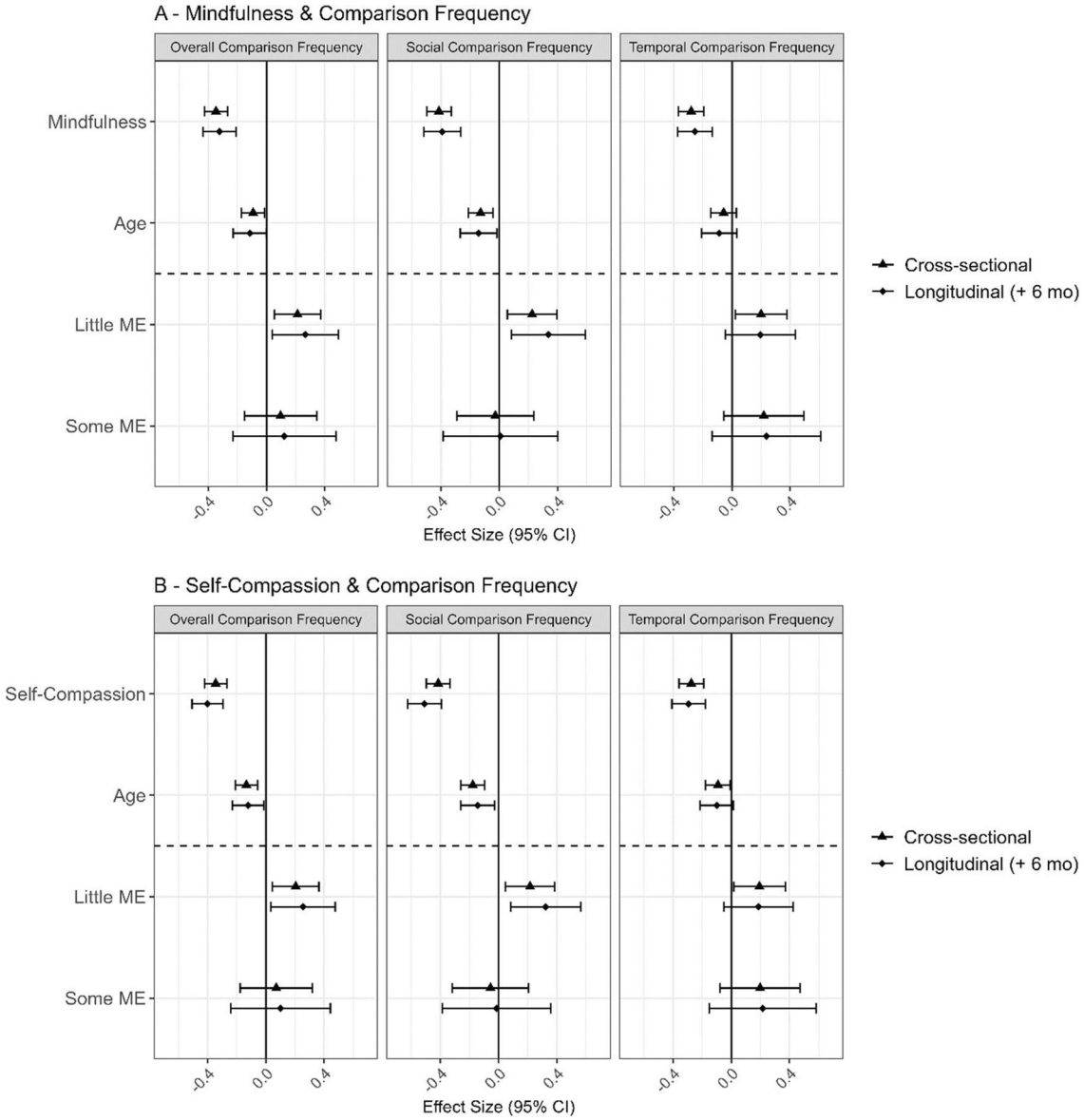

Fig. 1 Results of the Multiple Linear Regressions for Prediction of Comparison Frequency by Mindfulness (Panel A) and Self-Compassion (Panel B)**.** *Note*. This figure displays the regression weights and the respective 95% CIs of the regression of comparison frequency at T1 and T2 on mindfulness at T1 (with control variables; Panel A) and self-compassion at T1 (with control variables; Panel B), both overall and separately for social and temporal comparisons. Values above the dotted line are standardized; values below the dotted line are unstandardized. Values on the left mean less comparison frequency. Little ME = no versus little meditation experience (< 50 hr); Some ME = no versus some meditation experience (> 50 hr)

perceived utility of comparisons (see Fig. 2, Panel A, and Table S9). Similarly, higher self-compassion was not associated with less perceived utility of comparisons, both cross-sectionally and longitudinally (H4; see Fig. 2, Panel B, and Table S10).

