Studia Psychologica, Vol. 66, No. 1, 2024, 3-18
https://doi.org/10.31577/sp.2024.01.887

The Effect of Future Time Perspective on Emotions and Personal Goals

Gabriela-Maria Man[1], Maria Nicoleta Turliuc[2]
[1] Lucian Blaga University of Sibiu, Department of Psychology, Romania
[2] Alexandru Ioan Cuza University, Department of Psychology, Romania

Drawing on Socioemotional Selectivity Theory, which explains how the future time perspective changes throughout one's lifetime, we investigated the effect of manipulating time perspective on positive and negative affect, and personal goal selection. An experiment was conducted using an imaginary task that hypothetically and explicitly altered participants' time perspective. 60 younger adults and 60 older adults (N = 120) were assigned to one of the following experimental conditions: open future time (30 younger adults and 30 older adults) and limited future time (30 younger adults and 30 older adults). Results revealed that positive affect is not modified by alterations in the future time perspective, while negative affect increased. Goal patterns also change, in line with Socioemotional Selectivity Theory. Although younger and older adults in ordinary life circumstances perceive time left to live differently, some emotion and goal patterns emerge when they face explicit hypothetical alterations of time.

Key words: future time perspective, positive affect, negative affect, goal selection, age

As people advance through their lives, several changes may occur regarding well-being, emotion regulation, cognitive processing, social preferences, and personal goals. The Socioemotional Selectivity Theory (SST) explains that such changes are related to the way future time is perceived at advanced ages compared with perceptions during young adulthood (Carstensen, 2021; Reed & Carstensen, 2015; Scheibe & Carstensen, 2010). Younger adults tend to perceive time as more open while older adults perceive time as more limited (Strough et al., 2016). Similar changes in time perspective can occur at all ages in certain circumstances: for instance, at the end of a life cycle (Charles & Carstensen, 2009) or when dealing with a severe medical condition (Coudin & Lima, 2011). SST argues that time perspective impacts emotion regulation and that emotion regulation gives older adults an advantage in dealing with negative situations (Liao & Carstensen, 2018). However, these ad-

Correspondence concerning this article should be addressed to Gabriela-Maria Man, Lucian Blaga University, 2A Lucian Blaga, Sibiu, SB – 550169, Romania. E-mail: gabriela.man@ulbsibiu.ro

Received October 25, 2022

vantages have primarily been studied when the limitations of time perspective have been considered implicit (due to age). This raises the question as to whether the advantages will manifest in explicit conditions.

Future Time Perspective and Emotions

How is the emotion pattern of both younger and older adults affected by future time perspective? The Socioemotional Selectivity Theory (SST) suggests that a limited time perspective has implications for emotion regulation through a greater selectivity of stimuli, the positivity effect (Liao & Carstensen, 2018; Sims et al., 2015). The positivity effect refers to the tendency to process more positive information (Barber & Kim, 2021). This tendency is specific to older adults in ordinary life circumstances as they have an implicitly limited future time perspective due to age (Carstensen & DeLiema, 2018; Notthoff & Carstensen, 2014). For instance, older adults tend to pay more attention to positive, as opposed to negative, information (Liu et al., 2022). They also rate ambiguous emotional content more positively (Petro et al., 2021), and tend to recall information more positively (Gerhardsson et al., 2019; Mather & Carstensen, 2005; Ruthig et al., 2019). The positivity effect was also identified in younger adults when their future is hypothetically limited in an explicit way (e.g., participants were told to imagine that they had only 6 more months left to live) (Barber et al., 2016). This emotion regulation strategy may explain why older adults display, in ordinary life conditions, an increase in positive affect (Burr et al., 2021; Carstensen et al., 2011; Scheibe & Carstensen, 2010; Turan et al., 2016), and a decline in negative affect (Burr et al., 2021; Grühn et al., 2010). Studies also revealed that even in threatening situations older adults display more positive emotions (Canet-Juric et al., 2020) and less negative emotions (Carstensen et al., 2020) than younger adults. Still, although this pattern of emotions can be displayed by older adults while future time is implicitly perceived as being more limited (due to age), explicit time constraints can produce negative emotions alongside positive ones. In this regard, experimental evidence reveals that happiness decreases and sadness increases when younger and older adults face a particularly explicit limitation (Ersner-Hershfiels et al., 2008) but also an increase in mixed emotions (the occurrence of positive and negative emotions at the same time) when young adults face symbolic limitations (e.g., moments in life that cannot be repeated) (Larsen et al., 2021). Younger adults exhibit an increase in the occurrence of both positive and negative emotions when facing endings that are meaningful to them (Shirai & Kimura, 2022). Other studies revealed also that limited time perspective is associated with increased levels of negative affect, depressive symptoms, but also with decreased levels of positive affect (Allemand et al., 2012; Grühn et al., 2016; Hicks et al., 2012; Hoppmann et al., 2015) and increased level of cortisol (Kozik et al., 2015).

Therefore, this study addresses the lack of consensual findings by analyzing the patterns of influence of future time perspective on positive and negative affect in two experimental conditions (the limited future and the open future), using the 'unspecified future time perspective' as a control condition, for both younger and older adults.

Thus, if future time perspective produces changes in the emotional pattern, not chronological age per se, as the SST states (Liao & Carstensen, 2018), then both older adults and younger adults should display the same pattern of negative and positive affect when future time alteration occurs. We hypothesized that limiting future time perspec-

tive will increase negative and positive affect for both older and younger adults. We hypothesize this in line with the positivity effect literature (Liao & Carstensen, 2018) and with the SST, which states that emotionally meaningful aspects will be more salient in this condition, which in turn facilitates positive affect (Carstensen et al., 2003; Liao & Carstensen, 2018). This hypothesis is also in line with the studies and evidence relating to the fact that meaningful endings increase the negative affect, or at least the occurrence of both positive and negative affect (Larsen et al., 2021; Shirai & Kimura, 2022). Moreover, the explicit limitation of the future time perspective may be a meaningful ending, compared to implicit limitation (due solely to age). When it comes to the open future time perspective, we hypothesize an increased negative affect with no change in positive affect. This hypothesis is in line with the SST, which states that an open future time perspective facilitates more preparation actions, and adults are more willing to take the risk of experiencing negative emotions (Carstensen et al., 2003).

