University of Liverpool

A qualitative exploration of socio-temporal mental schemas to investigate meaning-making on a worldview level

The novel socio-temporal matrix as a tool for holistic self-reflection

MSc Psychology Dissertation

Mathias Sager, March 2020

Declaration

No portion of this work has been submitted in support of an application, for degree or qualification of this or any other university or institute of learning.

Signature

Abstract

We live in a global world, but identifying with thoughts about distant social and temporal perspectives as, for example, including all future humanity in one's worldview seems to represent a challenge. To date, no research established the matrix-organized interdependencies of the intra-, inter-, and extra-personal aspects together with the past, present, and future in a single framework. However, there would be good reasons for doing so. By using a qualitative approach, the socio-temporal mental schemas of fourteen expert interviewees between thirty-six and seventy-two years have been explored. Thematic analysis identified three themes: (1) Learning from the intra-past, (2) (over-)identification with the inter-present, and (3) rewards from connecting to the extra-future. Creating temporal and social coherences was found to increase a person's agency, and higher values instead of empathy that is focusing the inter-personal, let one relate to a broader world. The study concludes that the ability to embrace a fuller social and temporal scope in one's mind-wandering (especially to the extra-future), comes with more effective approaches towards worries, remaining adaptive, and a sense of meaningful satisfaction. Such a socio-temporal awareness intelligence is theoretically learnable. Examples evidenced shifts in schema constellations over time, particularly in response to critical life events. Overall, the novel socio-temporal matrix presented in this study proved to offer a useful tool to reflect on individuals' meaning-making on a worldview level. Finally, indications for future research and eventually possible applications in interventions in therapeutic and educational settings are provided.

Keywords: worldview, socio-temporal, schemas, self-reflection, qualitative research

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Glossary

Sociality	The term sociality in this study stands for 'social level' (i.e., the intra-personal, inter-personal, and extra-personal). Sociality is commonly defined as "the tendency to associate in … groups" (Sociality, n.d.) and, therefore, suits to describe mind-wandering tendencies as related to social scopes.
Temporality	The term temporality is used as a synonym for 'temporal mode' (i.e., the past, present, and future) in this study. Temporality commonly means "the quality or state of being temporal" (Temporality, n.d.). Temporal itself can mean "relating to the sequence of time or to a particular time" (Temporal, n.d.).
Socio-temporality	Socio-temporality could not be identified as a commonly used term. For the purpose of this study, it shall mean any combination of a particular sociality and temporality, as they are defined above. For example, the combination of an inter-personal sociality with the temporality of the future would result in an inter-future socio-temporality. The nine fields of the socio-temporal matrix presented in this study (Figure 1) are visual representations of the nine possible different socio-temporalities. These are the intra-past, inter-past, extra-past; the intra-present, inter-present, extra-present; and the intra-future, inter-future, and extra-future.

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Introduction and Background

Introduction

Looking at people's stress and anguish, the conflict between societies and how the environment gets maltreated, it seems that the human ability of mentally embracing a global collective as a species did not keep pace with the globalization of the world. Is there a lack of a kind of mentality in the sense of, as Butler, Mercer, McClain-Meeder, Horne, and Dudley (2019) observe, how populations connect themselves to a broader context like all humanity? It appears challenging to bridge between individual and collective levels of reasoning (Grotzer, Derbiszewska, & Solis, 2017). However, the feeling of interconnectedness is essential in contributing to health and well-being (Kucinskas, Wright, Ray, & Ortberg, 2017). Indeed, research findings suggest that psychological well-being is dependent upon one's connection to a broader, even widely anonymous social scope that comes with a sense of meaning in life (Gabriel, Valenti, Naragon-Gainey, &Young, 2017). Carl Jung (as cited in Drew & Ho, 2017) spoke about different parts of the self that transcend the 'ego' self and that these need to be integrated to complete a harmonious inner self. The power of imagination can overcome an inflexible ego-centered mind (Doherty, 2017). Imagination is also required to imagine future events, which constitutes (besides recalling matters of the past) a part of the ability to mentally 'travel in time' (Shum et al., 2015). If people don't imagine the future, their sense of self, and the perceived agency diminishes (Gerrans & Kennett, 2017).

Moreover, it is a person's relation to the social world and time that can determine his or her meaning-making. In other words, it is a core construct of beliefs in these dimensions that forms a so-called 'worldview' (Magee, 2012). 'Sensemaking on a worldview level' and 'mental schemas' are appropriate related terms at the cognitive level (Taves, Asprem, & Ihm, 2018).

Therefore, it seems to be worthwhile to investigate the appropriateness of such mental schemas to understand how people self-reflect on their socio-temporal worldviews.

Background

Globalization has caused people to travel and migrate, buy products across borders, and inform themselves through global media. This strongly influences people's identity and their psychological construction of the world (Reese, Rosenmann, & McGarty, 2015). It's also a person's internal system of meaning-making, respectively worldview that determines the scope and quality of capacities like the empathy one experiences (Nelems, 2017). Worldviews also help to interpret the world meaningfully, which allows us to better handle suffering (Yang, Liu, Sullivan, & Pan, 2016). Consequently, any investigation on how worldviews influence meaning/understanding seeks to derive insights that are beneficial for the individual well-being and the common good alike.

Worldviews are arrangements of beliefs used to create meaning of one's experience of reality (Koltko-Rivera, 2004). From a cognitive perspective, worldviews involve 'thinking systems' including intricate patterns of thoughts and beliefs that integrate as an interactive whole (Davis, & Stroink, 2016). Beliefs are mental constellations that stand for relationships between categories, which determine how one experiences the world (Chen, Fok, Bond, & Matsumoto, 2006). For example, social worldview schemas would represent an individual's beliefs about the social world (Sibley, & Duckitt, 2009). To mentally build a worldview, the abilities to learn and imagine, all of which require *reflection*, are essential (Killingsworth & Gilbert, 2010). And humans do reflect on the continuum of time, a mental process that involves thinking about the past, present, and future (Vannucci, Peagatti, Chiorri, & Brugger, 2019).

The before-mentioned schematic concepts of beliefs can be called ‘meaning frameworks’ (Taves et al., 2018). Such a meaning framework is presented by Friedman (2018), who mentions two fundamental dimensions related to worldview, which are space and time. Neuroimaging research agrees that psychological orientation bases on the relationship between one’s behavior and the aspects of space, time, and people (Peer, Salomon, Goldberg, Blanke, & Arzy, 2015). Van Dijk and Withagen (2016) state that learning, specifically, meaning-making requires contextualization and a broadening of both the *spatial* and *temporal* scope of the individual.

Regarding the above-mentioned social dimension (Peer et al., 2015), the *intra-personal*, *inter-personal*, and *extra-personal* factors have been found to influence human perception, experience, and the capacity to manage life areas such as risks (Jayasuriya, Whittaker, Halim, & Matineau, 2012). Intra-personal means the thoughts and beliefs related to the individual herself (Jayasuriya et al., 2012). A definition of inter-personal comes from those thoughts and beliefs, which are related to personal interactions with others (Jayasuriya et al., 2012). Extra-personal can be defined as a social scope that goes beyond the direct interaction with others (Jayasuriya et al., 2012). Extra-personal beliefs are related to long-term interests such as social needs that surpass intra- and inter-personal benefits (Sternberg, Reznitskaya, & Jarvin, 2007). They can comprise social relationships beyond group memberships, i.e., being a member of the whole human species (Leary, Tipsord, & Tate, 2008).

