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"How old do I want to be? The role of ideal age in life satisfaction and well-being"

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Abstract

Depending on a large variety of factors, every individual experiences their own aging differently, this individuality accounted for by the widely used term 'subjective aging'. This thesis synthesizes results from an online experience-sampling study to investigate effects of differences between how old individuals feel and how old they wish they were (i.e., subjective age discordances) on overall life satisfaction and joy in specific everyday situations. Over the course of seven days, participants were asked to offer information on their subjective experiences in specific situations six times a day, also filling out a baseline questionnaire beforehand. The construct awareness of age-related changes (AARC-gains) and the salience of participants' ages in everyday situations were hypothesised to play a moderating role.

The results confirmed findings from previous research that on average, individuals would like to be younger than they are feeling. Subjective age discordance was, as expected, also associated negatively with general life satisfaction and reported levels of joy in everyday situations and increased with chronological age. However, whereas salience was confirmed to have a moderating role in the relationship between situational joy and SAD, this was not the case for AARC-gains in the relationship between life satisfaction and SAD.

As SAD is a relatively novel construct, there is a long way to go to understand the underlying mechanisms and the role of constructs such as AARC in their entirety. It is to be hoped that this thesis has nevertheless contributed to this understanding and that future research will continue to build on the existing state of knowledge.

Keywords: *subjective aging, subjective age discordance (SAD), felt age, perceived age, ideal age, life satisfaction*

Abstract

Jede Person nimmt, abhängig von einer Vielzahl an verschiedenen Faktoren, das eigene Älterwerden unterschiedlich wahr, diese Individualität schlägt sich auch im breit verwendeten Ausdruck des „subjektiven Alterns“ nieder. Die vorliegende Arbeit fasst Ergebnisse einer online experience sampling-Studie zusammen und wertet diese aus, um Effekte subjektiver Altersdiskordanzen auf die allgemeine Lebenszufriedenheit und das Erleben von Freude in spezifischen alltäglichen Situationen zu untersuchen. Über eine Zeitspanne von sieben Tagen wurden die Studienteilnehmer*innen gebeten, ihre subjektiven Erfahrungen in spezifischen Alltagssituationen darzulegen, nachdem sie zu Beginn auch einen Baseline-Fragebogen ausgefüllt hatten. Die Hypothese des Konstrukts AARC-Gewinne und der Salienz des Alters der Teilnehmer*innen in den Alltagssituationen als Moderatorvariablen wurde überprüft.

Die Ergebnisse der Studie bestätigten frühere Studien, die zeigen, dass sich Personen im Durchschnitt jünger wünschen, als sie sich fühlen. Die subjektive Altersdiskordanz war außerdem wie erwartet negativ mit allgemeiner Lebenszufriedenheit und berichteter Freude in Alltagssituationen assoziiert und stieg mit dem chronologischen Alter der Teilnehmer*innen an. Wohingegen die moderierende Rolle der situationsspezifischen Salienz des Alters im Zusammenhang zwischen alltäglicher Freude und SAD bestätigt werden konnte, war dies nicht der Fall bei AARC-Gains im Zusammenhang zwischen Lebenszufriedenheit und SAD.

Da es sich bei SAD um ein relativ neues Konstrukt handelt, ist noch ein weiter Weg zu gehen, um die zugrundeliegenden Mechanismen und die Rolle anderer Konstrukte wie AARC in ihrer Gesamtheit zu verstehen. Es gilt dennoch zu hoffen, dass die vorliegende Arbeit zu diesem Verständnis beitragen konnte und ein Teil des Wissensstandes sein kann, auf dem künftige Forschung aufbauen kann.

Schlüsselwörter: *subjektives Altern, subjective Altersdiskordanz (SAD), gefühltes Alter, ideales Alter, Lebenszufriedenheit*

Theoretical background

From the moment we are born, we start going through multifaceted, uncertain and daunting, but exciting processes of aging. The world population has been aging rapidly in the last decades, with the fraction of individuals older than 60 years having increased from 9.2% in 1990 to 11.7% in 2013 and projected to reach 21.1% by 2050 (Sander et al., 2015). This trend has implications for many aspects of our society and has thus sparked a further research interest in the mechanisms of aging, considered from a biological as well as a psychological perspective. In this line, the aim of this thesis is to explore how subjective aging, specifically subjective age discordances between how old an individual feels and how old they would like to be, is associated with life satisfaction and psychological well-being.

In the last few years, research in developmental psychology has increasingly acknowledged the importance of exploring psychological mechanisms underlying the process of aging. These mechanisms cannot only be measured in terms of the chronological age of an individual, but also by asking how old individuals feel (i.e., felt age) and how old they would like to be (i.e., ideal age). Felt and ideal ages, as well as the related societal expectations and concepts, can be summarised under the term *subjective aging*. Research has even suggested that challenges faced by the older adult population are related to deeply subjective cognitive processes rather than simply biological changes manifesting naturally (Stenner et al., 2011). This does, however, not signify that psychological and biological aging processes are only to be considered separately. In fact, research has demonstrated a complex interplay between how we subjectively assess our own aging and our actual health, i.e., how we biologically age. Positive views on aging have been shown to bring diverse health benefits and for instance higher survival rates, and physical health could be improved in an intervention against implicit age stereotypes (Craciun et al., 2017; Levy et al., 2014).

More research into the directions and exact nature of the relationship between SAD and different health outcomes, such as emotions or life satisfaction, is yet to be done. Existing research shows a pathway leading from subjective aging, including age identity and self-perceptions of aging, to health (Westerhof & Wurm, 2015), but there are also effects going in the opposite direction by which subjective aging and well-being are influenced by health (Steptoe et al., 2014).

Subjective age or *age identity*, another term for felt age, is one construct covered by the broad term of subjective aging, describing how old a person feels (Barrett & Montepare, 2015). Although the concept seems trivial at first glance, it is actually based on complex personal models often connected to benchmarks dictated by society or located in individual biographies (Galambos et al., 2005, Kirkpatrick Johnson et al., 2007). It is likely that subjective age is informed by socioenvironmental cues about aging as well as individual perception of health or functioning (Stephan et al., 2015). With the passage of time, it is influenced by both developmental processes in different phases of the lifespan (life span perspective; Barrett & Montepare, 2015) and external factors shaping these processes (life course perspective; Barrett & Montepare, 2015). In line with findings such as these, age identity is seen as a fluid concept with the possibility to change with time and fluctuate throughout everyday experiences (Bellingtier et al., 2021).