Future Time Perspective and Personal Goals

The Socioemotional Selectivity Theory (SST) presumes that future time perspective changes the goals pursued by adults. In ordinary circumstances, younger adults cherish and engage more frequently in preparatory goals such as those related to learning new information, while older adults cherish and engage more frequently in goals related to well-being, the support of others, and goals achievable within a short time frame (Giasson et al., 2019; Reed & Carstensen, 2015). According to the SST, the differences in goal selection between younger and older adults are not influenced by chronological age *per se* but are influenced by the future time perspective that changes during their life span (Carstensen, 2021), thus, when the time perspective was experimentally limited, it was found that young adult's personal goals fitted into the usual patterns of older adults (Carstensen & Fredrickson, 1998; Chu et al., 2018; Fung et al., 1999; Fung & Carstensen, 2006). However, Fung et al. (2020) found that future time perspective changes goal selection but only in the case of older adults.

Still, most of the studies limiting participants' future time perspective have investigated goal selection by making them choose an answer from a pre-selected list (e.g., Carstensen & Fredrickson, 1998; Fung et al., 1999). This procedure raises the question as to whether shifts in goal selection, as postulated by the SST, will remain when there are no pre-selected choices available. To address this limitation and contribute to expanding knowledge, this study will investigate the impact of future time perspective on goal selection by using open questions.

Given the limitations and contradictions that exist in the research, our research question is: What type of goals are selected by older and younger adults when they face explicit alterations in their future time perspective?

Method

Power Analysis

A power analysis conducted in G*Power indicated that a sample of 98 participants was required to achieve a power level of .80, assuming an effect size of .25 with an α error probability of .05.

Participants

A total of 138 participants completed the experimental procedure, but only 120 were considered eligible and introduced in the analysis, with 18 participants excluded. The

only inclusion criterion was that the participant understood and expressed verbally the experimental condition correctly (manipulation checks). The 120 participants were divided into four groups of 30 participants: two groups of younger adults aged between 20-35 years (*M* = 26.5 years, *SD* = 5.9; and *M* = 29.2, *SD* = 5.6), and two groups of older adults, aged between 65-85 years (*M* = 68.4 years, *SD* = 3.9; and *M* = 67.7 years, *SD* = 5.86). Table 1 presents the demographic characteristics of the participants.

There were no significant age differences between the two groups of younger adults $t(58) = 1.8$, $p = .76$; nor between the two groups of older adults $t(50.74) = -.54$, $p = .58$. Gender was equally distributed between groups (40% of younger adults were men and 53.33% of older adults were men) χ^2 (1, $N = 120$) = 2.14, $p = .14$. There were no differences regarding education level (completed studies) between older (68.33% completed middle level education) and younger participants (70% completed middle level education) χ^2 (1, $N = 120$) = .03, $p = .84$; nor differences between participants when it comes to area of residency (rural or urban) – Fisher's exact test ($p = .5$, one sided); only 8.33% of older adults and 6.66% of younger adults were from rural area.

Procedure and Instruments

The younger participants were recruited through announcements made in the universities of Mureș county and older participants were recruited through announcements made by the representatives of the churches from Mureș county, Romania.

60 younger adults who accepted our invitation to participate in the experiment, were randomly divided into two groups of 30. Similarly, the 60 older participants, were randomly divided into two groups of 30. Having been divided into four groups, the participants followed the procedure adapted and expanded from an experiment developed by Fung et al. (1999).

Each member of the groups underwent the following two-stage procedure: the control condition (the unspecified future time perspective condition) which was assessed in Time 1 (T1), and then the experimental condition Time 2 (T2), but half of the participants in T2 underwent the procedure for open future time condition and the other half of the participants underwent the procedure for the limited future time condition.

Time 1 (T1): a) informed consent was obtained; b) participants were asked to imagine

Table 1 *Demographic characteristics of the sample*

Variable	Value	*N*	%
Age	Older	60	50
	Young	60	50
Gender	Female	64	53.3
	Male	56	46.7
Educational level	Elementary	0	0
(completed studies)	Middle	83	69.2
	Higher	37	30.8
Place of residence	Rural	9	7.5
	Urban	111	92.5

a situation (unspecified condition) where they have some free time to spend with a family member to talk about their most important goal; c) each participant had to answer the following two questions: "Which family member would you like to talk to about your most important objective?" and "What would be the goal you would like to talk about with the chosen family member?". d) Each participant had to talk about this goal for two minutes as if he/she was telling it to the chosen family member. e) Thinking about the previously imagined situation, participants then completed the Positive and Negative Affect Scale (PANAS) for positive and negative affect.

Time 2 (T2): after a one-minute break, half of the participants underwent the procedure for the open future time condition (30 younger adults and 30 older adults), while the other half (30 younger adults and 30 older adults) underwent the procedure for the limited future time condition. f) Participants in the open future time condition were asked to imagine a situation in which they had just found out that their life was to be prolonged by about 20 years under reasonably good health due to a drug they had previously been chosen to test. The participants in the limited time condition were asked to imagine the situation in which they had just found out that their life was to be shortened by about 10 years under reasonably good health due to a drug they had previously been chosen to test. g) In these new situations, all the participants had to imagine that they have some free time to spend with a family member to talk about their most important goal and to answer the following two questions: "Which family member would you like to talk to about your most important objective?" and "What would be the goal you would like to talk about with the chosen family member?". h) Each participant had to talk about this goal for two minutes as if he/she was telling it to the chosen family member. i) Thinking about the previously-imagined situation, the participants then completed again the PANAS questionnaire for positive and negative affect.