Vannucci et al. (2019) mention that the temporal dimension of reflective thought is dependent on spatial context (i.e., including places close and far, the world, and the cosmos), but these researchers do not specifically focus the interpersonal, respectively social component of context. Similarly, Sullivan, Stewart, and Diefendorf (2015) see time and space as the critical variables for human cognition. Still, their model fails to consider the impact of the social

dimension on perception too. To clarify the construction of worldviews, this present study, on the other hand, is specifying 'spatial' as the 'social' attributes of the intra-, inter-, and extra-personal.

Nilsson (2014a) suggests that a person's worldview, i.e., the schema through which the world is experienced, influences one's well-being. Cloninger's 'unity of being' represents a model of a coherent self-concept that consists of the self, others, and the world as a whole and has an impact on the degree of self-reliance, hope, the ability to cope, compassion, and cooperativeness (Garcia & Rosenberg, 2016). In that sense, the *socio-temporal matrix* (see Figure 1) proposed by this study as a framework to identify and visualize worldviews, can facilitate the exploration of similar possible psychological effects related to a person's meaning-making and well-being through socio-temporal worldviews. Therefore, this study aims to understand individuals' socio-temporal worldview ontology through introspective information gathering (Nilsson, 2014b).

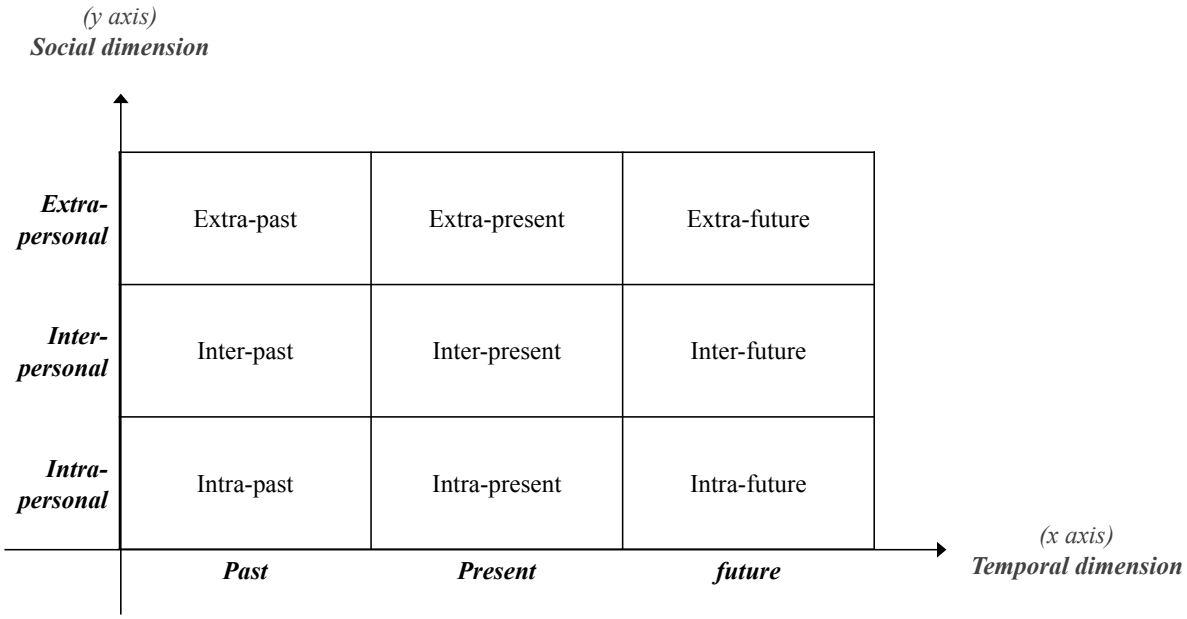


Figure 1. The socio-temporal matrix of worldview schemas

The novel socio-temporal matrix proposed by this study is derived as described in the following and as visualized by Figure 1. On the x-axis of the model, there are three variables of the temporal dimension. More specifically, this horizontal axis partitions itself, in the order from left to right, into the 'past,' 'present,' and 'future.' The vertical y-axis of the matrix contains the three variables of the social dimension. Starting from the intersection with the horizontal axis, which represents time as explained, the first third of the vertical line (y-axis) shall be labeled 'intra-' that is short for 'intra-personal. The next, middle part of the vertical axis becomes 'inter-,'which stands for the 'inter-personal' scope. The third and uppermost vertical section is the 'extra-,' which signifies 'extra-personal.' Similar to a coordinate system, through these two tripartite grid lines, a matrix can be formed (see Figure 1). When using the vertical and horizontal axis' labels in the same manner as the numerical coordinates of a map, or the letters and numbers of a chessboard, it is possible to identify and navigate the three times three - in total nine - fields of the matrix (see Figure 1).

The nine fields of the matrix will be used to inquire about socio-temporal mental schemas. An individual's worldview schema is expected to consist of a specific set of matrix fields, depending on whether one's belief system emphasizes certain socio-temporal mental states over others. For example, one may emphasize other-related extra-past (e.g., socio-cultural upbringing), behave in an inter-present, rather relationship-dominated way, while focusing, however, on a self-oriented intra-future. Such a socio-temporal mental worldview schema might link to specific meanings as, for example, a more independent (i.e., denoted by the intra-past instead of an inter- or extra-past) and other-oriented (i.e., depicted as the extra-future rather than an inter- or intra-future) cognitive socio-temporal worldview preference.

To explore persons' meaning-making through the use of socio-temporal worldview schemas, the objectives of this study are as follows.

1. To describe and assess the utility and validity of the conceptualization of the socio-temporal matrix, which can be used to visualize the construction of worldviews.
2. To understand how one constructs socio-temporal mental schemas and related meanings on a worldview level, e.g., which fields of the matrix are emphasized for what reason.

Socio-temporal *schema constellations* are expected to emerge from combinations of meaningful and often frequented social and temporal aspects within the socio-temporal matrix. The mental schemas related to the study participants' worldviews will be investigated using the socio-temporal model and the interviewee's reflection on related schema constellations. By doing so, the study describes the novel concept of the socio-temporal framework of worldview schemas. It initially validates it as a tool for, for example, educational purposes, by serving as a mental map to support the navigation of socio-temporal worldviews. As such, the matrix may prove to be useful for self-reflection and fostering awareness about oneself and others.