Exploratory analyses indicated that mindfulness was associated with a better perceived comparison outcome overall, both cross-sectionally and longitudinally (see Fig. 3, Panel A, and Table S11). This was also true for self-compassion, for which higher values were associated with better perceived comparison outcomes overall, both cross-sectionally and longitudinally (see Fig. 3, Panel B, and Table S12).

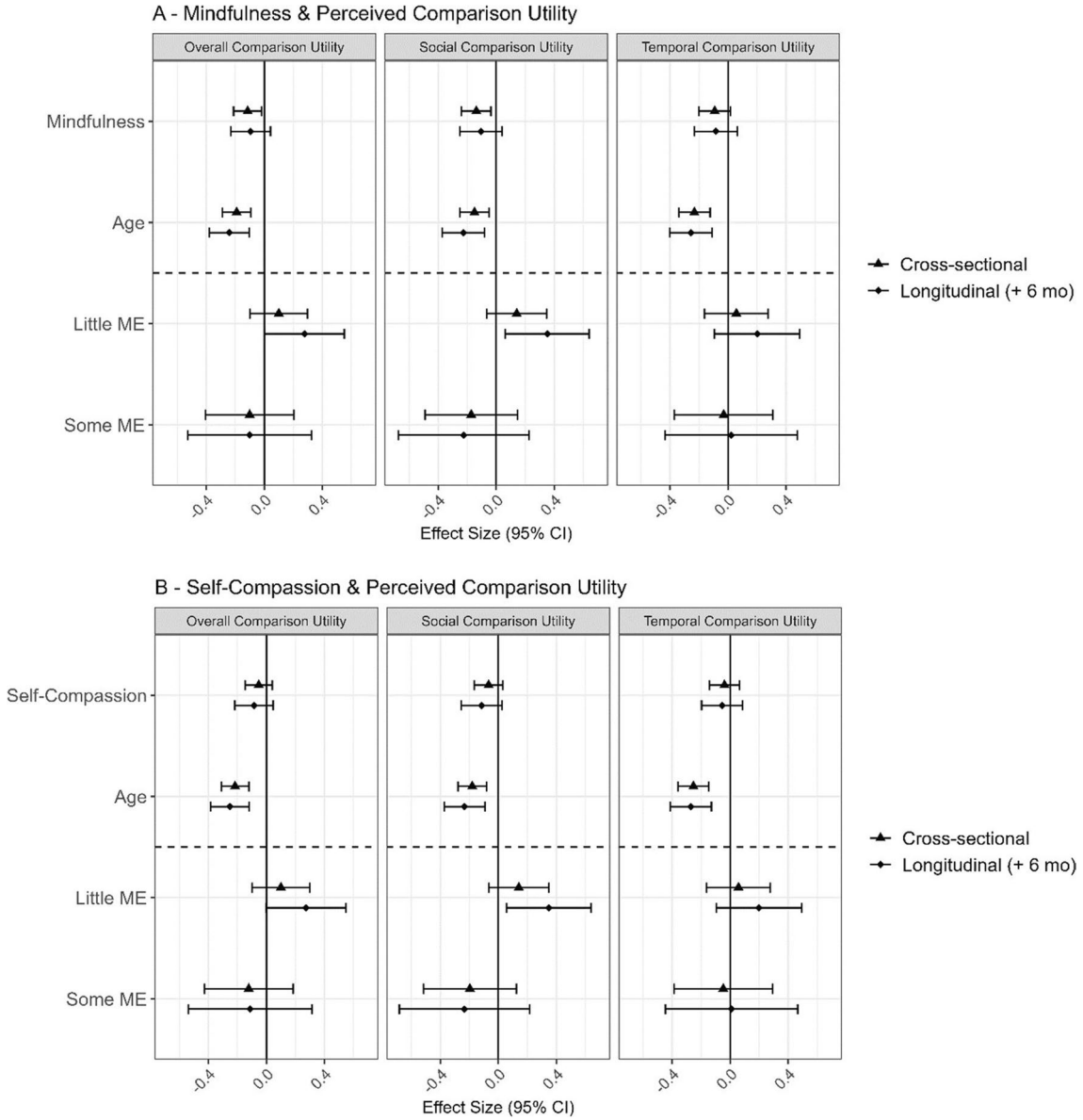

Fig. 2 Results of the Multiple Linear Regressions for Prediction of Perceived Comparison Utility by Mindfulness (Panel A) and Self-Compassion (Panel B). *Note.* This figure displays the regression weights and the respective 95% CIs of the regression of perceived comparison utility at T1 and T2 on mindfulness at T1 (with control variables; Panel A) and self-compassion at T1 (with control variables; Panel B), both overall and separately for social and temporal comparisons. Values above the dotted line are standardized; values below the dotted line are unstandardized. Values on the left mean less perceived comparison utility. Little ME = no versus little meditation experience (< 50 hr); Some ME = no versus some meditation experience (> 50 hr)

Discussion

The objective of this study was to investigate the associations between mindfulness and self-compassion with basic comparison characteristics, that is, frequency and perceived utility of social and temporal comparisons. Results from this large, binational, age- and gender-diverse sample suggest that the more mindful and self-compassionate individuals are, the less they use social and temporal comparisons to evaluate their standing across professional performance, physical appearance, personality characteristics, and their personal life. Contrary to our expectations, more mindful and self-compassionate individuals did not perceive social or temporal comparisons as less useful than individuals with lower scores on mindfulness and self-compassion regarding the same domains. However, individuals with higher mindfulness and self-compassion scores perceived themselves as having a better standing across professional performance, physical appearance, personality characteristics, and their personal life overall

