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Abstract

Perceiving the amount of time remaining in life as limited or expansive is thought to play an important role in the quantity and quality of social interactions. Socioemotional selectivity theory posits that a limited time perspective leads to increased social well-being, but recent findings question the scope of this claim. The study investigated the potential effects of chronic self-regulatory fatigue as a moderating condition. 190 participants aged 18-50+ took an online questionnaire that measured social well-being and categorized participants as limited or expansive time perspective and high or low fatigue. A 2x2 factorial analysis showed no interaction effect. Significant effects indicated that a limited time perspective predicted low social well-being, and high fatigue predicted low social well-being. It is unclear why a limited time perspective led to lower social well-being. Our findings indicate a need to reinvestigate what factors lead to increased social well-being across the lifespan, thus providing a better framework for interventions.

Keywords: time perspective, social well-being, socioemotional selectivity theory, self-regulatory fatigue, lifespan

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Research on social interactions has particularly focused on what motivates social choices (Nikitin & Freund, 2017; Sander et al., 2017) and what social interaction characteristics are suited to a person's age (Carmichael et al., 2015; Zhaoyang et al., 2018), emotional goals (Carstensen, 1992; Lansford et al., 1998), and life circumstances (Sullivan-Singh et al., 2015). There are many positive effects associated with making beneficial social choices (Fung et al., 1999; Pauly et al., 2018), but people do not consistently make optimal social choices (Lang & Carstensen, 2002). Researchers have begun to identify moderators, such as self-regulatory fatigue, that may influence an individual's social well-being (Fung & Isaacowitz, 2016; Segerstrom et al., 2016).

Socioemotional Selectivity Theory

The amount of social interaction tends to decline with age, and the leading explanation for this phenomenon is socioemotional selectivity theory (Lang & Carstensen, 2002), which suggests that the age differences in social interactions are related to changing social motives and time perspective. According to the theory, social interactions serve different purposes depending on one's age, and reduced social contact is an individual's choice rather than something that cannot be helped. The theory posits that time perspective—how one views the opportunities and limitations of the present and future—plays a crucial role in the selection of social partners and optimization of psychological well-being. Older people are often more concerned with immediate emotional rewards from interactions and have a limited time perspective, while younger people prioritize gaining knowledge through social interactions and have a more expansive view of the future (Carstensen, 1992).

An expansive time perspective leads younger people to interact with various groups of people and have larger social networks that promote a greater understanding of the world. Younger adults typically have more varied interactions with peripheral members compared to older adults (Zhaoyang et al., 2018). A limited time perspective motivates older individuals to deliberately narrow their social network size and prioritize relationships with emotionally close partners and family members, which is more likely to elicit positive emotions (Lans-

ford et al., 1998). Supporting the predictions of socioemotional selectivity theory, in-person contact frequency with family members is generally fixed throughout the lifespan, while the number of contacts outside the family declines (Sander et al., 2017). Additionally, older adults tend to center attention on stimuli that represent emotionally close relationships rather than choosing to focus on stimuli with positive characteristics, suggesting that emotional closeness is more salient to them (Fung et al., 2019). When young adults are primed to have a limited time perspective, their subsequent social choices mimic those of older adults (Fredrickson & Carstensen, 1990). Bucket list items change in relation to an individual's time perspective, with perceptual manipulations for shorter time horizons predicting items that maximize emotional satisfaction over novel experiences (Chu et al., 2018).

Social Interaction Choices Predict Well-being

Making social decisions that are congruent with one's time perspective and developmental circumstance is predictive of psychological well-being, and interaction quantity has a higher predictive value for future well-being in early adulthood compared to middle and late adulthood (Carmichael et al., 2015). Young adults transitioning to independent living are less likely to experience loneliness when they have social interactions that are high in social approach and low in social avoidance cognitions (Ang et al., 2014; Nikitin & Freund, 2017; Pauly et al., 2018). Younger adults also tend to showcase more reactivity to conflict in social situations and are less adept at dealing with stress from social interactions (Luong & Charles, 2014).