According to the procedure, the participants had to select a family member in the two conditions to facilitate a more familiar setting. This choice is motivated by the previous studies that revealed that family, regardless of age, is designated as the closest social relation (Ajrouch et al., 2005), is the most stable social network in adulthood (Wrzus et al., 2013), and is a source of great support (Fingerman et al., 2004). In our study, there were no differences between older (80% selected a nuclear family member) and younger participants (71.66% selected a nuclear family member) regarding the chosen family member in the unspecified condition χ^2 (1, N = 120) = 1.13, p = .28; in the limited condition Fisher's exact test *(*p = .5 one-sided, 96.66% younger participants and 93.33% older participants); or in the open condition Fisher's exact test *(*p = .35 one-sided, 90% younger participants and 83.33% older participants chose a nuclear family member).

During the experimental situation, the verbal expressions of each participant were monitored for manipulation checks. We included in the research only the participants who verbally expressed that in the experimental situation, they understood whether their time had been reduced (e.g., if during the limited time condition, the participants had used words such as limited, shortened life, and less time to live) or extended (e.g., if during the open time condition the participants had used words such as longer life, more time to live, etc.). Thus, as mentioned in the "participants" section, from the total 138 of participants, 120 participants were eligible, and 18 participants were excluded.

The experiment was performed individually, face-to-face with the researcher. At the end

of this experimental procedure, all the participants took part in a debriefing, where they were presented with the purpose of the study and thanked for their participation. The participation was voluntary and the participants did not receive any reward.

The Positive and Negative Affect Scale (PANAS) (Watson et al., 1988) was used to measure the experience of positive (e.g., pride) and negative (e.g., guilt) affect. PANAS was used to assess the affect that occurred during the imagined situation. Participants used a 5-point Likert-type scale, ranging from 1 (*very slightly* or *not at all*) to 5 (*extremely*), to indicate how well each of the 20 adjectives described "how [they] feel." Coefficient alphas of the positive and negative scales were 0.79 and 0.78, respectively.

The protocol of this present study was approved by an Institutional Ethical Committee.

Results

Goal Selection

To test the differences between younger and older adults when it comes to goal selection when the future is experimentally changed, a content analysis was performed for the two-minute answers of the participants to the question "What would be the goal you would like to talk about?" The coding scheme was determined a priori for three categories namely knowledge goals, well-being, and support goal, the last two categories being referenced in the SST as emotional goals, but in this study are considered separately. These categories are established based on a Socio-emotional Theory (Carstensen et al., 2003). In the initial coding, a coder received one list of 240 goals selected by the 120 participants and a list of the three goal categories. The coder asked to place each goal into one of the three categories or in the category ˝the goal doesn't fit into any category˝. Meetings were organized to discuss the building of the final categories, and two categories, house-related goals, and testamentary goals were additionally added to the coding scheme. After this stage, two coders were given the lists of goals selected by the participants in the study and the five categories of goals. To verify if the same goals are being coded in the same category by the two coders, an inter-rater reliability was calculated using Cohen's Kappa formula $\kappa = .905$ (95% CI, .733 to .948), $p < .001$. In order to resolve disagreements between coders discussions were organized to reach a consensus.

Five categories of personal goals emerged, namely: goals focused on well-being, goals related to the support of others, goals focused on the accumulation of knowledge, house-related goals, and testamentary goals. Well-being goals included plans related to the participant's own physical and mental well-being. Goals related to the support of others included plans for material, emotional or informational support of others. Knowledge accumulation goals included plans to acquire new information and to develop one's skills. House-related goals included plans to rebuild or improve their own house. Testamentary goals included concrete plans related to their death. In the category testamentary goals, older adults selected clarifying the limits of properties (for instance, one participant stated: I need to make sure that my will is clear and that all the properties and my assets have all the necessary documents), and references to what family members should do after their death (one participant stated: I will build my grave near my parents' grave, and I want to make sure that my family understands that it is important for me to go back to my childhood town when I die. The results are summarized in Table 2.

Table 2 *Percentages of goals selected by the older adults and young adults*

	Unspecified [a]		Limited [b]		Open [b]	
	Old	Young	Old	Young	Old	Young
Well-being	53.3	1.7	43.3	43.3	30	10
Support	28.3	15	20	36.7	43.3	46.7
Knowledge	1.7	70	0	13.3	10	43.3
House	16.7	13.3	3.3	3.3	16.7	0
Testamentary	0	0	33.3	3.3	0	0

Note. [a] The results reflect the analysis of 60 young and 60 old participants; [b] the results reflect the analysis of 30 young and 30 old participants.

In the unspecified condition. The results reveal significant differences in younger adults' goals selection, the one-variable χ^2 (3, N = 60) = 67.33, p = .001; with a preference for knowledge goals (70% of goals selected), then support and then house goals. Only one person selected well-being goals, and no younger adult selected testamentary goals. In the category of knowledge goals, younger adults selected excursions to find new places, to find new lifestyles, new people; to search for information/knowledge through formal training programs; professional reconversion; employment plans, and searching for information on the job market. In the category of support goals, they selected providing support for a teenager in searching for a career, helping children to study, and extracurricular activities for children. In the category of house goals, younger adults selected to look for a home or build a home.

In *the unspecified condition*, the one-variable χ^2 test revealed that there are significant differences in the goals selection by older adults χ^2 (3, N = 60) = 34.27, p = .001. They mostly selected well-being goals (53.3%), followed by support goals, house goals, and then knowledge goals. For the well-being goals they selected vacations for recreation and spiritual purposes, plans for physical health, plans to improve one's spiritual life through prayers and motivational/positive readings, organizing events with symbolic and sentimental value for oneself. For the support goals, older adults selected counseling younger family members (e.g., counseling their children who were experiencing family problems or family members engaged in dangerous behavior), financial support of family members, education of grandchildren, and so on. The house goals included rearrangements of the house, the courtyard, and house renovation. Just one person selected a knowledge goal, mentioning a journey to learn about the history of Europe.