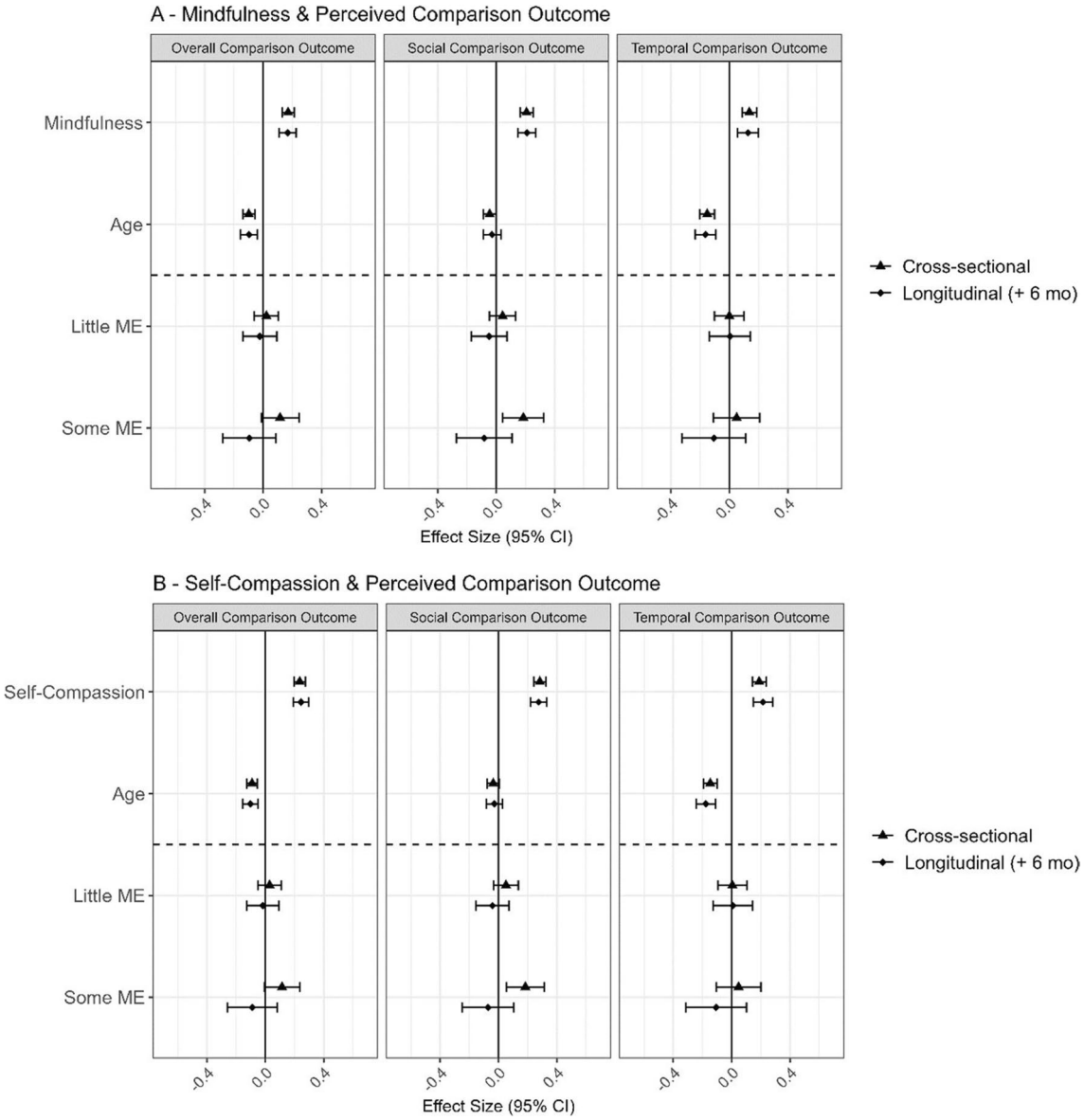

Fig. 3 Results of the Multiple Linear Regressions for Prediction of Perceived Comparison Outcome by Mindfulness (Panel A) and Self-Compassion (Panel B). *Note*. This figure displays the regression weights and the respective 95% CIs of the regression of perceived comparison outcome at T1 and T2 on mindfulness at T1 (with control variables; Panel A) and self-compassion at T1 (with control variables; Panel B), both overall and separately for social and temporal comparisons. Values above the dotted line are standardized; values below the dotted line are unstandardized. Values on the left indicate a worse comparison outcome. Little ME = no versus little meditation experience (< 50 hr); Some ME = no versus some meditation experience (> 50 hr)

compared with others or with their past selves. Because we chose a prospective longitudinal design, this also offers preliminary evidence for the stability and predictive value of mindfulness and self-compassion of basic comparison characteristics.

We suggest that individuals higher in mindfulness and self-compassion use fewer social and temporal comparisons for self-evaluations because of enhanced processing and integration of more information from various sources (e.g., nonverbal cues in social situations, enhanced interoceptive perception; Carlson, 2013). These individuals may also process the available information less defensively and consider it as valid feedback rather than ego-threatening comparison information. This is in line with earlier findings suggesting that mindfulness is related to a clearer self-concept and autonomous forms of motivation (Donald et al., 2020; Dummel, 2018), and that self-compassion increases self-improvement motivation (Breines & Chen, 2012; Chwyl et al., 2021). Rather than focusing on aspects these individuals do *not* have (comparatively), they may place more importance

on finding out where they are standing now (clarity) and how they can get to another state (self-improvement). The finding could also indicate that individuals with higher mindfulness and self-compassion may generally have a lower self-evaluation motive, which results in fewer comparisons.

Interestingly, we found that the control variables, age and little meditation experience (< 10–50 hr, compared with no meditation experience), showed some significant associations with the outcome variables as well. We suggest that, as they age, people have less desire to compare themselves because they may already have a clear self-concept (Lodi-Smith et al., 2017). With regard to meditation experience, the results indicate that with little experience compared to no experience, people compare themselves more frequently. This may hint at the use(fulness) of comparisons to evaluate one's relative standing especially while learning a new skill, such as meditation, and more feedback on one's progress in form of comparisons is sought.