Perceived and ideal age

The aging self comprises many concepts, such as *perceived age* and *ideal age*. Perceived or felt age refers to subjective age in its basic sense, describing how old an individual feels most of the time or in specific situations. From this point on, the term perceived age will be used to highlight its subjective nature and relation to concepts and perception of the self (Rupprecht et al., 2020). Ideal age on the other hand is the age an individual would like to be, regardless of how old they feel or how old they actually are. These constructs do not always align with, but can be greatly distinct from *chronological age*. To date, research has focused on discrepancies between felt and chronological age or ideal and chronological age (Agogo et al., 2014; Bellingtier et al., 2021; Veenstra et al., 2021). In the following sections, the aim is to review the current status of research on these age discrepancies as well as the relatively new concept of *subjective age discordance* (SAD; Rupprecht & Lang, 2020) before examining how SAD relates to life satisfaction and joy as well as possible roles of *awareness of age-related change* (AARC; Diehl & Wahl, 2010) and salience of age in everyday situations.

Age discrepancies: The current status of research

As stated previously, it is the norm rather than the exception that perceived and ideal age will not align with an individual's chronological age. Biological, mental

as well as social factors can act to increase or reduce perceived age, resulting in feeling older or younger than one's chronological age, respectively (Agogo et al., 2014). Some examples for these factors have been identified by research and include psychosocial maturity, markers of biological aging and health or experiences of ageism and, to a lesser extent, even sexual minority status (Barrett & Barbee, 2017; Galambos et al., 2005; Stephan et al., 2015). Prominently, there is also strong evidence that perceived age is related to *mastery beliefs*, i.e., perceived capability of control (Gallagher et al., 2010; Langer, 1975). Individuals showing higher mastery beliefs tend not to feel old even when they actually are, possibly because of an increased sense of independence (Infurna et al., 2010).

Generally, research on subjective aging has detected a *youthful bias* (Gana et al., 2004), meaning that adults and especially members of the elderly population tend to feel younger than their chronological age (Barak, 2009; Kaufman & Elder, 2002; Keyes & Westerhof, 2012; Rubin & Berntsen, 2006; Westerhof et al., 2003). More recent research has indicated a similar effect in the development of ideal age throughout the lifespan, where individuals want to be continuously younger the older they are (Barak, 2009).

The role of subjective age discordance (SAD)

Chronological age has often been used as a reference point to investigate subjective age discrepancies. In recently proposed theoretical frameworks, the focus has shifted to a perspective which further emphasises the subjective and self-perceptive aspects of aging processes. Instead of discrepancies between chronological and perceived or, more rarely, ideal age, recent research has investigated the discrepancies between perceived and ideal age (Bellingtier et al., 2021; Rupprecht et al., 2020). Such a discrepancy has been termed subjective age discordance (SAD; Rupprecht et al., 2020). The existence of SAD has been deduced from interculturally consistent findings that individuals tend to state a lower ideal than perceived age (Barnes-Farrell et al., 2002; Kaufman & Elder, 2002; Rupprecht & Lang, 2020; Uotinen et al., 2006). SAD has further been hypothesised to be associated with mental health, as both an older perceived age and a younger ideal age have been linked to lower psychological well-being (Keyes & Westerhof, 2012; Uotinen et al., 2003; Ward, 2010). The aim of this thesis is to expand the knowledge

of this relatively novel construct and how it relates to different aspects of well-being, such as life satisfaction and joy in everyday experiences.

Life satisfaction

How satisfied individuals are with their lives is affected by a wide range of sociodemographic factors such as gender, age, marital status, the culture in which they are socialised (individualism vs. collectivism), economic activity and health (Torres, 2016; Yetim, 2003). However, psychological factors are at least as important in determining *life satisfaction*, the following section focusing on factors related to an individual's view of themselves.

Our self-concepts can be organised into different dimensions, including, but not limited to, the ideal self, the social self, the deserved self, or the minimum-needs self (Sirgy, 2021). But what happens when there are, possibly even great, differences between self-concepts? One of the earliest psychological theories to address this question is *self-discrepancy theory*, which has recently also been suggested as a diagnostic framework in the field of psychopathology (Higgins, 1989; Mason et al., 2019). According to this theory, it is not the contents of a particular self-concept that influence well-being, but rather negative emotions or reduced well-being occur when there is a large discrepancy between conflicting contents of the self. Applying self-discrepancy theory to subjective aging, perceived or ideal age alone would not have a strong influence on our well-being. However, negative emotions or reduced well-being would occur when there is a large discrepancy between conflicting contents of the self, i.e., ideal and perceived age.

How we perceive ourselves as well as our emotions and well-being are closely associated with life satisfaction (Moksnes & Espnes, 2013). When our attributes and behaviour, the actual self, is perceived to be consistent with our ideal self, it enables individuals to see themselves positively and thus increases self-esteem (Sirgy, 2021). The role of mastery in subjective aging has been introduced in the section "Subjective aging", but both mastery and self-esteem are also associated with life satisfaction (Yetim, 2003). On the other hand, not having sufficient evidence to affirm one's self-image has been associated with a decrease in well-being and cognitive functioning (Coleman et al., 2015). Thus, if an individual's perceived age deviates strongly from this person's ideal age, there will be inconsistencies in the self-concept, threatening self-esteem and leading to frustration or other negative emotions which

will reduce life satisfaction (Tesser et al., 2000). Also taking into account the established connection between subjective aging and mental health, it is to be expected that SAD is negatively related to life satisfaction.

Joy

Joy is one of the most prevalent emotions we feel, making up more than a third of everyday emotional experience (Trampe et al., 2015). In the core affect framework of emotions, joy can be categorized as a pleasant and moderately activating emotion (Russell, 2003).
The conception of age identity as fluid and ever-changing makes a conjoint investigation with emotions in everyday situations, which are also constantly changing, fitting (Bellingtier et al., 2021).

As one would expect, trait joy has been found to be positively associated with subjective well-being and it can be reliably measured via self-report instruments (Watkins et al., 2018). Positive emotions such as joy have also been associated with life satisfaction, which is why it is fitting to analyse joy on the situational level in parallel to life satisfaction on the personal level (Mutz & Kampfer, 2013). The experience of joy in certain everyday situations and subjective aging may thus influence each other, with a greater joy in a specific situation being related to a smaller SAD in the same situation.