In the limited future condition, when the future was hypothetically shortened by 10 years, the one-variable χ^2 test revealed significant differences in the younger adults goals choices χ^2 (4, N = 30) = 21.33, p = .001; they preferred well-being goals (43.3%), then the support goals, and then the knowledge goals. One person selected a house goal and one a testamentary goal. In the category of well-being goals, younger adults mentioned travel plans, but not to learn about the world as they were mentioned in the unspecified condition but for relaxation and self-rediscovery; plans to strengthen one's family relationships; founding one's own family; to invest in cultur-

al activities ignored for a long time, and engaging in pleasant reading. In the category of support goals, younger adults mentioned setting up support groups for vulnerable people; organizing motivational workshops; supporting colleagues and family members; and raising awareness. Knowledge goals were similar to those from the unspecified condition (e.g., formal training programs and excursions to find new places). The testamentary goal was related to what one expects after one's death, while the house goal was related to buying a new house.

In this experimental condition (limited time), the one-variable χ^2 test points out that there is a difference between frequencies of the goals selected χ^2 (3, N = 30) = 10.8, p = .01; the older adults preferred well-being goals (43.3%), then testamentary and support goals. Only one person selected a house-related goal, and no one selected knowledge goals. For the well-being goals, older adults selected reconnection with one's ancestors (e.g., visiting all the places with personal symbolism), spiritual journeys to monasteries with family members, doing activities that are not imposed, plans to reduce health problems, and so on. In the category testamentary goals, older adults selected clarifying the limits of properties, and references to what family members should do after their death (how they should behave, and what to do, how to accomplish their last wishes). The category of support goals was similar to the one from the unspecified condition.

In the open future condition, when the future time was hypothetically prolonged by 20 years, the one-variable χ^2 test points out that there is a difference between frequencies of the goal selected χ^2 (2, N = 30) = 7.4, p = .02; the younger adults mostly selected support goals, then knowledge, and lastly well-being goals. Support goals included plans for one's children, helping children in the community through therapy, helping families through formal mentoring classes, and so on. Knowledge goals included information related to career changes, information about the possibilities of combining hobbies with professional activities, and so on. Among the goals listed in the category of well-being goals, the respondents mentioned going on a Camino de Santiago self-discovery pilgrimage and trip to improve one's relationship with one's family.

In this experimental condition, the older adults preferred to select support goals (46.7%) as the one-variable χ^2 reveals significant differences is goal selection χ^2 (3, N = 30) = 7.87, p = .04, followed by well-being goals and then house goals. Older adults also selected knowledge goals. The support goals mentioned by older adults were: involvement in grandchildren's care (e.g., permanently, as a parent), the adoption of an orphaned child, developing a non-governmental organization for isolated older adults, and so on. For well-being goals, older adults selected old desires for which they had not had time in the past (e.g., writing stories, etc.) and vacations for fun and relaxation. When it came to house goals there were plans for building a new house or repairing the old one.

Although it is not the focus of our research, the results suggest some changes in the goals' time frame. For instance, in unspecified condition, older adults mentioned goals achievable in a few months (e.g., house renovation). By contrast, younger adults mentioned many goals involving a larger time frame (e.g. buying or building a house using a bank loan). Many more long-term goals emerged when the future time was hypothetically prolonged for older adults (e.g., permanent care of grandchildren, or even the adoption of an orphaned child). Younger adults followed the same path when the time was hypothetically shortened; they chose shorter goals such as reading pleasant literature, organizing motivational workshops, and so on.

Positive and Negative Affect

To assess the changes of positive and negative affect during future time manipulation, four 2×2 mixed-design ANOVAs were run (Age: younger adults, older adults) × (Future Time condition: unspecified, open or limited condition) (the results are summarized in Table 3), with age as between subjects' factor and future time condition as repeated measures.

The only significant effect found was the main effect of Future Time condition (open or unspecified) for negative affect: adults, regardless of age, report more intense negative affect in the open condition than in the unspecified condition $F(1, 58) = 10.76$, $p = .002$, $\eta p^2 = .15$. A significant increase in the intensity of negative affect, when the Future Time perspective was hypothetically prolonged, revealed changes in only a few types of negative affect. 2×2 mixed-design ANOVAs were run for every negative affect and the analysis revealed a significant interaction effect Time x Age for the scare $F(1, 58) = 9.99$, $p = .002$, $\eta p^2 = .15$; more specifically, a prolonged future increased the intensity of scare only for younger adults $t(29) = -3.002$ $p = .005$; (unspecified $M = 1.50$, $SD = .86$; and open $M = 2.03$, $SD = .96$) although both groups (older adults $M = 1.33$, $SD = .75$) in an unspecified time condition have comparable levels of scare intensity $t(58) = .79$ $p = .43$. The jittery negative affect increased as well, but in a different way for the two age groups. The interaction effect Time x Age $F(1, 58) = 11.85$, $p = .001$, $\eta p^2 = .17$; was significant for jittery. In an unspecified condition, younger adults ($M = 3.66$, $SD = .75$) exhibited a significantly more intense jitteriness $t(58) = 4.79$ $p = .001$; than older adults ($M = 2.33$, $SD = 1.32$), but when the future time was prolongued ($M =$

Table 3 *Mixed-design 2 × 2 ANOVA for negative and positive affect, with age as between subjects' factor and time condition as repeated measures*

Conditions					Young				Old			
					T1		**T2**		**T1**		**T2**	
		F	*p*	ηp^2	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Open					20.46	3.96	23.00	7.08	18.96	5.01	20.26	4.89
N.A.	Age	2.84	.09	.04								
	Time	10.76	.00	.15								
	Age x time	1.11	.29	.01								
Open					37.93	4.71	39.10	4.18	36.70	6.17	37	6.70
P.A.	Age	1.86	.17	.03								
	Time	.97	.32	.01								
	Age x time	.34	.56	.006								
Limited					22.7	7.23	25.76	5.89	19.03	6.60	23.83	7.52
N.A.	Age	3.36	.07	.05								
	Time	19.55	.00	.25								
	Age x time	.95	.33	.01								
Limited					38.53	5.51	37.60	5.82	32.63	4.95	31.77	6.00
P.A.	Age	26.86	.00	.31								
	Time	1.01	.31	.01								
	Age x time	.00	.97	.00								

Note. N.A. = negative affect; P.A. = positive affect; *p* = *p* value; ηp^2 = partial eta-squared; *M* = mean; *SD* = standard deviation; T1 = (time 1 in the repeated measures) unspecified future condition; T2 = (time 2 in the repeated measures) open or limited condition.