Beginning in middle age, negative events begin to increase in frequency, which heightens the need for focusing on positive past memories and having supportive social networks (Leist et al., 2010). Older adults who prioritize meaningfulness in social interactions will likely have greater positive affect, which is related to self-reports of a strong sense of meaning in life (Hicks et al., 2012). Additionally, older individuals who have social networks that are satisfying and characterized by high-quality relationships are at a lower risk of dementia (Amieva et al., 2010). Older adults also tend to be less confrontational and their social contacts tend to be less confrontational in return (Fingerman et al., 2008). Sullivan-Singh et al. (2015) suggested that making social

choices based on one's current circumstances is thought to be an adaptive response; in short, social interactions that aid in expanding social networks are more important for younger adults, whereas increasing interaction quality is more important for older adults.

Because people do not always make advantageous social choices that prioritize emotional closeness as predicted by socioemotional selectivity theory, further research is needed to explain why this occurs. Time perspective does not completely account for the motivations behind older adults' goals of increased well-being from social interactions (Fung & Isaacowitz, 2016). Future time perspective has been shown to be better defined by two dimensions: attention towards opportunities and attention towards limitations (Cate & John, 2007). A focus on limited opportunities tends to increase in old age, yet older adults remain more effective at emotional regulation and are typically happier (Strough et al., 2016). Centering attention on limited opportunities is associated with poor emotional functioning, and people who have this time perspective also predominantly contemplate the past (Gruhn et al., 2016). In contrast, an expansive future time perspective with greater awareness on positive changes resulting from aging is linked to psychological well-being (Brothers et al., 2016). Although patients afflicted with Alzheimer's disease had future time perspectives that resembled those of younger people, they recalled more positive memories, and this positivity bias was once thought to be a result of limited time perspective (Bohn et al., 2016). The results of these recent studies suggest that although a limited future time perspective can lead to prioritizing emotionally close relationships, there are other moderators responsible for social choices that maximize psychological well-being (Fung & Isaacowitz, 2016).

Self-Regulatory Fatigue as a Moderator for Social Choices

As one ages, the narrowing size of social networks to close relationships for the purpose of increased well-being is thought to be due to an individual's choice (Fung et al., 1999). If this is true, then social choices should be affected by one's executive functioning capabilities. Self-regulation is commonly defined as one's ability to control thoughts and impulses to aid in making beneficial decisions (Eisenlohr-Moul et al., 2013); analogous to a muscle, self-regulation is a limited re-

source that can be depleted over time by multiple tasks that exercise cognition and decision making (Hagger et al., 2010; Muraven & Baumeister, 2000; Muraven et al., 1999). This depletion of regulatory resources that results in poorer subsequent decision making is referred to as self-regulatory fatigue. Additionally, chronic self-regulatory fatigue occurs when one suffers from long-term difficulty in controlling thoughts and actions due to negative circumstances (Solberg Nes et al., 2010). Self-regulatory fatigue, which manifests itself in older and younger adults, leads to poorer social choices that are not synchronized with their time perspectives, implying that decreased executive functioning may lead to dissatisfactory social partners (Segerstrom et al., 2016).

The Current Study

Socioemotional selectivity theory—the overarching theoretical framework for studies on age-related changes in social network characteristics, emotional functioning, and psychological well-being—posits that time perspective plays a crucial role in the selection of social partners and optimization of psychological well-being (Lang & Carstensen, 2002). There are significant differences in the selection and satisfaction of social interactions between different age groups that necessitate an explanation going beyond changing time perspective alone. It is of interest to identify factors that potentially lead people to make social choices that are not optimal for success for their particular stage of life. Self-regulatory fatigue is a suggested moderator influencing social choices, and further research on the topic is warranted. The current study seeks to further investigate the question of why time perspective does not consistently account for age differences in social interaction choices and emotional regulation, building on the idea that self-regulatory fatigue is an important factor in social interaction choices. Segerstrom et al. (2016) induced self-regulatory fatigue in younger and older adults in a laboratory setting, which resulted in changing social preferences, but they mention the need for examining the impacts of chronic self-regulatory fatigue on social choices in real life. The purpose of this study is to examine the relationship of time perspective and the amount of chronic self-regulatory fatigue reported by individuals to their social well-being. Since social interaction choices predict well-being (Carmichael et al., 2015), knowing factors that predict social interaction choices