Literature Review

According to Carl Jung (1960), human creativity, as expressed by imagination, can be seen as a force of the universe that extends into each individual and may help to assume a perspective of wholeness, i.e., the unification of the self, the planet, and the cosmos (Doherty, 2017). It's such coordination of views that affect people's socio-temporal experience of the world (Selman, 2008). There are everyday tasks that demand our attention. Still, thinking can also be directed internally in the form of mind wandering to access internal information (Vannucci, Pelagatti, & Marchetti, 2017). According to Irish, Goldberg, Alaeddin, O-Callaghan, and Andrews-Hanna (2019), we *mind-wander* almost half of our waking time. Also, the imagination of alternative perspectives can turn over beliefs that were perceived unsatisfactory (Lear, 2017). Imagining the future and revisiting the past are fundamentally linked through involving the overarching faculty of mental time travel (McCarroll, 2019). It becomes evident that our identity and experience of the world, and modifications thereof, have a lot to do with socio-temporal cognition. Eventually, there is hope that everybody can learn to achieve meaning in their lives, for example, by expanding the connection to serve others (Edmondson, 2018) and by broadening one's time orientation towards the future (Norgate, Davies, Speed, Cherrett, & Dickinson, 2014).

Imagination and meaning-making

"The human imagination represents the pinnacle of evolution. Through the inner channels of the imagination, we can see through the eyes of others, travel back to the past, anticipate future circumstances, visit imaginary places and create impossible worlds" (Marks-Tarlow, 2012, p. 149). The human ability to simulate temporal and social perceptibility is a mental process that was found to enhance meaning (e.g., knowing what is truly important) and

psychological well-being (Waytz, Hershfield, & Tamir, 2015). Mental simulation precedes behavior, either by triggering actions or by supporting self-control that can constrain activity (Macrae et al., 2014). In that sense, simulated mental constructs form worldviews, which guide a person's understanding, point of view, meaning-making, and experience of the world (Nelems, 2017).

Worldview schemas

Worldviews mean beliefs about the conception of the social world (Perry & Sibley, 2010). It is this fundamental level from which meaning (i.e., answering the question of why something should be as it is according to expected relationships) arises (Taves et al., 2018). Such belief systems about the world (worldviews) serve as the most foundational elements that inform one's values and attitudes in the form of mental models or schemas (Magee, 2012). This study is about an encompassing notion of schema on a meta, respectively worldview level (Hertlein & Weeks, 2017), providing the possibility to explore individuals' highest-level interpretative frameworks (Ecklund, Peifer, White, & Chan, 2017). The human mind can think (e.g., when mind-wandering) independent of external stimulation, an ability, which Ruby, Smallwood, Engen, and Singer (2013) term self-generated thought. Thoughts can emanate at the sensational, perceptional, and emotional level (Pransky & Kelley, 2017). Accordingly, Tomlinson, Keyfitz, Rawana, and Lumley (2017) refer to the content specificity theory when pointing to the importance of schema content regarding its determination of one's emotional experiences.

We know that meaning in life predicts well-being with progressing age (Ryu & Lee, 2016). Although Dag et al. (2019) state that early (maladaptive) schemas establish during first years, the social scope can broaden across a lifespan (Magee, 2012), and pathologies like, for

example, egoistic narcissism, can be transformed in older age (Schipke, 2017). Also, during adulthood, the occupation with oneself often shifts to a more others-related orientation with concern for the next generation (Rubinstein, Girling, Brazda, de Medeiros, & Hannum, 2015). In that sense, mental schemas, despite their relative stability (Dag et al., 2019), appear to remain malleable over time. As a person's agency evolves, the socio-temporal experience of the world changes, too, through the psychological coordination of more diverse perspectives (Selman, 2008), which can mature to a holistic meta-reflective social stance (Martin, Sokol, & Elfers, 2008).

Two-dimensional mind-wandering

Our brain sophisticatedly processes the link between time and social relations (Schirmer, Penney, & Meck, 2016). While time and space are essential factors in psychology (Sullivan et al., 2015), time itself is often mentally visualized in space employing a mental timeline (Aguirre & Santiago, 2017). Thoughts about the relationship with others similarly constitute a sort of psychological distance (Maglio & Trope, 2019). Reflecting on the positions of the self about others in the past, in the now, and in the future, was found to provide for socio-temporal points of reference and comparison that affect self-compassion (Karanika & Hogg, 2016) and mood (Ruby et al., 2013). Self-compassion generally leads to improved empathy (Fuochi, Veneziani, & Voci, 2018). Consequently, in the case of reduced (socio-temporal) mentalizing, empathic emotions might be decreased as well (Dvash & Shamay-Tsoory, 2014). Also, there is broad agreement that conceptual thinking – as socio-temporal schemas might represent – fosters moral judgment ability (Mårtensson, 2017).

The temporal dimension

Imagination creates beliefs and knowledge, which includes past/future mindedness (Zhe, Logan, Cupchik, Ritterfeld, & Gaffin, 2017). And temporal relating implies meaning for human understanding of the world (Squiers, 2014). In other words, it is essential to emphasize the logic intertwinement of a person's social experience with one's sense of time (Avital, 2000). Autonoetic consciousness, i.e., the ability to extend the self in time, enables a person's self-projection into the future and the awareness of related outcomes of one's behavior, which can aid the delay of gratifications and more beneficial results in the long-term (Gold & Kyratsous, 2017). Furthermore, being able to link the present moment to past and future points in time can be developed for better problem-solving and conflict resolution (Montangero, Pons, & Cattin, 2000).

Adding the social dimension

Neurological evidence supports the idea that socio-temporal constructs build an organized system in the brain that processes a person's relations to time and persons (Peer et al., 2015). And Meilinger and Vosgerau (201) state that egocentric and allocentric (i.e., non-ego) mental perspectives can systematically interplay. To understand an individual's motivation, a holistic consideration, rather than a deterministic input (e.g., skills) and output (i.e., behavior) point of view, is crucial (Doenyas, 2017). Therefore, a person's identity may consist of elements like (1) self-reflection based on one's past, (2) existing social relationships with others, and (3) social comparison of what one could become going forward (Obodaru, 2008). However, different underlying socio-temporal worldview schemas may exist for different people as the schemas define their sense of identity. Also, meaning in life might impact different individuals'

well-being differently (Bhattacharya, 2011). Therefore, the interviews conducted in this study explore how people use socio-temporal mental schemas to create meaning on a worldview level.

Methods

Methodology

"Qualitative researchers stress the socially constructed nature of reality... They seek answers to questions that stress how social experience is created and given meaning" (Denzin & Lincoln, 1998, p. 8). Unlike quantitative methods that base on numerical representations of research data, a qualitative approach allows studying the behavior under investigation to be represented linguistically (Heppner, Kivlighan, & Wampold, 1999). Furthermore, by employing a constructivist approach to this study, it was possible to gain insight into 'how,' and even 'why' interviewees construct meaning from specific circumstances (Bryant & Charmaz, 2007). The researcher carrying out this study assumed an impartial mind towards the data, open to expect anything, which is especially vital for an explorative study of a novel concept such as the present one.

This study aimed to explore persons' meaning-making through the use of socio-temporal worldview schemas. Worldviews are the subjective side of personality (Nilsson, 2014b). A qualitative approach was considered most appropriate to inquire about such individual inner schemas and the qualities of individuals' worldviews (Nilsson, 2018). Internal validity was expected to be high thanks to a participatory approach during the interviews. External validity in the sense of generalizability was not the goal of this study, although the results presented herein may be relatable to any reader.