3.56, *SD* = 1.27) the intensity of jitteriness increased significanly only for older adults $t(29) = -4.57$, $p = .001$. The analysis also revealed that an open future time perspective leads to higher intensity of afraid negative affect (Time main effect) $F(1, 58) = 4.33$, $p = .04$, $\eta p^2 = .07$; for all adults, regardless of age group (unspecified $M = 1.56$, $SD = .08$; and open $M = 1.86$, $SD = 1.06$).

No significant results were found for positive affect, meaning that independently of age and time perception as open or unspecified, adults display similar intensity of positive affect.

The significant main effect of the Future Time condition (unspecified or limited) indicated that adults, regardless of age, display more intense negative affect when future time is hypothetically shortened by 10 years than in day-to-day situations (unspecified condition) $F(1, 58) = 19.56$, $p = .001$, $\eta p^2 = .25$. A more detailed analysis using 2×2 mixed-design ANOVAs for each of the ten negative affects was performed to reveal which affects changed when the time was limited by 10 years. The results indicate a significant increase in the intensity of five negative affects: upset, scared, hostile, nervous, and afraid. The main effects of the Future Time condition for the upset $F(1, 58) = 12.03$, $p = .001$, $\eta p^2 = .17$; (unspecified $M = 1.93$, $SD = 1.11$; and limited $M = 2.66$, $SD = 1.24$); for the scared $F(1, 58) = 27.54$, $p = .001$, $\eta p^2 = .32$; (unspecified $M = 1.65$, $SD = .93$; and limited $M = 2.58$, $SD = 1.29$); hostile $F(1, 58) = 5.55$, $p = .02$, $\eta p^2 = .09$; (unspecified $M = 1.6$, $SD = .86$; and limited $M = 1.93$, $SD = 1.1$); nervous $F(1, 58) = 10.25$, $p = .002$, $\eta p^2 = .15$; (unspecified $M = 1.96$, $SD = 1.2$ and limited $M = 2.5$, $SD = 1.24$); and afraid affects $F(1, 58) = 11.03$, $p = .002$, $\eta p^2 = .16$; ($M = 1.65$, $SD = 1.03$ and limited $M = 2.3$, $SD = 1.3$), were all significant.

No other effect was significant for negative affect.

Regardless of time conditions (unspecified or limited), the results regarding the positive affect indicate that there are significant differences between the responses of younger adults and older adults. The significant main effect of Age $F(1, 58) = 26.86$, $p = .001$, $\eta p^2 = .31$; revealed that younger adults display more intense positive affect then older adults. No other effect was significant for positive affect.

The effect size, partial eta squares, have high values in our study. This suggests that the open/limited time perspective in our study largely explains the variance of negative affect, which also has a high practical value.

All data, and measures, for all experimental conditions, were reported in the results section.

Discussion

Alterations in future time perspective change the way adults react emotionally and what they choose to do with their time in terms of goals. Based on SST literature, the present study focuses on the effect of future time perspective on emotions, and the effect of future time perspective on personal goals in the context of an experimental hypothetical alteration of future time.

Future time perspective and affects. The SST postulates that the limitation of time perspective is a central element in emotion regulation for older adults through an increased selectivity of positive stimuli (Carstensen, 2021; Liao & Carstensen, 2018). This is effective in terms of maintaining well-being (Carstensen et al., 2011; Scheibe & Carstensen, 2010). A positive emotional pattern in day-to-day situations, in which the limitation of time is presumably present in an implicit manner for older adults (Carstensen et al., 2011; Scheibe & Carstensen, 2010), was not found in the current study in explicit limitation of future time perspective. The emotional response to

a hypothetical time limitation for both younger and older adults is characterized by an increase in the intensity of negative affect and no changes in positive affect. This is in line with studies revealing that negative stimuli have a greater impact on individuals (Baumeister et al., 2001; Rozin & Royzman, 2001) and have the potential to generate and preserve a negative emotional state rather than a positive one (Baumeister et al., 2001; Brickman et al., 1978). The results support the conclusions of Ersner-Hershfiels et al. (2008), who found that under symbolic limitations, negative affect (sadness) may increase. Our results support those studies that have found an association between time limitations and decreased well-being (e.g., Brothers et al., 2016; Gabrian et al., 2017; Grühn et al., 2016; Hoppmann et al., 2015) and found an increase in the intensity of sadness (Larsen et al., 2021).

Similarly, our results indicate that when faced with prolongation of the future, younger adults and older adults do not display significant differences in terms of positive affect in comparison with the day-to-day condition. But both age groups display more intense negative affect. Prolonging an unknown future may lead to an increase in emotional pressure, fear of the unknown, and a higher willingness to endure negative emotions, as the SST postulates (Giasson et al., 2019; Reed & Carstensen, 2015). Also, previous studies revealed that ongoing and important changes are related to increased negative affect (Kiefer, 2005; Rafferty & Jimmieson, 2017). Our detailed analyses are in line with these studies pointing out that an open future leads to an increased level of afraid for all adults, an increased level of jittery for older adults, and an increased intensity of scare for younger adults. On the other hand, our results contradict the studies that found that an open future time perspective is negatively associated with negative affect (Kooij et al., 2018; Kozik et al., 2020). The results are in line with evidence that shows that in intense or threatening situations, the regular emotional benefits for older adults will disappear (Charles, 2010; Charles & Carstensen, 2009; Sims et al., 2015).

Future time perspective and goal patterns. When it comes to goal selection, the pattern of results in the unspecified condition is consistent with the postulates of the SST, revealing that in ordinary conditions, older adults will engage more in emotional goals. More than 81% of older adults selected an emotional goal (in our study emotional goals correspond to well-being and support goals). By contrast, 70% of the younger adults stated that they would follow knowledge goals. The descriptions reflect younger adults' preparatory activities for the future (Reed & Carstensen, 2015; Scheibe & Carstensen, 2010). Although both age groups chose to do the same activity, they had different goals. For example, young adults wanted to travel to learn about the world, while older adults wished to travel for recreation and spiritual reasons.