could help develop methods for people who struggle to have satisfying social networks across the lifespan. It is hypothesized that self-regulatory fatigue will moderate time perspective with respect to social well-being.

Method

Participants

Participants were recruited through advertisements on our personal Facebook pages in which viewers were asked to both respond to the ad and to share the advertisement with others via social media. The researchers desired a sample size of 200 to generate adequate power for this study. A total of 190 participants who were 18 years old or older self-selected into the study: 102 participants were between the ages of 18 and 29, 44 participants were between the ages of 30 and 59, and 44 participants were age 50 or older. There were no other inclusion criteria for this study, and participants were not compensated for participating in this study.

Measures

Participants were first assigned to groups based on their responses to questions on the Future Time Perspective Scale (*limited* or *expansive*), and they were also categorized into second groups based on their responses to the Multidimensional Fatigue Symptom Inventory (*high* or *low*). They were then asked to respond to the Psychological Well-being Scale. All data were collected through a Google Form, which presented each scale or inventory in the order listed above.

Future Time Perspective

Time perspective was measured with the Future Time Perspective Scale, which is a modified version of the original scale used by Carstensen and Lang (1996) and later updated by Cate and John (2007); it has two more questions that pertain to one's focus on limited time. The Future Time Perspective Scale (Carstensen & Lang, 1996) utilizes a 7-point Likert-type scale (from 1= *very untrue*, to 7 = *very true*), and the score is calculated by averaging the quantitative responses of the questions. Higher average scores (>3.5) indicate more expansive time perspective, while lower average scores (≤3.5) indicate a more limited time perspective. Participants have been grouped in similar ways in previous studies

(Carstensen & Lang, 1996; Cate & John, 2007; Lang & Carstensen, 2002). The instrument has demonstrated strong internal validity with a coefficient (α = .92) (Lang & Carstensen, 2002).

Self-Regulatory Fatigue

Self-regulatory fatigue was measured using the mental fatigue subsection of the Multidimensional Fatigue Symptom Inventory (Stein et al.,1998). This section of the test has previously been utilized to measure subjective self-regulatory fatigue (Eisenlohr-Moul et al., 2013), and self-report measures of this construct are considered to be valid (Hagger et al., 2010). The questionnaire consisted of 6 items that are answered on a 5-point Likert-type scale, and the score is the average of all responses. Participants with high self-regulatory fatigue scores ($\geq$ 2.5) were separated into a separate group from those with lower self-regulatory fatigue scores (< 2.5). The Multidimensional Fatigue Symptom Inventory has demonstrated high internal consistency with coefficient alphas between (α=0.75) and (α=0.94) (Chan et al., 2018).

Social Well-Being

Social well-being was measured using the positive personal relations subsection of the Psychological Well-being Scale created by Ryff and Keyes (1995). Since the scale's scoring method is tailored for calculating each subscale separately, we omitted sections of the questionnaire not pertinent to the variable of interest, as Eisenlohr-Moul et al. (2013) did when operationalizing chronic self-regulatory fatigue. Participants rated their agreement through a 7-point scale (from 1 = *strongly disagree*, to 7 = *strongly agree*) on questions such as "I like most parts of my personality," and scores for all responses were averaged to obtain a final score for social well-being. This test is robust and has been used cross-culturally (Curhan et al., 2014).