Awareness of age-related change (AARC)

A relatively modern subjective aging concept is known as awareness of age-related change (AARC), defined as all experiences through which individuals become aware of the ways in which aging processes have changed their behaviour and other aspects of their lives (Diehl & Wahl, 2010). The term AARC and the scales used to operationalise the construct include both gains and losses that are expected in the future and attributed to aging processes. Research has shown that gains and losses coexist in individuals' perception of aging, however the risk of losses is seen as higher with age (Heckhausen et al., 1989; Wahl et al., 2013). In order to operationalise a positive perception of aging, only AARC-gains items are included in the analysis for this thesis (Sample items and used scales are shown in Table 1, section "Variables and instruments".)

The dimensions of AARC are *Health and physical functioning*, *Cognitive functioning*, *Interpersonal relations*, *Social-cognitive and social-emotional functioning* and *Lifestyle and engagement*. Since all of these dimensions are also associated with life satisfaction (see section “Life satisfaction”), it seems reasonable to expect a connection between AARC and life satisfaction. It has been suggested that AARC is also a part of the interplay between subjective aging and health and should be taken into account when collecting longitudinal evidence in future research (Westerhof & Wurm, 2015). When we become more aware of how aging processes have already changed and perhaps improved our life, it may be easier to cope with the negative consequences of a large SAD, alleviating possible effects on well-being and life satisfaction.

Salience

The term *salience* is often used in combination with attention (*salience-driven attention*) to describe situations in which attention is captured by certain features of different stimuli (Bruce & Tsotsos, 2009; Cornia et al., 2018). The concept of salience can also be applied to abstract concepts, such as age. In the context of this thesis, salience refers to the extent to which individuals were conscious of their age in specific everyday situations.

In line with theories about stereotypes and priming, salience of their age has been shown to influence how people are perceived and how they feel about themselves (Meade et al., 2017). In terms of the Compensatory Consumer Behaviour Model (Mandel et al., 2017), which can be applied to behaviour beyond consuming, the situation in which one’s age becomes salient can be considered a “source of self-discrepancy” (Mandel et al., 2017), for instance for individuals wanting to be much younger than they feel. Especially in these cases, situations in which chronological age is highly salient will be likely to induce cognitive processes in which attention is also directed to perceived and ideal age and possibly large discrepancies between these self-concepts. Therefore, it seems reasonable to expect that self-perception changes depending on how salient your age is in a certain situation. If age is highly salient and SAD is already high, experienced joy might be reduced even more, meaning that salience is possibly a moderator in the relationship between SAD and joy.

Research question and hypotheses

Research question

The research question with which the presented study concerns itself is as follows:

How are subjective age discordances, i.e. differences between perceived and ideal ages, related to life satisfaction and experienced joy in everyday situations and are these relations moderated by awareness of age-related change (AARC) and salience of age in everyday situations?

Hypotheses

Based on existing theories and research findings detailed in the chapter Theoretical Background, the hypotheses of this research are as follows:

H1: Trait-SAD is negatively related to life satisfaction.

H2: State-SAD in a day-to-day situation is negatively related to experienced joy in this situation.

H3: The relationship between trait-SAD and life satisfaction is moderated by AARC-gains.

H4: The relationship between state-SAD and experienced joy in a day-to-day situation is moderated by the salience of an individual's age in this situation.

These hypotheses were tested in an online experience-sampling study, in which participants offered diverse information about random situations in their everyday life via a questionnaire filled out in an app. In total, up to 42 situations were collected from each participant (six per day) following a longitudinal design. Additionally, participants were asked to fill out a baseline survey prior to the study, in which they were informed of their rights, provided their consent to take part in the study as well as demographic information about themselves. The baseline questionnaire also contained questions about health, well-being, lifestyle, personality or their view of the future.

Methods

Research design

This research was conducted as part of an online longitudinal experience sampling study titled “Quality of Everyday Life”, organised and conducted by professors and students at the Department Psychology of Aging (part of the Faculty of Psychology at the University of Vienna, Austria). The experience sampling method was used in this case to collect immediate data about specific situations in the participants’ day-to-day lives, which is needed to gain insights into how the perception of aging is influenced by situational factors. This type of design also allows for a more thorough examination of how state-SAD fluctuates throughout the day and the ways it may differ from trait-SAD. After being informed of the aims of the study and their rights, participants were asked to fill out a baseline questionnaire and afterwards give information on specific situations in their day-to-day life. Across the timespan of one week, participants were presented with the same questions via an app six times a day, eliciting a maximum of 42 situations per participant. The items were mainly targeted at the social environment of the situation and the emotions the situation evoked in the participants. Additionally, participants had the option to receive a processed summary of the data that was collected on situations in their day-to-day life.

All the variables included in the analysis were embedded in a multilevel model with single situations at level one and participants at level two, in order to account for the nested data structure.

Sample description

The sample of the study included German speakers aged 18 and above and was mainly recruited through students and their circles of relatives, friends and acquaintances.

Baseline questionnaire

In total, N = 159 participants answered questions of the baseline questionnaire. Age ranged from 18 to 85 and mean age was M = 40.4 years (SD = 17.1). 34.6% of participants were male and 65.4% were female. The majority of participants (79.2%) lived in Austria, some of them also in Germany (17.6%) and Switzerland (2.5%), only .6% lived in none of these countries. The level of education was high in this sample; 52.8% of participants had graduated with a university or FH

degree, 23.3% had Matura or Abitur as their highest educational qualification, 3.1% had received compulsory education.

ESM-Quest App

Of those who participated in the baseline questionnaire, N = 117 participants answered questions in the app. Age ranged from 18 to 85 and mean age was M = 38.44 years (SD = 16.6). 32.5% of participants were male and 67.5% were female. The majority of participants (76.1%) lived in Austria, some of them also in Germany (19.7%) and Switzerland (3.4%), only .9% lived in none of these countries. The level of education was high in this sample; 57.3% of participants had graduated with a university or FH degree, 20.5% had Matura or Abitur as their highest educational qualification, 3.4% had received compulsory education.

Variables and instruments

Table 1 shows all constructs, scales and sample items relevant to this research. The complete scales for life satisfaction and AARC-gains are listed in Appendix A.

Table 1

Measured constructs, scales and sample items in the baseline questionnaire and the ESM app.

Baseline questionnaire		
Construct	Scale	Sample items
Felt and ideal age	Subjective aging (Huxhold & Wurm, 2010)	"Regardless of your actual age, if you were to express it in years, how old do you feel most of the time?" "If you could choose freely, how old would you like to be most of the time?" Value: *Felt/Ideal age in years*
Life satisfaction	Satisfaction With Life Scale (SWLS; Diener et al., 1985; German version: Schuhmacher et al., 2003)	"In most ways, my life is close to my ideal." "The conditions of my life are excellent." "If I could live my life over, I would change almost nothing."