The SST presumes that when younger adults, due to different life circumstances, perceive that time is running out, they will prioritize emotional goals (Liao & Carstensen, 2018). The results of our research support this postulate. Young adults shifted towards emotional goals (well-being and support goals) when the future time was hypothetically shortened. Our research supports the studies that explored the selection of goals under time limitations using a card sorting task (Carstensen & Fredrickson, 1998; Fung et al., 1999; Fung & Carstensen, 2006), bucket-list goals (Chu et al., 2018), and studies that investigated symbolic limitation (Fung et al., 2020). Limiting the future for older adults by 10 years maintained their investment in emotional goals, which is in line with the SST (Giasson et al., 2019). However, a new category emerged – testamentary goals. The mean

age of participants in the limited experimental condition was 68.4 years which meant that the 10 years limitation brought them hypothetically closer to their death. This may be the reason why they selected this category.

When the future time was hypothetically prolonged, older adults remained focused on emotional goals, and only 10 % selected knowledge goals. Younger adults reconsidered knowledge goals and decreased their selection meanwhile they increased the selection of emotional goals.

Strengths and limitations. The main strength of the study lies in the use of a mixed-method approach (quantitative and qualitative), under the circumstances of explicit (experimental) alterations of time perception. The experiment adds some insights to the results of studies that have only considered implicit alterations (e.g., Ersner-Hershfiels et al., 2008; Fung & Carstensen, 2006) and pre-defined choices (e.g., Fung et al., 1999), it also adds important insights to the SST research.

The findings of this study need to be treated with caution. Because the present study used an imaginary task in the procedure, it also involves certain limitations. We cannot be sure that these conclusions coincide with concrete situations in real life. Future research may include another manipulation check, asking the participants whether they consider the scenario from the procedure as likely or believable.

However, given that the experimental manipulation of real-time limitations cannot be achieved, it will be important to verify the emotional patterns in situations where natural time limitations occur in real life (e.g., in the case of real medical conditions). An additional issue is that the emotional patterns identified in this research have been quantified using an instrument that measures emotional aspects that are known to have high arousal. Many studies have revealed that older adults tend to experience a greater number of affective states with low arousal (English & Carstensen, 2014; Scheibe et al., 2011; 2013).

There might also be a minor group of participants who were not comfortable with having to pick a family member as a person with whom they would like to share their goal. Even if for most people family is associated with stability, support, and emotional warmth (Ajrouch et al., 2005; Fingerman et al., 2004), it may not apply to everyone. Future studies could choose a more flexible approach in which participants are instructed to choose any significant person, family or not.

Another limitation is related to the fact that it was a fixed temporal order of the conditions in the study, that is why we cannot be sure that the goal selected in the first condition is not the most important and in the second condition is not an alternative one to the first condition and therefore this could explain the goal types that emerged.

Conclusions

Hypothetical alterations of the future time change the emotion and goal patterns usually displayed by adults in their ordinary life circumstances. Perceptions of the alteration of future time, by opening or limiting the future, increase the negative emotions of adults, regardless of their age, while positive affect is not modified. This study provides evidence of the presence of similar emotion patterns in younger and older adults confronted with future time manipulations. Finally, the pattern of personal goals is also changed by this experimental manipulation of future time, the results are in line with the socioemotional selectivity theory.

Authors' ORCID
Gabriela-Maria Man
https://orcid.org/0000-0003-2212-0970

Maria Nicoleta Turliuc
https://orcid.org/0000-0002-4142-5799

References

Allemand, M., Hill, P. L., Ghaemmaghami, P., & Martin, M. (2012). Forgivingness and subjective well-being in adulthood: The moderating role of future time perspective. *Journal of Research in Personality, 46*(1), 32–39. https://doi.org/10.1016/j.jrp.2011.11.004

Ajrouch, K. J., Blandon, A. Y., & Antonucci, T. C. (2005). Social networks among men and women: The effects of age and socioeconomic status. *The Journals of Gerontology: Series B, 60*(6), S311–S317. https://doi.org/10.1093/geronb/60.6.S311

Barber, S. J., & Kim, H. (2021). The Positivity Effect: A review of theories and recent findings. In S. Grzegorz, T. Hess, & D. Touron (Eds.), *Multiple pathways cognitive aging: Motivational and contextual influences* (pp. 84–104). New York: Oxford Academic. https://doi.org/10.1093/oso/9780197528976.003.0005

Barber, S. J., Opitz, P. C., Martins, B., Sakaki, M., & Mather, M. (2016). Thinking about a limited future enhances the positivity of younger and older adults' recall: Support for socioemotional selectivity theory. *Memory & Cognition, 44*(6), 869–882. https://doi.org/10.3758/s13421-016-0612-0

Baumeister, R. F., Bratslavsky, E., Finkenauer, C., & Vohs, K. D. (2001). Bad is stronger than good. *Review of General Psychology, 5*(4)*,* 323–370. https://doi.org/10.1037/1089-2680.5.4.323

Brickman, P., Coates, D., & Janoff-Bulman, R. (1978). Lottery winners and accident victims: Is happiness relative? *Journal of Personality and Social Psychology, 36*(8), 917–927. https://doi.org/10.1037/0022-3514.36.8.917

Brothers, A., Gabrian, M., Wahl, H. W., & Diehl, M. (2016). Future time perspective and awareness of age-related change: Examining their role in predicting psychological well-being. *Psychology and Aging, 31*(6), 605–617. https://doi.org/10.1037/pag0000101

Burr, D. A., Castrellon, J. J., Zald, D. H., & Samanez-Larkin, G. R. (2021). Emotion dynamics across adulthood in everyday life: Older adults are more emotionally stable and better at regulating desires. *Emotion, 21*(3), 453–464. https://doi.org/10.1037/emo0000734

Canet-Juric, L., Andrés, M. L., del Valle, M., López-Morales, H., Poó, F., Galli, J. I., & Urquijo, S. (2020). A longitudinal study on the emotional impact cause by the COVID-19 pandemic quarantine on general population. *Frontiers in Psychology, 11*. https://doi.org/10.3389/fpsyg.2020.565688