Participants

The participants of this study were expert interviewees who have published on the topic of this study or related topic. Expert opinions were expected to provide rich information

efficiently. Individuals who are professionally trained and regularly engage in the subject area may possess increased understanding or have at least reflected significantly on the topic. Advanced self-reflection abilities of expert participants could be another advantage in validating the psychological features of the socio-temporal matrix to investigate socio-temporal worldview schemas.

Fourteen individuals (five women, nine men) participated in the interviews. Their age was between 36 and 72 years, with a mean age of 51 years. No younger individuals were recruited to benefit from broad experiences throughout the participants' life. In today's societies, people from their middle-age may increasingly and differentially reflect on mortality awareness and their past, present, and future life, and this is why participants under 36 years were excluded from the sample. Due to the difficulty in finding enough responses from published experts in the field, the initial age range between 40 and 60 years has been adjusted. Eventually, the data from the younger (Interviewee 1, 3, and 13; mean age = 36.3 years) and older (Interviewee 6, 7, and 8; mean age = 69 years) participants, too proved to be useful (i.e., providing individual explanations of overall observed themes). They also contributed to the saturation of data (i.e., all of their schemas fit in a schema category already established by the group of participants aged 40 – 60).

Theoretical saturation determined the sample size. According to the interview approach taken the recommended sample size of 12 participants was followed (Fusch, & Ness, 2015). As the sample size that is required to reach saturation varies according to the nature and scope of the research (Saunders et al., 2018), the proposed study anticipated a process that evaluated theoretical saturation on an ongoing basis. Although other studies (e.g., Mousa & Morteza, 2019) have landed at a sample size of around 15, the current study established redundancy of themes at a sample size of 14 participants through gathering sufficient data. A research attitude of openness

formed part of the foundation that brought out various viewpoints about the meaning of the inquired topic (Fusch & Ness, 2015).

Recruitment

The literature study of this research provided the population of possible study participants. The researcher contacted the authors of the relevant publications by email. He provided them with information about the study, the role of the researcher, and the role of the participant. It was explained that there is no obligation whatsoever to take part in this study. The email highlighted that the researcher did not act in a professional role but, instead, as a student dissertation researcher supported by the University of Liverpool. Once the potential participants expressed the intention to take part in the study, more information was forwarded to them in the form of the Participants Information Sheet (PIS). Those who were still eligible and interested after receiving the PIS were recruited for the study, and informed consent was forwarded to them. Informed consent was collected per email before any data collection. For two participants (Interviewee 8 and 14), the interview questions were sent, according to their wishes, in writing before the interviews.

Questionnaire development

The questionnaire (see Table 1; for the detailed questionnaire with references to the literature, see Appendix I) to perform the structured interviews was developed based on the literature study (see section 'Literature Review') and the author's conceptualization of the socio-temporal matrix. The questions 1 to 4 intended to open up the discussion related to the participants' overall use of the social and temporal dimensions and patterns in mentally creating

their identity and worldview. The interview questions 5, 6, and 7 targeted the exploration of social preferences within each temporal mode more specifically to enable the filling in of the schemas during the analysis. The topics of obligations and worries (questions 8 and 9) meant to probe possible tensions between previously made choices and to solidify the descriptions related to meaning-making through socio-temporal thought patterns. Question 10 asked for general feedback related to the usability of the socio-temporal framework.

Hill et al. (2005) recommend developing an interview protocol that consists of 8 - 10 questions with explorations to fit within one hour. The ten open-ended questions with sub-questions, mainly to investigate the 'why' and related affective states, were designed for interviews between 40 and 60 minutes. Where it could clarify the ‘how’ and ‘why,’ the answers provided to the standard questions were further probed.

Table 1.

Interview questions

ID	Question
Question Q1	How do you mostly construct your identity? Through self-reflection on past experiences, current social interactions, or thinking about who you could become like?
Question Q2	How do you create coherence between your past, presence, and future?
Question Q3	Which temporal mode (past, present, future) or combination of modes is most meaningful to you? And how do you experience the consequences from these mind-wanderings?
Question Q4	In what temporal mode do you most of your waking time time-travel? Are you mostly thinking about the past, the present, or the future? Or is it a mix of what kind of proportions?
Question Q5	a. When you voluntarily mind travel into the past, are your thoughts mostly self-, inter-relational, or otherwise other-related? b. When your thoughts are related to either of the combinations (the intra-past, the inter-past, and the extra-past), how do these thoughts make you feel? c. Why do you think this is so?
Question Q6	a. Relating to the present: Whom respectively what group or social definition of your identity do you most think about? b. When your thoughts are related to either of the

	combinations (the intra-present, the inter-present, and the extra-present), how do these make you feel? c. Why do you think this is so?
Question Q7	a. When you voluntarily mind travel into the future, are your thoughts mostly self-, inter-relational, or otherwise other-related? b. When your thoughts are related to either of the combinations (the intra-future, the inter-future, and the extra-future), how do these make you feel? c. Why do you think this is so?
Question Q8	a. What are your most significant worries about the future? b. How do you react to these concerns?
Question Q9	a. What are your biggest obligations? b. How do you feel in light of these obligations?
Question Q10	Do you think the socio-temporal framework would be a suitable tool to reflect on an individual's construal of worldview? Please justify your answer.

Procedures

The interviews were performed by using the questionnaire and through a video conferencing system (Skype and Zoom). They took place from Switzerland in the researcher's private home office. The duration of the interviews, including the introduction and wrap-up phases, was between 45 and 99 minutes, with a mean duration of 66 minutes. The interviews have been audio-recorded with permission from the participants. As McGrath, Palmgren, and Liljedahl (2018) recommend, the scheduled times accommodated for the interviewees' convenience. The anonymization and secure storage of the audio-recordings were guaranteed throughout the whole data lifecycle (creation, storage, use, archival/deletion). The interviews have been transcribed and data analyzed by the student researcher. Upon completion of the transcripts, the audio recordings have been deleted. The transcriptions were anonymized and stored on a password-protected computer. A debriefing in the form of a summary report based on this study was offered to the participants. As of the submission date of this research, this has not yet been realized.

Analysis

The 6-step thematic analysis, as described by Braun and Clarke (2006), was used to identify themes within the data. Data coding used the MAXQDA software for qualitative data analysis. The tool allowed an excellent organization of codes and themes (Castleberry & Nolen, 2018) and supported an efficient and reliable handling of the analyzed data throughout the research. As the data collection had been planned for probing the different socio-temporalities, the related data gathered could be mapped according to the pre-defined fields of the socio-temporal matrix. Therefore, the analysis process overall contained in parallel an interpretative part searching for themes and patterns, and a part analyzing, sorting, and mapping data around the socio-temporal framework as summarized in Table 2.