		Value: Participants rate five items on a scale from 1 - *do not agree at all* to 7 - *agree fully*
Awareness of age-related change (AARC) - gains	AARC-10 SF (Kaspar et al., 2019; German version: Wahl et al., 2018): items 1, 3, 5, 7 and 9	„With my increasing age, I realise that I pay more attention to my health." "With my increasing age, I realise that I appreciate relationships and people much more." Value: Participants rate five items on a scale from 1 – *absolutely not* to 7 – *very strongly*
	ESM app	
Felt and ideal ages	Self-generated	"How old are you feeling in this moment?" – felt age in situation "If you could choose freely, how old would you like to be now?" – ideal age in situation Value: Participants respond on a scale from 1 – *very much younger* to 7 – *very much older*, 4 representing the participant's chronological age SAD is calculated as felt – ideal age, so ranges from -6 (low) to 6 (high), all values within this range were included in the analysis.
Joy in day-to-day situations	Titz (2001), adapted from Thomas Götz	"How strongly did you experience joy during this activity?" Value: Participants respond on a scale from 1 – *absolutely not* to 5 – *very strongly*

Salience of age in day-to-day situations	Self-generated	"I was very conscious of my age just now." Value: Participants rate item on a scale from 1 – *absolutely not* to 5 – *very much*

Table 2 shows the reliabilities of scales used to measure life satisfaction, AARC-gains, joy and salience. Reliabilities are stated in Cronbach's α.

Table 2

Reliabilities of scales (in Cronbach's α used to measure life satisfaction, AARC-gains, joy and salience.

Construct measured	Reliability (in Cronbach's α)
Life satisfaction	0.886
AARC-gains	0.576
Joy	0.904
Salience	0.645

Especially the scales used to measure life satisfaction and joy had good reliabilities ($\alpha > .80$). AARC-gains and salience had weaker reliabilities, which is important to consider when interpreting results.

Data collection and processing

The study on which this thesis is based was conducted from October to December 2021. Data was collected using a baseline questionnaire which was made available online and a separate questionnaire which the participants were asked to fill out using the app "ESM-Quest" six times daily over the course of one week. To ensure anonymity, every participant was given an individual alphanumeric code.

The data were processed using both IBM SPSS 28 and R 4.2.1. Multiple mixed linear models were calculated, progressively adding expected predictors and moderators until arriving at the intended complete multilevel model. Table 2 shows the exact variables included in each of the models.

Table 2

Overview of models and included variables.

Model	Outcome variable	Included predictor variables	Included moderator variables	Included covariates
1 – Null model	SAD	-	-	
2 – individual variables	SAD	Life satisfaction	AARC-gains	Age
3 – situational variables	SAD	Joy	Salience (of age)	
4 – full model	SAD	Life satisfaction, Joy	AARC-gains, Salience (of age)	Age

Results

Descriptive Statistics

Descriptive Statistics for the Baseline Questionnaire

The baseline questionnaire included items measuring subjective aging, in which participants were asked for both perceived and ideal age. Participants' perceived age (M = 35.00 years, SD = 15.02) ranged from 5 to 75 years and was higher than their ideal age (M = 32.99 years, SD = 14.09), which ranged from 17 to 75 years. On average, participants felt 3.44 years younger than their chronological age (SD = 5.65) and considered their ideal age to be 5.45 years younger than their chronological age (SD = 8.45). The average SAD, calculated as the mean difference between perceived and ideal age, was moderate (M = 2.01 years, SD = 8.06). Other relevant variables in the baseline questionnaire were life satisfaction and AARC-gains. On average, participants indicated to be moderately satisfied with their lives (M = 4.96, SD = 1.22). The five items for AARC-gains were rated with an average of M = 5.32 (SD = 0.87), indicating that participants in the analysed sample had a good awareness of positive effects or gains that aging can bring with it.

Descriptive Statistics for the ESM-Quest App

Overall, 2970 situations in participants' everyday lives were analysed. All analysed variables were averaged over the entirety of those situations, which yielded second measures for subjective aging, i.e. perceived and ideal age, on a trait level.

Participants' reports on their subjective age discordance measured in numerical categories were highly correlated to their reports of SAD measured in years, $r(2968) = .715$, $p < .001$. On a state level, participants reported feeling as old

as they are (category 4) the most often (84.4% of reported situations). Participants' ideal ages were also most often the same as their chronological age (category 4, 76.9% of reported situations). On average, participants reported moderate levels of joy (M = 3.33, SD = 1.02) and were moderately self-conscious about their age in situations of their everyday lives, meaning that their chronological age was averagely salient to them (M = 2.55, SD = 1.11).

Correlation Matrix

In order to assess the relationships between relevant variables, correlations were calculated in a pairwise manner for all of them. Table 3 shows the correlation matrix for all individual variables, Table 4 for all situational variables.

Table 3

Correlation matrix of relevant individual variables.

	SAD	Life satisfaction	AARC-gains	Age
SAD	-	**-.170**	**.031**	**.249**
Life satisfaction		-	**.353**	**.074**
AARC-gains			-	**.081**
Age				-

Note: All significant correlations ($p < .05$) are printed in bold.

Table 4

Correlation matrix of relevant variables.