Procedure

After providing informed consent on the Google Form, participants first responded to the Future Time Perspective Scale followed by the Multidimensional Fatigue Symptom Inventory, both of which the researchers later used to assign each participant to a time perspective

group and a chronic self-regulatory fatigue group based on the average scores generated by these scales. Finally, participants completed the Psychological Well-being Scale, after which they submitted their responses to the researchers and exited the study.
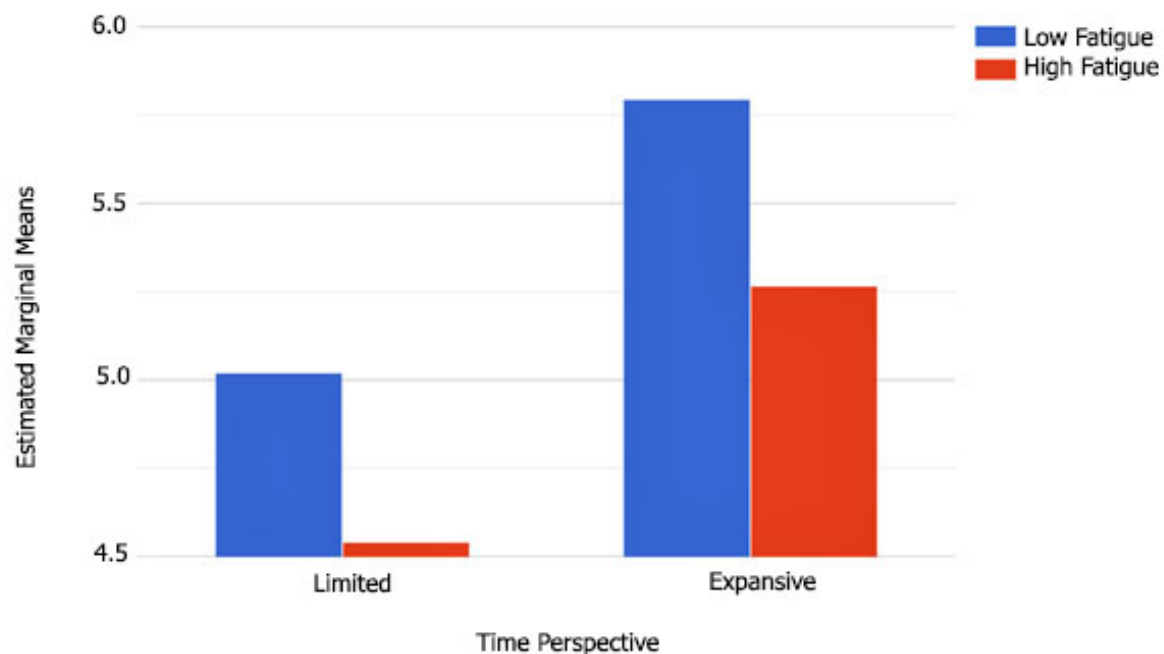
Results

We conducted a 2 x 2 factorial analysis of variance, grouping the participants by their time perspective (*limited* or *expansive*) and their self-regulatory fatigue (*low* or *high*). Main effects were found for both factors, but there was no interaction effect between time perspective and self-regulatory fatigue on the outcome variable of social wellbeing. The limited time perspective group (M = 4.8, SD = 1) had a significantly lower social well-being score than the expansive time perspective group (M = 5.6, SD = 1) indicating time perspective ($F(1, 186)$ = 849.08, p = .02) has a large effect on social wellbeing (d = 0.85). Additionally, the high fatigue group (M = 5.1, SD = 1) had a significantly lower social well-being score than the low fatigue group (M = 5.7; SD = 0.9), leading to the conclusion that chronic self-regulatory fatigue ($F(1, 186)$ = 387.38, p = .03) also greatly impacts social well-being in adults (d = 0.61). What we hypothesized, however, was that self-regulatory fatigue would moderate time perspective in regard to social well-being. Despite large effects for each independent factor, no interaction effect between the two factors was discovered ($F(1, 186)$ = 0.02, p = .89), suggesting that the effect of time perspective does not depend on levels of chronic self-regulatory fatigue. The factorial analysis is illustrated in Figure 1.