Table 2

Combined thematic analysis and socio-temporal framework-mapping based on Braun and Clarke (2006)

6-step thematic analysis	**Socio-temporal framework-mapping**
1. Familiarization with the data • Several re-readings of the transcripts	Preparation of the graphical logic and design to visualize the schemas
2. Generation of initial codes • Identification of numerous codes that appeared appropriate to label the topics mentioned by the participants	Classification of responses according to the socio-temporalities, both in terms of 'most meaningful' and 'most frequently mind-wandered.' • Past (i.e., intra, inter-, and extra-past) • Present (i.e., intra-, inter-, and extra-present) • Future (i.e., intra-, inter-, and extra-future) • Others (e.g., non-temporal notions of thinking)
3. Search for themes • Interpretation of the codes • Sorting (divided and combined) of the codes into themes and sub-themes	Analysis of the socio-temporal schemas • Generation of the schemas per interviewee • Search for patterns in the individual schemas and across the sample • Categorization of the schemas according to similar designs (e.g., for past-, present-, future-orientation)
4. Review and refinement of the themes • Check of the themes against the coded segments • Check of the themes against the overall data • Completion of the themes and codes hierarchy	Mapping of themes to the schema observations and vice-versa • Mapping of themes to explain patterns within individual schemas • Mapping of themes to explain patterns and categories across all the schemas
5. Definition and naming of themes • Search for, respectively, refining and renaming of key themes that captured the essence of the data	Linking and application of vital refined themes to relevant schemas and vice-versa • Identification of sample schemas that reflected the refined critical themes
6. Production of the report • Summarizing of themes into text and illustrative material (tables, figures) • Selection of relevant extracts • Creation of the story-line to be presented in the results section	The combined presentation of the report together with the schemas • Completion of the graphical representations of the schemas • Selection of relevant schemas • Building in the schemas into the report

Results

Navigating the socio-temporal matrix

The interview questions (see Appendix I) were used to explore the participants' socio-temporal mental schemas. The results repeatedly refer to the schemas generated for each of the 14 interviewees according to their responses. Appendix II contains the detailed socio-temporal mental schemas for all the interviewees. Table 3 categorizes summarized graphical representations of these schemas according to the mentioned most meaningful temporal modes. Section I of Table 3 contains the four meaning-wise past-oriented schemas, Section II, the six present-related, Section III, the two future-related, and Section IV the schemas of the 2 participants who couldn't decide on their temporal preference in mind-wandering. For simple identification of each interviewee in Table 3, each schema is titled according to which interviewee it belongs.

Table 3

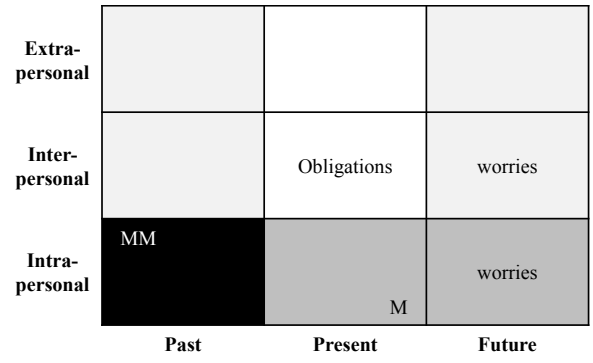
Categories of socio-temporal schemas

Legend:

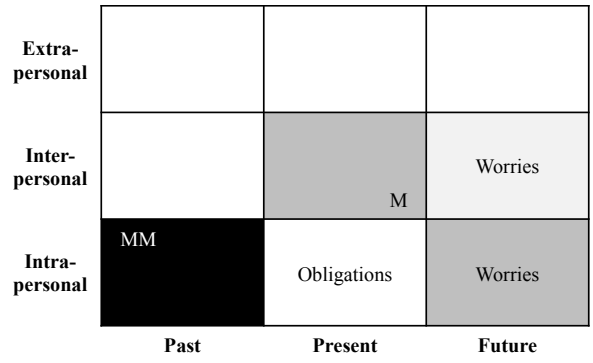
	Not mind-wandered socio-temporality (field of the socio-temporal matrix)
MM	Most meaningful socio-temporality overall
M	Most time spent overall
	Most often mind-wandered within respective temporal mode
	Second often mind-wandered within respective temporal mode
Worries	Worries mentioned in response to the specific question Q8
Obligation	Obligations mentioned in response to the specific question Q9