	SAD	Joy	Salience
SAD	-	**-.116**	**-.143**
Joy		-	.007
Salience			-

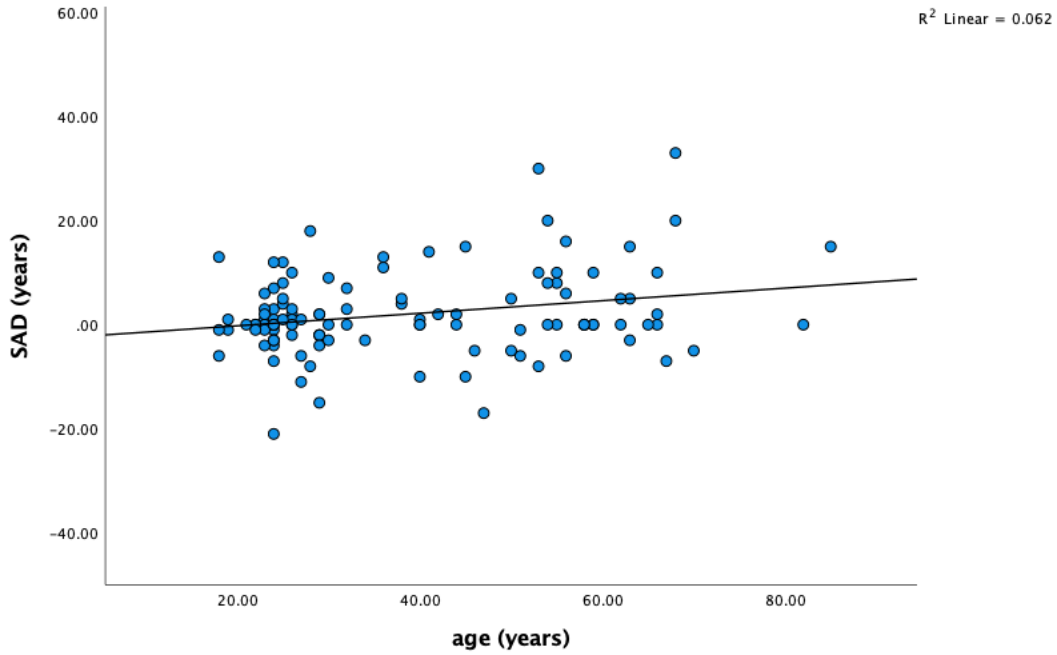
Note: All significant correlations ($p < .05$) are printed in bold.

Graphic depiction of relationship between SAD and age

Graph 1 shows SAD (calculated as the participants' self-reported felt age subtracted by their ideal age in absolute years) plotted against age of the participants (also in absolute years).

Graph 1

Scatter plot of SAD against age (both in absolute years).



The graph confirms the significant positive correlation between SAD and age in that it shows SAD increasing with age. The line of best fit suggests that with every year a person ages, SAD increases by 0.12 years on average.

Multilevel Models

Model 1: Null Model

In the first step of analysis, a null model was calculated, in which no predictors or moderator variables were included, but situations were rather merely grouped into the respective participants. Table 4 shows model parameters and variance components of the null model (Model 1).

Calculating R^2 using the formula $R^2 = \frac{var1}{var1+var2}$, we get:

$$R^2 = \frac{0.1188}{0.1188 + 0.4167} = 0.2218$$

The estimated intercept of the fixed effects model is highly significant ($p < .001$) and amounts to 0.18, indicating the average SAD over all participants and situations. An intercept of 0.18 suggests that felt and ideal ages of participants did not stray far from each other, meaning that on average, SAD was not very high in the

studied sample. Interindividual variance, i.e. the variance in SAD thus accounts for 22% of total variance, while the other 78% is explained by intraindividual, i.e. situational, differences.

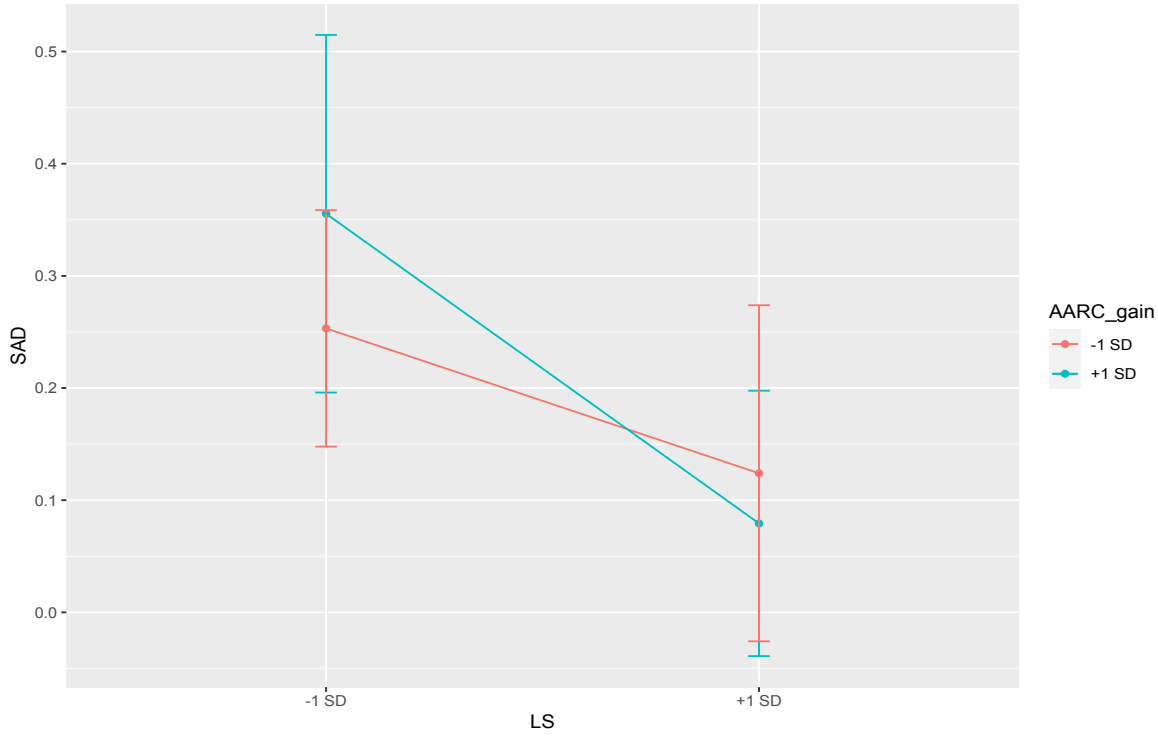
Model 2: Individual variables (Level 2)

In the next model, the variable life satisfaction was added as a predictor and the variable AARC-gains was added as a moderator. Additionally, the interaction between life satisfaction and AARC-gains was added to the model. Table 4 shows model parameters and variance components of the model including individual variables (Model 2). Graph 2 shows SAD (calculated by subtracting participants' ideal ages from their felt ages as self-reported in the app with respect to their chronological ages) plotted against self-reported life satisfaction of participants (see Table 1 for used scales). The separate lines indicate groups of participants reporting low versus high AARC-gains.

Like in the first model, the intercept is highly significant ($p < .001$). Significant effects can also be observed in the variables life satisfaction and age ($p < .05$), with life satisfaction having a negative and age a positive coefficient. No significant effects were found for AARC-gains and the interaction life satisfaction*AARC-gains, however.

Graph 2

Graph plotting SAD against self-reported life satisfaction (lines correspond to groups of participants with low or high AARC-gains scores, error bars represent standard deviation).