Carstensen, L. L. (2021). Socioemotional selectivity theory: The role of perceived endings in human motivation, *The Gerontologist*, 61(8), 1188–1196. https://doi.org/10.1093/geront/gnab116

Carstensen, L. L., & DeLiema, M. (2018). The positivity effect: A negativity bias in youth fades with age. *Current Opinion in Behavioral Sciences, 19*(1),7–12. https://doi.org/10.1016/j.cobeha.2017.07.009

Carstensen, L. L., & Fredrickson, B. L. (1998). The influence of HIV status and age on cognitive representations of others. *Health Psychology, 17*(6), 1–10. https://doi.org/10.1037//0278-6133.17.6.494

Carstensen, L. L., Fung, H. H. & Charles, S. T. (2003). Socioemotional selectivity theory and the regulation of emotion in the second half of life. *Motivation and Emotion 27*(2), 103–123. https://doi.org/10.1023/A:1024569803230

Carstensen, L. L., Shavit, Y. Z., & Barnes, J. T. (2020). Age advantages in emotional experience persist even under threat from the COVID-19 pandemic. *Psychological Science, 31*(11), 1374–1385. https://doi.org/10.1177/0956797620967261

Carstensen, L. L., Turan, B., Scheibe, S., Ram, N., Ersner-Hershfield, H., Samanez-Larkin, G. R., Brooks, K. P., & Nesselroade, J. R. (2011). Emotional experience improves with age: Evidence based on over 10 years of experience sampling. *Psychology and Aging*, *26*(1), 21–33. https://doi.org/10.1037/a0021285

Charles, S. T. (2010). Strength and vulnerability integration: A model of emotional well-being across adulthood. *Psychological Bulletin, 136*(6)*,* 1068–1091. https://doi.org/10.1037/a0021232

Charles, S. T., & Carstensen, L. L. (2009). Socioemotional selectivity theory. In H. Reis & S. Sprecher (Eds.), *Encyclopedia of human relationships* (pp. 1578–1581). Sage Publications.

Chu, Q., Grühn, D., & Holland, A. M. (2018). Before I die: The impact of time horizon and age

on bucket-list goals. *GeroPsych: The Journal of Gerontopsychology and Geriatric Psychiatry, 31*(3), 151–162. https://doi.org/10.1024/1662-9647/a000190

Coudin, G., & Lima, M. L. (2011). Being well as time goes by: Future time perspective and well-being. *International Journal of Psychology & Psychological Therapy, 11*(2)*,* 219–232.

English, T., & Carstensen, L. L. (2014). Emotional experience in the mornings and the evenings: Consideration of age differences in specific emotions by time of day. *Frontiers in Psychology, 5,* 185. https://doi.org/10.3389/fpsyg.2014.00185

English, T., & Carstensen, L. L. (2015). Does positivity operate when the stakes are high? Health status and decision making among older adults. *Psychology and Aging, 30*(2), 348–355. https://doi.org/10.1037/a0039121

Ersner-Hershfields, H., Mikels, J. A., Sullivan, S., & Carstensen, L. L. (2008). Poignancy: Mixed emotional experience in the face of meaningful endings. *Journal of Personality and Social Psychology*, *94*(1), 158–167. https://doi.org/10.1037/0022-3514.94.1.158

Fingerman, K. L., Hay, E. L., & Birditt, K. S. (2004). The best of ties, the worst of ties: Close, problematic, and ambivalent social relationships. *Journal of Marriage and Family, 66*(3), 792–808. https://doi.org/10.1111/j.0022-2445.2004.00053.x

Fung, H. H., & Carstensen, L. L. (2006). Goals change when life's fragility is primed: Lessons learned from older adults, the September 11th attacks and SARS. *Social Cognition, 24*(3), 248–278. https://doi.org/10.1521/soco.2006.24.3.248

Fung, H. H., Carstensen, L. L., & Lutz, A. (1999). The influence of time on social preferences: Implications for life-span development. *Psychology and Aging, 14*(4), 595–604. https://doi.org/10.1037/0882-7974.14.4.595

Fung, H. H., Chu, S. T.-W., Jiang, D., Chen, A. X., & Ng, C. C. (2020). Contrasting the effects of mortality salience and future time limitation on goal prioritization in older and younger adults. *The Journals of Gerontology: Series B, 75*(10), 2112–2121. https://doi.org/10.1093/geronb/gbz133

Gabrian, M., Dutt, A. J., & Wahl, H. W. (2017). Subjective time perceptions and aging well: A review of concepts and empirical research – A mini-review. *Gerontology. Behavioural Science Section, 63*(4), 1–9. https://doi.org/10.1159/000470906

Gerhardsson, A., Fischer, H., Lekander, M., Kecklund, G., Axelsson, J., Åkerstedt, T., & Schwarz, J. (2019). Positivity effect and working memory performance remains intact in older adults after sleep deprivation. *Frontiers in Psychology, 10*(605), 1–9. https://doi.org/10.3389/fpsyg.2019.00605

Giasson, H. L., Liao, H. W., & Carstensen, L. L. (2019). Counting down while time flies: Implications of age-related time acceleration for goal pursuit across adulthood. *Current Opinion in Psychology, 26*, 85–89. https://doi.org/10.1016/j.copsyc.2018.07.001

Grühn, D., Kotter-Grühn, D., & Röcke, C. (2010). Discrete affects across the adult lifespan: Evidence for multidimensionality and multidirectionality of affective experiences in young, middle-aged and older adults. *Journal of Research in Personality, 44*(4), 492–500. https://doi.org/10.1016/j.jrp.2010.06.003

Grühn, D., Sharifian, N., & Chu, Q. (2016). The limits of a limited future time perspective in explaining age differences in emotional functioning. *Psychology and Aging, 31*(6), 583–593. https://doi.org/10.1037/pag0000060

Hicks, J. A., Trent, J., Davis, W. E., & King, L. A. (2012). Positive affect, meaning in life, and future time perspective: An application of socioemotional selectivity theory. *Psychology and Aging, 27*(1), 181–189. https://doi.org/10.1037/a0023965