I. Past-related most meaningful socio-temporalities

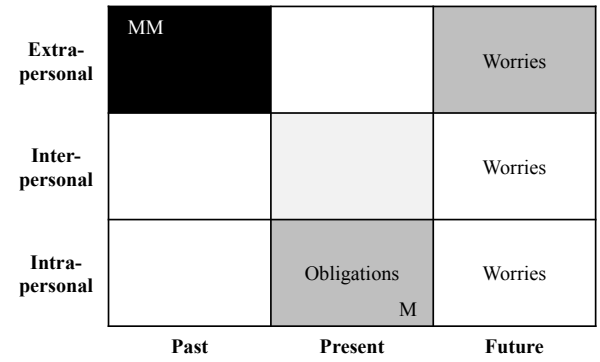
Interviewee 4



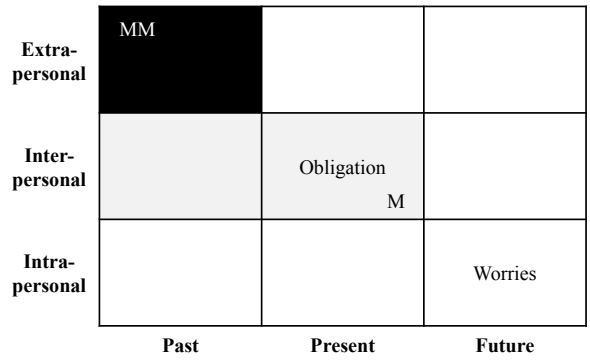
Interviewee 14



Interviewee 7

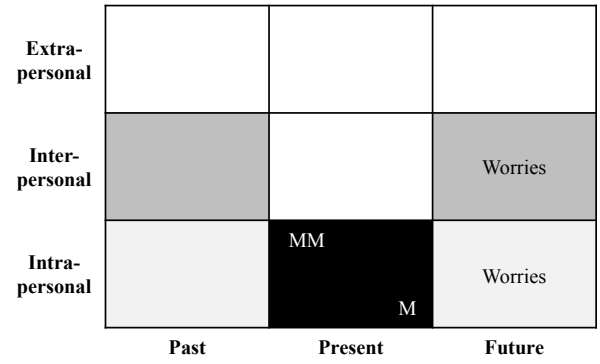


Interviewee 8

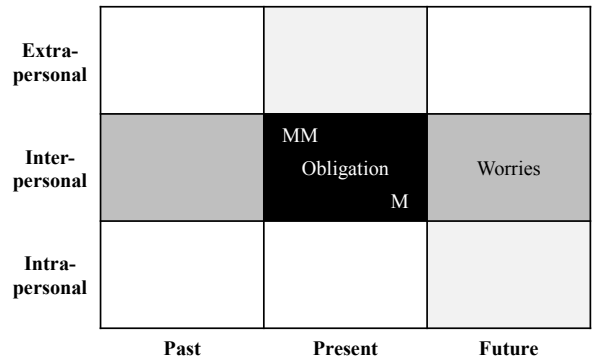


II. Present-related most meaningful socio-temporalities

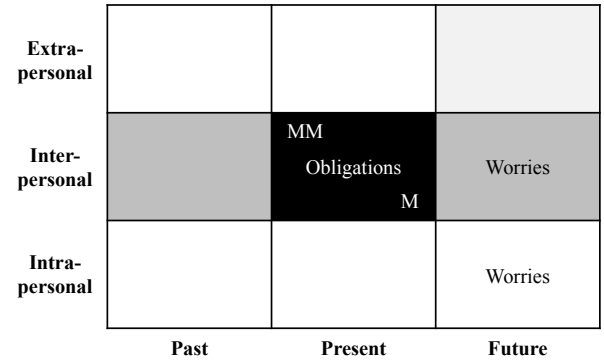
Interviewee 5



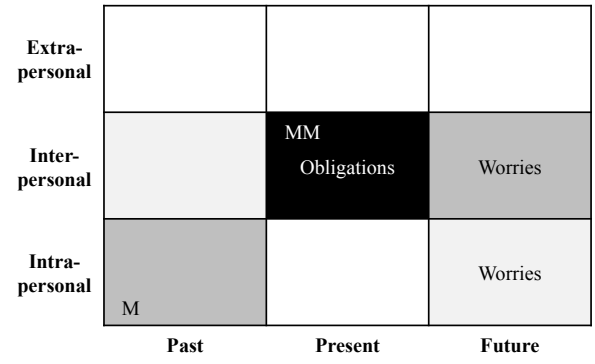
Interviewee 9



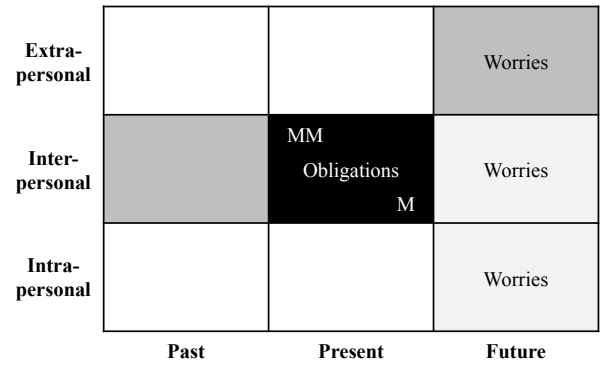
Interviewee 11



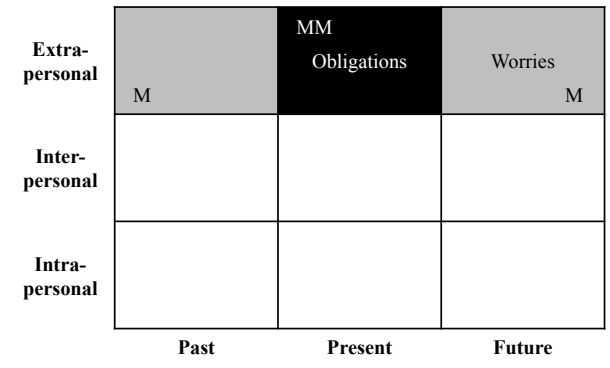
Interviewee 13



Interviewee 3

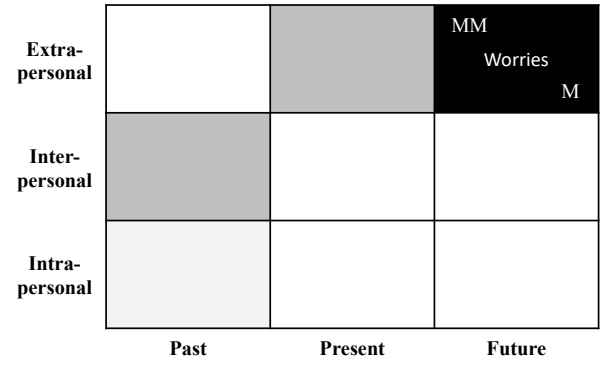


Interviewee 6

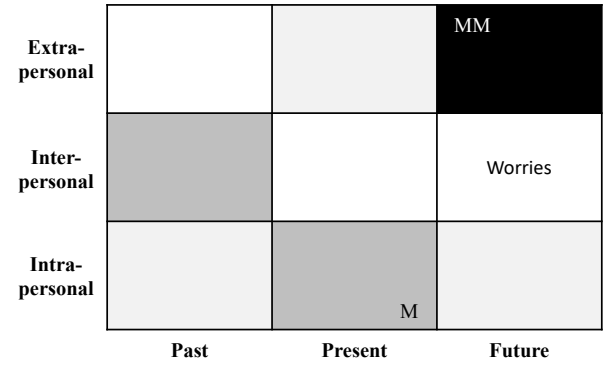


III. Future-related most meaningful socio-temporalities

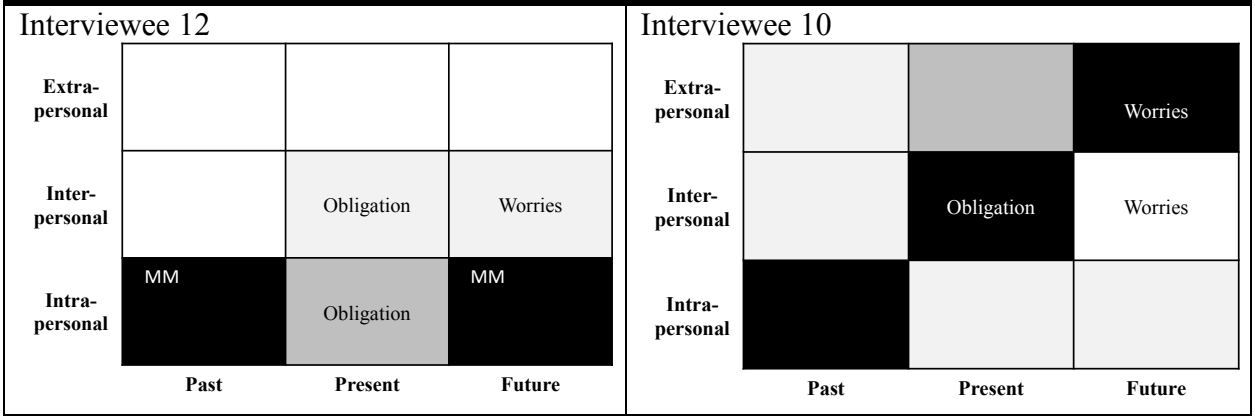
Interviewee 2



Interviewee 1



IV. Schemas with various most meaningful socio-temporalities



As for further general observations when investigating Table 3, the most meaningful and the most frequently mind-wandered socio-temporalities within schemas can be congruent (e.g., Interviewee 9), but don't have to (e.g., Interviewee 4). Also, the socio-temporalities that are second-most mind-wandered are indicated where the interview revealed such detail. Some interviewees could also not decide, which single temporal mode they quantitatively prefer, which resulted in multiple mentions of most mind-wandered socio-temporalities (e.g., Interviewee 6). In case there was no quantitative indication on mind-wandering frequencies whatsoever, no preference is documented at all (e.g., Interviewee 10 and 12). Every schema contains at least one major worry from the response to question number eight of the questionnaire (i.e., "What are your most significant worries about the future? How do you react to these concerns?"). The schemas of the participants with the future-oriented schemas (Interviewee 1 and 2), however, did not mention having any obligations.