The graph confirms the negative relationship between life satisfaction and SAD, meaning that SAD decreases with life satisfaction. The intersecting lines suggest there might be an interaction between life satisfaction and AARC-gains, however, from the graph alone, there are no clear conclusions to be made due to overlapping standard deviation bars.

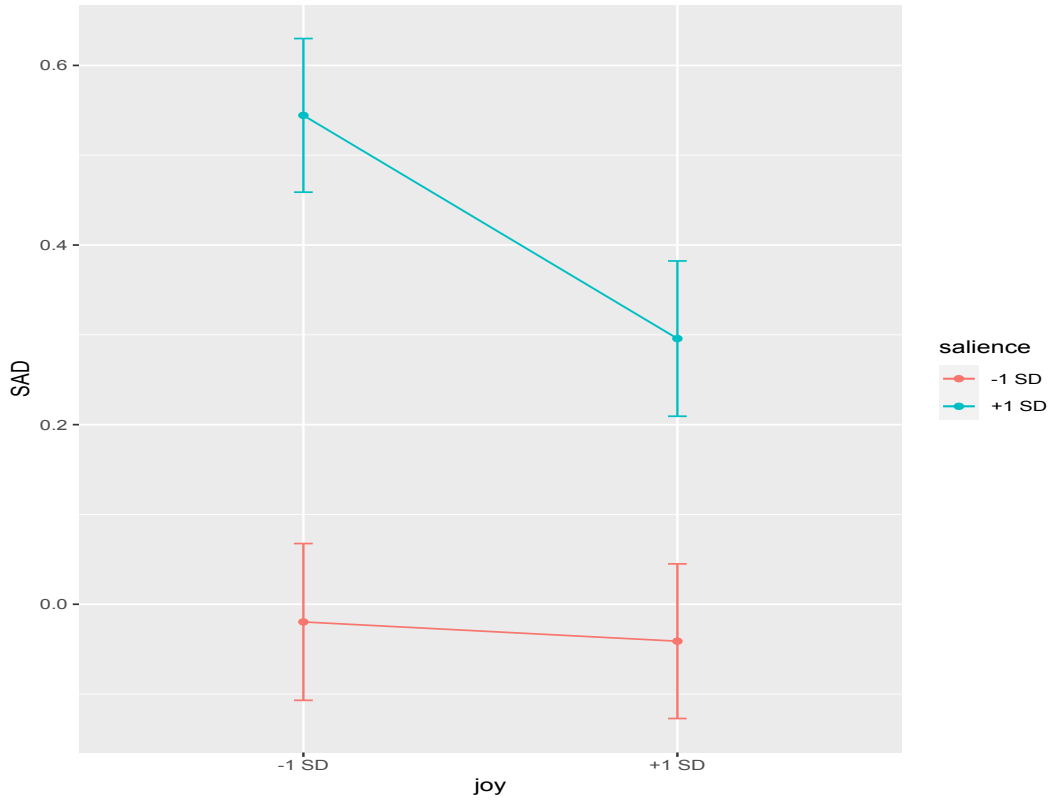
Model 3: Situational variables (Level 1)

In model 3, all of the relevant situational variables were added, including the levels of experienced joy as well as perceived salience of participants' chronological age in everyday situations. Table 4 shows model parameters and variance components of the model including situational variables (Model 3). Graph 3 shows SAD (calculated by subtracting participants' ideal ages from their felt ages as self-reported in the app with respect to their chronological ages) plotted against self-reported joy of participants in everyday situations (see Table 1 for used scales). The separate lines indicate groups of participants reporting low versus high salience of age in everyday situations.

As in the previous models, the intercept remains highly significant ($p < .001$). Joy and salience both show significant effects ($p < .001$), with joy having a negative and salience a positive coefficient. The interaction joy*salience also has a significant negative effect in this model ($p < .001$).

Graph 3

Graph plotting SAD against self-reported joy in everyday situations (lines correspond to groups of participants with low or high salience scores, errors represent standard deviation).



In this graph, there is again confirmation of a negative relationship, in this case between joy and SAD. As reported levels of joy in everyday situations increase, SAD decreases. This decrease in SAD is more pronounced in participants who reported higher average levels of salience of age in everyday situations.

The slopes of the lines are different and the lines do not intersect within the range of the data, again indicating interaction between joy and salience.

Model 4: All variables

In the final model, all predictors, moderators and covariates were included. Table 4 shows model parameters and variance components of the model including both individual and situational variables (Model 4).

Table 4

Multilevel Regression Analysis on the Experience of subjective age discordance (SAD) in everyday situations.

Model	1 (Null model)	2	3	4
Fixed Effects		Unstandardised Coefficient [Standard Error]		
Individual level (Level 2)				
Age		**0.0052**		**0.0044**
		[0.0020]		[0.0020]
Life Satisfaction		**-0.0839**		**-0.0836**
		[0.0308]		[0.0315]
AARC-gains		0.1933		0.2024
		[0.1399]		[0.1422]
Interaction LS*AARC-gains		-0.0354 [0.0277]		-0.0036 [0.0280]
Situational Level (Level 1)				
Joy			**-0.0664**	**-0.0654**
			[0.0148]	[0.0148]
Salience			**0.2018**	**0.3671**
			[0.0153]	[0.0426]
Interaction joy*salience			**-0.0503** [0.0121]	**-0.0496** [0.0121]
Random Effects				
Intercept	0.1188	0.1069	0.1066	0.1009
Residual	0.4167	0.4169	0.3921	0.4388

Note: Significant coefficients are printed in bold.

The intercept is also significant here ($p < .001$), and as before, joy, salience and the interaction joy*salience show highly significant effects ($p < .001$). Life satisfaction and age also show significant effects similar to those in the models presented above ($p < .05$).

Discussion

The aim of this thesis was to examine how discrepancies between different measures of subjective aging, i.e. subjective age discordance (SAD) between perceived and ideal age, related to life satisfaction and experienced joy in everyday situations and if these relations are moderated by awareness of age-related change (AARC) and salience of age in everyday situations. To this end, a longitudinal research design was used, in which participants first answered questions of a baseline questionnaire and then continued to fill out online surveys six times a day over the course of a week. This study design allows for the consideration of situational factors affecting subjective aging as well as situational aspects and variability of subjective aging itself.