Hoppmann, C. A., Infurna, F. J., Ram, N., & Gerstorf, D. (2015). Associations among individuals' perceptions of future time, individual resources, and subjective well-being in old age. *The Journals of Gerontology. Series B, Psychological Sciences and Social Sciences, 72*(3), 388–399. https://doi.org/10.1093/geronb/gbv063

Kiefer, T. (2005). Feeling bad: Antecedents and consequences of negative emotions in ongoing change. *Journal of Organizational Behavior, 26*(8), 875–897. https://doi.org/10.1002/job.339

Kooij, D. T. A. M., Kanfer, R., Betts, M., & Rudolph, C. W. (2018). Future time perspective: A systematic review and meta-analysis. *Journal of Applied Psychology, 103*(8), 867–893. https://doi.org/10.1037/apl0000306

Kozik, P., Drewelies, J., Düzel, S., Demuth, I., Steinhagen-Thiessen, E., Gerstorf, D., & Hoppmann, C. A. (2020). Future time perspective: Dimensions

of opportunities, life, and time are differentially associated with physical health, cognitive functioning, and well-being in old age. *Aging & Mental Health, 24*(9), 1487–1495. https://doi.org/10.1080/13607863.2019.1594159

Kozik, P., Hoppmann, C. A., & Gerstorf, D. (2015). Future time perspective: Opportunities and limitations are differentially associated with subjective well-being and hair cortisol concentration. *Gerontology, 61*(2), 166–174. https://doi.org/10.1159/000368716

Larsen, J. T., Hershfield, H. E., Cazares, J. L., Hogan, C. L., & Carstensen, L. L. (2021). Meaningful endings and mixed emotions: The double-edged sword of reminiscence on good times. *Emotion, 21*(8), 1650–1659. https://doi.org/10.1037/emo0001011

Liao, H. W., & Carstensen, L. L. (2018). Future time perspective: Time horizons and beyond. *The Journal of Gerontopsychology and Geriatric Psychiatry, 31*(3), 163–167. http://dx.doi.org/10.1024/1662-9647/a000194

Liu, H., Dong, X., Wang, J., Liu, H., Liu, Y., Han, B., & Sun, L. (2022). Age-related positivity effect of emotional attention: Time and frequency domain. *Psychology, Health & Medicine*, *8*(1), 1–12. https://doi.org/10.1080/13548506.2022.2050271

Mather, M., & Carstensen, L. L. (2005). Aging and motivated cognition: The positivity effect in attention and memory. *Trends in Cognitive Sciences, 9*(10), 496–502. https://doi.org/10.1016/j.tics.2005.08.005

Notthoff, N., & Carstensen, L. L. (2014). Positive messaging promotes walking in older adults. *Psychology and Aging, 29*(2), 329–341. https://doi.org/10.1037/a0036748

Petro, N. M., Basyouni, R., & Neta, M. (2021). Positivity effect in aging: Evidence for the primacy of positive responses to emotional ambiguity. *Neurobiology of Aging*, *106*(1), 232–240. https://doi.org/10.1016/j.neurobiolaging.2021.06.015

Reed, A. E., & Carstensen, L. L. (2015). Age-related positivity effect and its implications for social and health gerontology. In N. A. Pachana (Ed.), *Encyclopedia of Geropsychology*. Springer. https://doi.org/10.1007/978-981-287-080-3_50-1

Rozin, P., & Royzman, E. B. (2001). Negativity bias, negativity dominance, and contagion. *Personality and Social Psychology Review, 5*(4), 296–320. https://doi.org/10.1207/S15327957PSPR0504_2

Ruthig, J. C., Poltavski, D. P., & Petros, T. (2019). Examining positivity effect and working memory in young-old and very old adults using EEG-derived cognitive state metrics. *Research on Aging, 41*(10), 1014–1035. https://doi.org/10.1177/0164027519865

Scheibe, S., & Carstensen, L. L. (2010). Emotional aging: Recent findings and future trends. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 65B*(2), 135–144. https://doi.org/10.1093/geronb/gbp132

Scheibe, S., English, T., Tsai, J. L., & Carstensen, L. L. (2013). Striving to feel good: Ideal affect, actual affect, and their correspondence across adulthood. *Psychology and Aging, 28*(1), 160–171. https://doi.org/10.1037/a0030561

Scheibe, S., Mata, R., & Carstensen, L. L. (2011). Age differences in affective forecasting and experienced emotion surrounding the 2008 U.S. presidential election. *Cognition and Emotion, 25*(6), 1029–1044. https://doi.org/10.1080/02699931.2010.545543

Sims, T., Hogan, C., & Carstensen, L. L. (2015). Selectivity as an emotion regulation strategy: Lessons from older adults. *Current Opinion in Psychology, 3*, 80–84. https://doi.org/10.1016/j.copsyc.2015.02.012

Shirai, M., & Kimura, T. (2022). Degree of meaningfulness of an event's ending can modulate mixed emotional experiences among Japanese undergraduates. *Perceptual and Motor Skills, 129*(4), 1137–1150. https://doi.org/10.1177/00315125221096991

Strough, J., de Bruin, W., Parker, A. M., Lemaster, P., Pichayayothin, N., & Delaney, R. (2016). Hour glass half full or half empty? Future time perspective and preoccupation with negative events across the life span. *Psychology and Aging, 31*(6), 558–573. https://doi.org/10.1037/pag0000097

Turan, B., Sims, T., Best, S. E., & Carstensen, L. L. (2016). Older age may offset genetic influence on affect: The polymorphism and affective well-being across the life span. *Psychology and Aging, 31*(3), 287–294. https://doi.org/10.1037/pag0000085

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology,*

54(6), 1063–1070. https://doi.org/10.1037/0022-3514.54.6.1063

Wrzus, C., Hänel, M., Wagner, J., & Neyer, F. J. (2013). Social network changes and life events across the life span: A meta-analysis. *Psychological Bulletin, 139*(1), 53–80. https://doi.org/10.1037/a0028601