Some participants mentioned additional and alternative aspects of worldviews, which the socio-temporal matrix did not explicitly reflect. For example, intra-present was defined as 'thinking about oneself in the present moment,' but two interviewees came up with different

notions of mental states. First, it was a notion of a whole human reality that covers a state of embodied consciousness as a source for feeling rooted in one's body (see citation below, Interviewee 7). Second, the idea of a so-called capital S 'Self,' which was supposed to constitute meditative states of mind that differ from the concept of cognition about time and social relations (see citation below, Interviewee 5). The intra-present has been agreed to represent these states of being within oneself. Upon clarification, the interviewees could answer the regular interview questions as they, too, experienced socio-temporal mind-wandering as suggested by this research.

> *"Now, the only other place where I really feel comfortable is really entering a different sort of embodied state of consciousness with another person and sitting in that quality of shared presence where it's kind of like what it's like to be inside of me, but I'm inside of me with somebody who's inside of them. And there's a real deep affectively felt connection that sort of co-introverting."*
>
> *(Interviewee 7)*

> *"I would actually make a distinction between self with a capital S and self with the small s. Because this gets into the spiritual realm again, self with a capital S. Yes. It's like what we have brought into this world and in a sense, before thought. Who are we before thought?"*
>
> *(Interviewee 5)*

For one interviewee, the connection beyond the human species, including all the nature and the cosmos, informed an expansive definition of the extra-personal social scope. In the words of the interviewee:

> *"I am a human, but I'm not just a human. I'm also participating in the cosmos. I'm life itself. I'm energy. I'm more than just, you know, limited by the body and by my species. […] So, when you emphasize social interactions and the present I would add to that that interactions with nature are very important to me. For understanding myself and how I fit into the cosmos."*
>
> *(Interviewee 6)*

Regarding the temporal dimension, perceptions of an extended past before one's birth and a future after one's death were mentioned. For example:

> *"Now you can think about like what happens after death. You know, but it's ... the only way that would be helpful is if we think that we're going to be ... that our life is not going to end. And instead we're going to go into some other form and maybe even reincarnate"*
>
> *(Interviewee 5)*

> *"A lot of my past thinking is in terms of things like evolutionary anthropology or thinking about cosmology."*
>
> *(Interviewee 6)*

Although an interviewee challenged the necessity and usefulness of a linear notion of time, the interview could still take its course, the participant assuming the proposed departmentalization of time into the past, present, and future.

> *"Yes. And I believe that just as in the world of physics all the equations work equally well, running backwards as forward in time. That that there are these types of relationships that are deeper than the linear notions of time that are currently, except that as the world view of the modern West."*
>
> *(Interviewee 6)*

It was possible to explore the socio-temporal matrix as initially presented with all interviewees, albeit by leaving room for the different understandings acknowledged above and hereafter. The participants sometimes recalled thought patterns of previous phases in life. However, for the creation of the schemas, the current life situation and related mind-wandering practices were considered. The socio-temporal mental schemas do not differentiate between different identities an individual may have (e.g., work or related to one's private).

The main themes that arose from the data analysis were (1) learning from the intra-past, (2) the busy inter-present, and (3) mind-wandering to the extra-future as presented in the next sections.

Main theme 1: Learning from the intra-past

Mind-wandering into the past appeared to be favorable to learn for the present and the future:

> *"I can see that it's hard to understanding the meaning if I don't look to the past. I think the past helped me to understand my present. And in a way, not be so anxious about the future."*
>
> *(Interviewee 13)*

Six interviewees explicitly mentioned the importance of learning from the past. Four interviewees indicated the past as their exclusively most meaningful temporal mind-wandering mode (see Table 3, Section I), while another individual attributed the highest importance to the past and the future simultaneously (Table 3, Interviewee 10). Two additional participants referred to the past as the most frequently mentally visited period in time (Interviewee 6 and 13).

For example, for interviewee 13, although not having assigned the highest priority to the past overall, looking at the past was meaningful because it helped to understand the self throughout time (as cited above). Pertinently, this interviewee's socio-temporal mental schema displayed mind-wanderings also related to the present and future (see Figure 2).

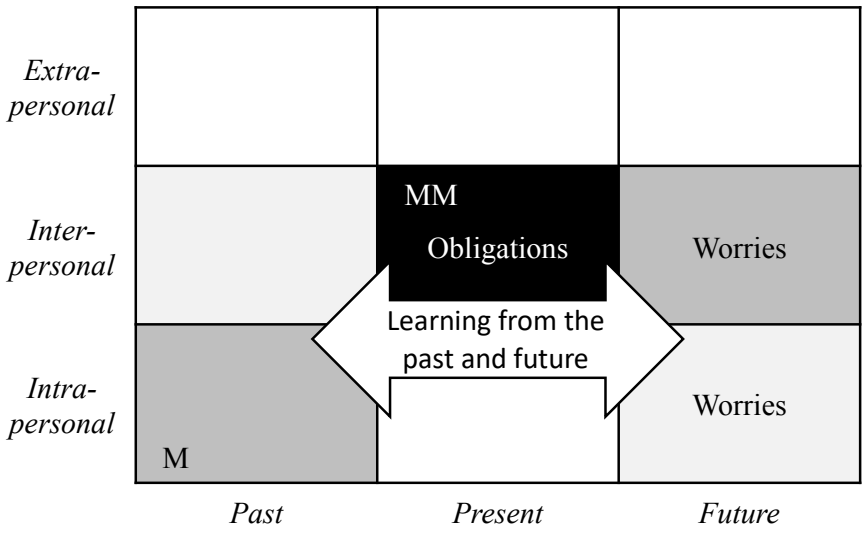


Figure 2. Socio-temporal schema Interviewee 13 (Learning from the past and future)

From the four interviewees who mentioned the past to constitute their most meaningful temporal mode, Interviewee 8 represented an exception in that this schema had no coverage of the future. Consequently, this interviewee's past-mindedness served not learning for the future. The following citation confirms that impression:

> *"So, there are different notions of future, do I want the future to sit on my head? I want the future to determine my identity because the future is only success and failure, either it works or doesn't work. Fuck'em. I don't want to live there."*
>
> *(Interviewee 8)*

For Interviewee 7 and 5, learning from the past depended on whether past-related mind-wandering was about a present identification with the contents of the past (e.g., with events, relationships) or whether it was about a reflection on one's thinking:

> *"I mean, it's like if I try to hold on to my past picture of who I am and I am going to distort the perception of the present. […] It is not just a matter that that what remains cohesive across time has become less and less the content. And more and more the one who engages. And tries to do so in a creative way that allows a reorganization to occur."*
>
> *(Interviewee 7)*

> *"I think that most of us are shaped by our thinking of what happened to us in the past. In other words, it's not from what happened to us in the past. It's from the meaning that we have made with our own thinking about what's happened to us in the past. […] You can even see that in in a family where there is abuse of the kids and one of the kids, you know, becomes abusive themselves and the other one, you know, becomes ... I'll never do that. I'll never do that to my kids. You know, and even so, even out of the same types of situations happening to them, they have different thinking about it. And that's what shapes who they become."*
>
> *(Interviewee 5)*

Expecting meaning from identifying oneself with the past may come at the cost of limited personal freedom in the present as one past-oriented participant depicts:

> *"I think I am too much centered on the past. And I would make a step beyond it. And but it's not easy. We in Italy, we say it impianti. We think we could be ... we could do better in the past. So, we are not happy for our past. […] I'm obliged toward me. My biggest problem is me ... is myself. And so, my freedom is limited by myself."*
>
> *(Interviewee 14)*

Main theme 2: The busy inter-present

The 'mindful' intra-present

Mindfulness was mentioned multiple times, either as a means to direct past- or future-related thought to the present (Interviewee 11 and 13), thinking just for/in the self (Interviewee 1 and 7), to enjoy oneself in the presence of a company (Interviewee 12), or to take a complete break from thinking (Interviewee 5). The three former definitions belonged to the intra-present; the last version of 'non-thinking' was placed outside of the socio-temporal matrix as it suggested not to be relevant for socio-temporal cognition (see Figure 3).