The results confirmed some of the existing findings in literature. As reported in previous studies, perceived age was higher than ideal age, on average (Barak, 2009; Kaufman & Elder, 2002; Keyes & Westerhof, 2012; Rubin & Berntsen, 2006; Westerhof et al., 2003). SAD increased with age of participants, which has also been found repeatedly in existing research (Barnes-Farrell et al., 2002; Kaufman & Elder, 2002; Rupprecht & Lang, 2020; Uotinen et al., 2006). That 78% of variance in SAD could be traced back to intraindividual, i.e. situational, differences, underlines that subjective aging is not invariable, but rather subjected to fluctuations that can occur in very short time frames, even throughout a single day (Bellingtier et al., 2021).

The first hypothesis that SAD is negatively related to life satisfaction is confirmed by the significant negative correlation between the two variables and asserted further by the negative coefficients of life satisfaction in the multilevel models. The results show that greater SAD is associated with lower life satisfaction. When individuals would like to be much younger than they feel, this large discrepancy between ideal and perceived age seems to be negatively associated with their well-being and in consequence how satisfied they are with their lives. This is also in line with existing findings that have underlined the links between subjective aging, well-being and life satisfaction (Moksnes & Espnes, 2013; Yetim, 2003).

Similarly, the results could confirm a significant negative relation between SAD and joy in everyday situations (H2). Parallel to the relationship between SAD and life satisfaction at the individual level, the experience of joy in everyday life is also associated with SAD at the situational level. If levels of joy in everyday situations are low, SAD will be high and vice versa, which is also in line with findings that have

shown a close relationship between subjective aging and emotional states. Joy has furthermore been associated with life satisfaction (Mutz & Kampfer, 2013). The results reported in this thesis do not, however, allow for conclusions as to whether joy has a greater influence on SAD or SAD influences joy. It is also possible that another third variable which has not been included in the analysis influences both SAD and our experience of joy in everyday life. More research is necessary to investigate the relationship between those variables in more depth, but it certainly seems that how individuals view their own aging and their emotional well-being affect each other.

The third hypothesis assumed a moderating effect of the variable AARC-gains on the relationship between SAD and life satisfaction (H3). After the statistical analysis, this hypothesis had to be discarded, as there was no significant effect of the interaction life satisfaction*AARC-gains. This indicates that even if individuals are highly aware of what gains they receive while going through aging processes, on its own this might not be sufficient to outweigh negative effects of a high SAD on life satisfaction. Although AARC-gains does not have the hypothesised moderating effect in the studied sample, it cannot be excluded that it may well have other meaningful roles to play in subjective aging and different health outcomes, primarily since all the components of AARC are connected to health and well-being (Diehl & Wahl, 2010). As other researchers have stated previously, AARC should definitely continue to be explored in contexts of health and aging processes, especially subjective aging (Westerhof & Wurm, 2015).

As to the fourth and final hypothesis (H4), the effect of the interaction joy*salience was significant, meaning that the hypothesis that salience of age is a moderator variable in the relationship between joy and SAD could be confirmed in this sample. However, the direction of the effect of salience proved to be different than originally hypothesised in that higher levels of salience seem to a steeper decrease of SAD with the increase of joy. It seems that in situations where individuals feel particularly joyful but their age is still highly salient to them, they might reappraise their subjective age, for instance, feeling younger, reducing SAD. This corresponds to reported findings in literature showing the importance of salience of age in how we perceive ourselves, thus also in how we age subjectively (Meade et al., 2017). This result may also once again demonstrate that felt and chronological age will often differ from each other, as many researchers and models have found (Agogo et al., 2014).

It is also notable that the variable age showed significant effects on SAD in both models in which it was included. The positive coefficients indicate that subjective age discordances individuals are confronted with tend to increase with their age, which supports findings showing that ideal ages become younger with higher chronological age. The exact role of chronological age in subjective age discordances does remain unclear, however, and there is definitely need to further examine this role in future studies.

The results of this thesis support the connections that have been established between emotions and self-concepts. They also support self-discrepancy theory (Higgins, 1987), as they show that large discrepancies between different self-concepts are associated with negative emotions. In this case, a large SAD, which is conceived as the discrepancy between the self-concepts perceived and ideal age, has a negative effect on the level of joy individuals experience in everyday situations. This also supports the idea underlying the Compensatory Consumer Model of Behaviour that largely diverging or inconsistent self-concepts can threaten self-esteem and thus evoke negative emotions (Mandel et al., 2017).

As in every research, limitations are to be expected and have to be considered in the effects they may have on the results and their interpretation. One limitation lies in the chosen multilevel analyses themselves, as it is not possible to infer causation or the direction of a pathway between SAD and life satisfaction and experience of joy. This limits the amount of exact knowledge that can be gained about SAD as a construct in this study. In the experience sampling method, filling out questionnaires multiple times a day can cost the participants a lot of effort and when it is not possible for them to answer the questions immediately after the signal, memory distortions might affect results. Although the participants remain anonymous throughout the entire course of the study, effects of social desirability may bias their responses (e.g., regarding their emotions in a certain situation).

Aging processes and the subjective experiences of them are among many other factors, influenced by culture (O'Brien et al., 2017). As the participants are all from German-speaking countries and thus share their cultural background, the results of this research do not justify conclusions about aging processes and mechanisms which are generalizable to further cultures. The role and validity of SAD as a construct in different cultures is generally a topic meriting attention in future studies.

Another limitation related to the sample is that only persons with access to and experience with smartphones participated in the experience-sampling part of the study. This excludes elderly age groups, whose data thus cannot be collected. Also, the app can only be downloaded at the Google Play Store and although users of smartphones without access to Google Play Store can borrow a phone for the study, the sample size is still limited.

In every research, limitations can also arise from methodical aspects. In this case, questionnaires may be too long, possibly reducing compliance, leading to participants breaking off the study and resulting in incomplete data. It is also possible that constructs are operationalised in ways that might not capture enough of their essence, for example using short form questionnaires or single items, such as when measuring salience of age. This limits the amount of information that can be given by the participants and used in statistical analyses.

Although the results of this thesis are to be interpreted carefully, they confirm that there will often be differences between the age an individual feels, i.e. perceived age, and the age they would like to be, i.e. ideal age. As such, the results corroborate the theoretical construct of subjective age discordance (Rupprecht et al., 2020). Also, this research confirms significant relationships between subjective aging and well-being, more specifically life satisfaction and joy. In everyday situations, it indeed seems not to be the case that negative effects of a large SAD are exacerbated in cases where an individual's age is particularly salient and the situation becomes a source of self-discrepancy. This study is also one of the first ones to explicitly explore subjective age discordance (SAD) as a concept and do so on both situational and individual levels.