Figure 1
Estimated Marginal Means of Social Wellbeing

Discussion

The results of our study provide evidence that limited time perspective predicts low social well-being and high self-regulatory fatigue predicts low social well-being. We predicted that being fatigued would be a potential moderator/condition that helped explain why a limited time perspective sometimes fails to produce higher social well-being, but we saw no such interaction. Although being fatigued did partly suggest why people have lower social well-being, it was not a significant reason that limited time perspective failed to predict higher well-being.

It is surprising that a limited time perspective predicted lower well-being in our study. Socioemotional selectivity theory suggests that people with limited time perspectives increase their social well-being as they prioritize close, higher quality relationships (Carstensen, 1992). A sense of limited time is thought to be an important factor for increasing well-being (Hicks et al., 2012). Our results do not support this implication of socioemotional selectivity theory. However, there have been several recent studies that also complicate the theory (Fung & Isaacowitz, 2016; Gruhn et al., 2016). For example, a limited time perspective has been identified as a reason for old people to have increased well-being because of a focus on positive information (Carstensen, & Mikels, 2005; Ben-Zur, 2016); yet, this positivity effect has also been shown to be present in old people regardless of time perspective (Bohn et al., 2016). Our results are yet another example of a finding that opposes the idea that a limited time perspective predicts higher social well-being. These conflicting results may be due to the importance of identifying if a person views the future as expansive or limited and if one perceives positive gains in the future (Brothers et al., 2016). Additionally, many people with a limited time perspective are older, and old age in the U.S. is associated with stressors, such as financial difficulties (Rank & Hirschl, 1999). This could have been present in the older-aged participants of our study and led this age group to have a limited time perspective that does not perceive positive gains. The presence of future positive gains may have moderated the effect of time perspective in our study, but the presence of chronic self-regulatory fatigue did not. Although Segerstrom et al. (2016) identified self-regulatory fatigue as a moderator, our results indicate that this does not apply for chronic self-regulatory fatigue.

Our study was limited by the use of a convenience sampling technique for recruiting the sample. Recruiting was done solely on Facebook by posting the advertisement on our personal pages and asking our friends to share the advertisement on their pages. Another limitation to our study was the unequal distribution of the time perspective and self-regulatory fatigue groups. About 85% of our participants reported an expansive time perspective, and about 64% of the sample reported low self-regulatory fatigue, so it is possible that more balanced groups may have produced differing results. Finally, the age ranges of the participants in our sample do not mirror the population of interest. Approximately 53.7% of our participants were between the ages of 18 and 29 versus only about 16% of the U.S. population that falls within this age group (U.S. Census Bureau, 2019). This discrepancy was consistent in the other two age groups as well (ages 30 to 49: 23% vs. 26%, and age 50 and over: 23% vs. 35%), and the considerable number of younger participants would help explain the overwhelming responses of both limited time perspective and low self-regulatory fatigue among participants. A larger, more representative sample might also establish self-regulatory fatigue as a moderator for time perspective when it comes to social well-being.

Implications for future research include the need to identify moderators for a limited time perspective, which would predict higher well-being. Identifying moderators could help guide interventions aimed at increasing social well-being. Future research could examine underlying causes of self-regulatory fatigue. While causes such as stress and physical fatigue are contributors to the self-control effects of self-regulatory fatigue, other effects such as mental fatigue were not as thoroughly discussed in other research discussions. Finally, prior research on time perspective and socioemotional selectivity theory suggest that limited time perspective increases social well-being and maximizes emotional satisfaction in individuals, whereas expansive time perspective leads to fewer high quality and emotionally satisfying interactions. Accordingly, we expected that an expansive time perspective would correlate to a lower social well-being, but our results showed otherwise. Further research should investigate possible reasons why an expansive time perspective might be associated with a higher social well-being.

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