Altogether, the participants in the current study judged social and temporal comparisons as barely useful. This may be because most individuals anticipate the potentially negative outcomes of comparisons, especially social comparisons (Gerber et al., 2018). At the same time, comparisons are an important source for evaluating attributes that constitute the self; they seem to happen automatically and are ubiquitous (Gilbert et al., 1995; Morina, 2021). Thus, people can hardly avoid them. And perhaps for good reason: To evaluate one's development and learn from previous experiences, an individual needs to know how they behaved, thought, and felt compared with others and at an earlier timepoint (e.g., for a review, see Wrzus, 2021). Nonetheless, we suggest that individuals can change their perspective on comparison standards and information. As previous research suggests, the motivational focus of comparisons determines the choice of the comparison standard (i.e., lateral, upward, downward comparison), and the goal of the comparison (e.g., self-verification; Wayment & Taylor, 1995). A mindful and self-compassionate focus that aims at a clear and accepting understanding of oneself in reference to others or the past self may lead to a more positive or neutral processing of information. This suggestion is reflected in the results of the exploratory analyses, which indicate that mindfulness, and especially self-compassion, is associated with a better perceived outcome of social and temporal comparisons. These findings challenge the assumption that upward comparisons necessarily lead to negative outcomes (Gerber et al., 2018; McComb et al., 2023). The association between higher mindfulness and self-compassion and more positive perceived comparison outcomes suggests that these qualities may buffer against the negative effects of upward comparisons. Thus, when performed with mindfulness and self-compassion, social and temporal comparisons may help individuals get a clearer, more adequate picture of their standing that is less blurred by a negative processing bias, and facilitate social learning and personal growth (Leary et al., 2007).

Limitations and Future Research

Despite the notable strengths of the current data, which were gathered from a large, binational, age- and gender-diverse sample, this study has some limitations. First, the analyses do not allow for any causal conclusions on the relationship between mindfulness, self-compassion, and basic comparison characteristics despite the fact that we analyzed these associations longitudinally. Future research could address this issue by comparing mindfulness and/or self-compassion interventions with control groups and their effect on comparison processes in a randomized-controlled design. Moreover, it would be interesting to investigate the specific mechanisms of mindfulness and self-compassion as well as differential effects on the dimension level of comparisons. Second, as dropout analyses suggest, the variance in this longitudinal sample was somewhat limited: Individuals higher in mindfulness, and lower in comparison frequency, perceived comparison utility, and perceived comparison outcomes tended to continue participation. The selective participation at follow-up should hence be considered when interpreting the longitudinal findings. Third, the study was limited by the use of self-report measures, which may have led to a biased or socially desirable response pattern. In future studies, researchers could use different settings (e.g., observational studies, as often done in social comparison research; Gerber et al., 2018), potentially in combination with the aforementioned interventions. Last, when we did not control for age, mindfulness and self-compassion were negatively associated with perceived comparisons utility. This finding hints at a potential third variable, for example, a clearer self-concept and thus a lower perceived comparison utility in general. Future research could aim to identify moderating or mediating variables.

The current findings suggest that social and temporal comparisons can provide useful information for self-evaluation and that a negative outcome of a comparison can be mitigated by adopting a kind and non-evaluative perspective on the given information. Individuals higher in mindfulness and self-compassion engage in fewer comparisons and may be able to more carefully discern which comparison information to choose (and which to disregard) to acquire self-knowledge. This study sets the foundation for further investigations into how mindfulness and self-compassion contribute to a kind and non-judgmental self-evaluation, a more thorough inclusion of information for self-evaluation, and potentially a more realistic self-perception.

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Data Availability The anonymized data and analysis script are openly available on the Open Science Framework (OSF) at: https://osf.io/f6qc8/. Hypotheses, exclusion criteria, measures, analyses, and inclusion of control variables were preregistered on the OSF: https://osf.io/6hfb2.

Declarations

Conflict of Interest The authors declare that they have no conflict of interest.

Ethics Approval This study was performed in line with the principles of the Declaration of Helsinki and was approved by the Ethics Committee of the Faculty of Behavioural and Cultural Studies at Heidelberg University, Germany (Wrzus 2019 1/1).

Informed Consent Informed consent was obtained from all individual participants prior to completing the online questionnaires by selecting a mandatory consent checkbox.

Use of Artificial Intelligence AI tools were not used.

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