Although psychological mechanisms of aging have been increasingly better understood in the last years, there is still a long way to go to have an understanding as complete as possible of how different variables of individual as well as situational nature influence subjective aging and the exact pathways through which complex constructs such as health and well-being are influenced by subjective aging. Although AARC did not have the hypothesised significant moderating effect in this sample, there is still a possibility that it does play a role in subjective aging, since connections have already been established in previous studies. Using five AARC-gains items only, as opposed to the other five AARC-losses items, might also have influenced model outcomes.

Research findings in the field of subjective aging are of high practical relevance in order to ensure and uphold the physical as well as the psychological well-being of the increasing aging population. To this end, research into the field of subjective aging should be continued, examining more variables and conducting more intercultural studies, as aging is viewed in different ways in different cultures and thus, associated variables might be related differently in different cultures.

This thesis has contributed to showing that regarding aging processes, subjective psychological processes can play an even greater role in the well-being of aging individuals than biological ones. Based on the presented findings, it may be beneficial to put a greater focus on how individuals age subjectively to ensure that they age as healthily and happily as possible. Generally speaking, topics pertaining to aging are becoming increasingly relevant to society as a whole, which is why it is of high importance that they continue to be addressed in the field of developmental psychology and other related research fields.

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Appendix A: Complete scales for measured variables

Satisfaction With Life Scale (SWLS; Diener et al., 1985; German version: Schuhmacher et al., 2003)

1. In den meisten Bereichen entspricht mein Leben meinen Idealvorstellungen.
   In most ways, my life is close to my ideal.
2. Meine Lebensbedingungen sind ausgezeichnet.
   The conditions of my life are excellent.
3. Ich bin mit meinem Leben zufrieden.
   I am satisfied with my life.
4. Bisher habe ich die wesentlichen Dinge erreicht, die ich mir für mein Leben wünsche.
   Up until now, I have accomplished the essential things I wish for in my life.
5. Wenn ich mein Leben noch einmal leben könnte, würde ich kaum etwas ändern.
   If I could live my life all over again, I would change almost nothing.

AARC-10 SF (Kaspar et al., 2019; German version: Wahl et al., 2018): items 1, 3, 5, 7 and 9

Mit dem Älterwerden merke ich, dass…
Getting older, I am noticing that…

1. ...ich Beziehungen und andere Menschen wesentlich mehr schätze.
   …I can appreciate relationships and other people significantly more.
2. …ich meiner Gesundheit mehr Aufmerksamkeit widme.
   …I am dedicating more attention to my health.
3. …ich mehr Erfahrung und Wissen habe, um Dinge und Menschen einzuschätzen.
   …I have more experience and knowledge to assess things and people.
4. …ich ein besseres Gespür dafür habe, was mir wichtig ist.
   …I have a better feeling for what is important to me.
5. …ich mehr Freiheit habe, meine Tage so zu erleben, wie ich will.
   …I have more freedom to live my days as I want.

Appendix B: SPSS syntax

Calculation of subjective age discordance (SAD)

```
COMPUTE SAD=SU01_02 - SU02_02.
EXECUTE.
```

Calculation of mean life satisfaction

```
COMPUTE LS_mean=(LE01_01 + LE01_02 + LE01_03 + LE01_04 + LE01_05) /
5.
EXECUTE.
```

Calculation of mean AARC-gains

```
COMPUTE AARC_mean=(GV01_01 + GV01_03 + GV01_05 + GV01_07 + GV01_0
9) / 5.
EXECUTE.
```

Descriptive statistics for SAD and the differences between felt/ideal and chronological age

```
DESCRIPTIVES VARIABLES=felt_chr_diff ideal_chr_diff SAD
/STATISTICS=MEAN STDDEV MIN MAX.
```

Reliability of scales

```
RELIABILITY
/VARIABLES=LE01_01 LE01_02 LE01_03 LE01_04 LE01_05
/SCALE('ALL VARIABLES') ALL
/MODEL=ALPHA.
RELIABILITY
/VARIABLES=GV01_01 GV01_03 GV01_05 GV01_07 GV01_09
/SCALE('ALL VARIABLES') ALL
/MODEL=ALPHA.
```

Sample description

```
DESCRIPTIVES VARIABLES= SD11_02
/STATISTICS=MEAN STDDEV MIN MAX.
FREQUENCIES VARIABLES=SD05 SD11_02 SD14 SD10
/ORDER=ANALYSIS.
```

Calculating correlations between individual variables

```
CORRELATIONS
  /VARIABLES=SD11_02 LS_mean AARC_mean SAD
  /PRINT=TWOTAIL NOSIG FULL
  /MISSING=PAIRWISE.
```

Calculating correlations between situational variables

```
DATASET ACTIVATE DataSet2.
CORRELATIONS
  /VARIABLES=value.40 value.8 SAD
  /PRINT=TWOTAIL NOSIG FULL
  /MISSING=PAIRWISE.
```

Appendix C: R syntax

```
long<-readRDS("/Users/florentinschoenhuber/Desktop/Thesis/Statistik (SPSS und R)/R/New Folder With Items/data_complete_long.RDs")
long$LS<-rowMeans(long[, c("LE01_01", "LE01_02", "LE01_03", "LE01_04", "LE01_05")], na.rm=TRUE)
long$AARC_gain<-rowMeans(long[, c("GV01_01", "GV01_03", "GV01_05", "GV01_07", "GV01_09")], na.rm=TRUE)
long$AARC_gain<-long$AARC_gain-mean(long$AARC_gain, na.rm=TRUE)
long$age<-c(scale(long$SD11_02, scale=FALSE))
install.packages("lme4")
library(lme4)
summary(lmer(SAD~1+(1|code), data=long))
summary(lmer(SAD~1+LS*AARC_gain+age+(1|code), data=long))
long$value.8<-long$value.8-mean(long$value.8, na.rm=TRUE)
long$val_1<-ifelse(long$value.40<6, long$value.40, NA)
long$val_2<-ifelse(long$value.40<6, long$value.40, 0)
long$val_1<-c(scale(long$val_1, scale=FALSE))
long$val_2<-c(scale(long$val_2, scale=FALSE))
long$salience<-long$val_1
summary(lmer(SAD~1+joy*salience+(1|code), data=long))
summary(lmer(SAD~1+joy*salience+LS*AARC_gain+age+(1|code), data=long))
library(reghelper)
graph_model(lmer(SAD~1+joy*salience+age+(1|code), data=long), y=SAD, x=joy, lines=salience)
graph_model(lmer(SAD~1+LS*AARC_gain+age+(1|code), data=long), y=SAD, x=LS, lines=AARC_gain)
```