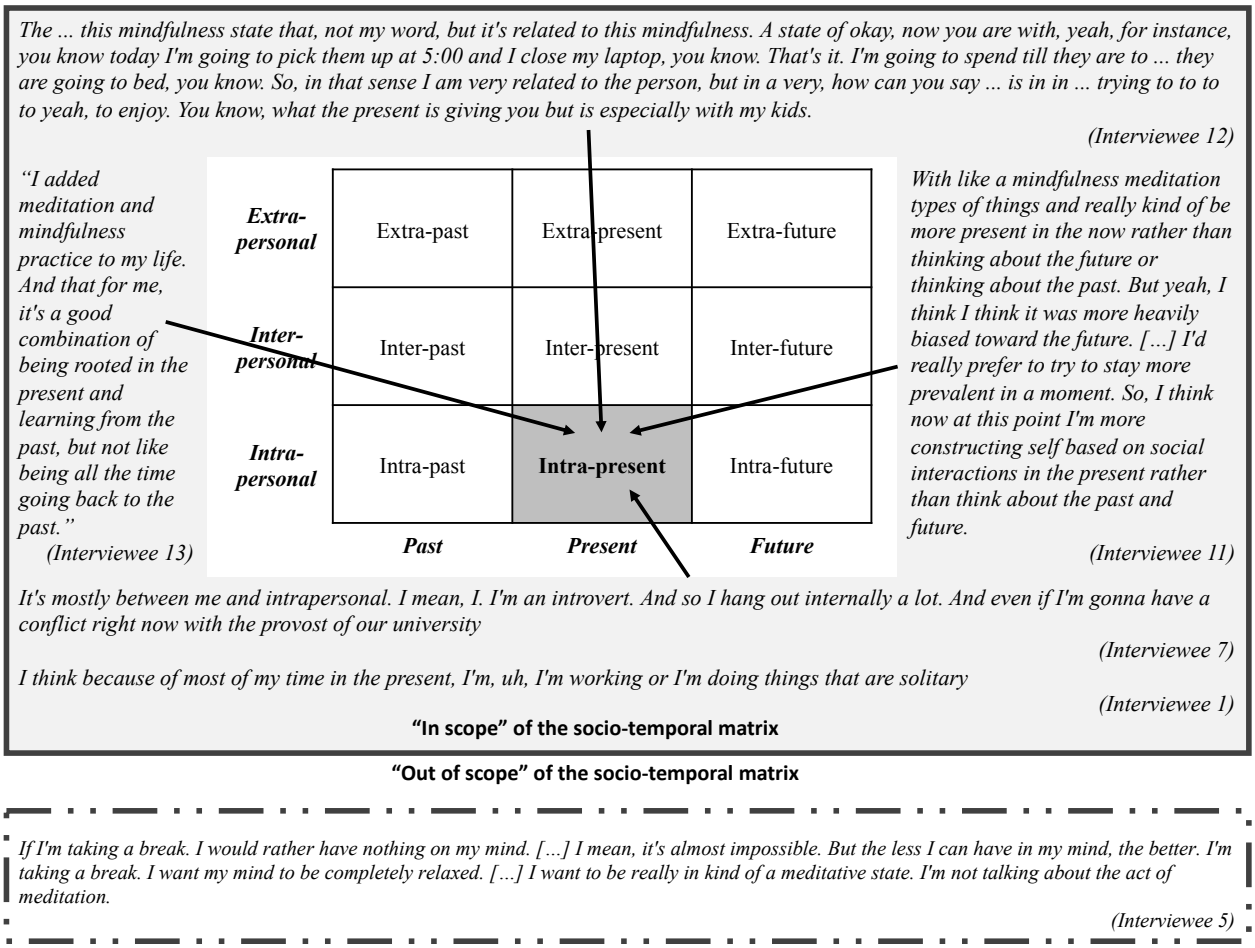


Figure 3. Individual definitions and purposes of mindfulness

The following statement criticizes mindfulness as an all-promising practice and stands up for thinking about the future as a tool for problem-solving.

> *"I think a lot of people believe that being in the present, mindfulness is an important value. And I don't hold that value. I think it's very situational. If I'm solving a problem that has to do with a human adaptation to the future, of course I'm going to be doing mental stimulations of future planning scenarios. And that's highly adaptive. If I'm trying to understand how a circumstance has arisen and I want to historically break out certain patterns, then, of course, that's very valuable. […] … the current belief seems to be that mindfulness practices … the being in the present, you know, solves every problem imaginable. And in fact, there's a lot of good research suggesting it causes problems for a lot of people."*
>
> *(Interviewee 6)*

Identification with the inter-present

Parenthood causing an inter-present focus

Seven interviewees told about experienced shifts to the present in general or to the inter-present, specifically when explaining their understanding of their construal of identity and worldview. The main reason in this sample for the prevalence of shifts towards the inter-present socio-temporality surfaced to be parenthood, exemplary recounted as follows:

> *"My family is very saliently right now. So, I think of my kids and my husband. But if I think about 10 years ago before I met my husband and had kids, then it would be different. It would be just me. […] There's something crazy about having kids, where for me I experience basically like a break in my life where like before I was like this one person. And like after having kids, my kids will always come first. And my identities are great. But like my identity as a mom is this new identity that just formed basically overnight and then suddenly is shaping every other consideration in my current day to day life."*
>
> *(Interviewee 3)*

All of the active parents but one rated their inter-present field of the schema highest both in terms of importance and quantity of mind-wandering (Interviewee 3, 9, and 11). Interviewee 13, although considering the inter-present the most meaningful socio-temporality in her schema,

was mind-wandering most of the time to the intra-past, an overall situation that didn't leave enough time for thinking about oneself in the intra-present. This gap was commented as follows:

> *"Maybe it's hard for me to ... like nowadays, I think I enjoy time alone. After I became a mom, I really appreciate the time that I just have with myself."*
>
> *(Interviewee 13)*

Family, work, and obligations occupying inter-present

A busy life with family and work was regularly perceived as mind-consuming so that there remained little or no time for wandering mentally away from it, albeit one interviewee's description portrayed a slightly extended present around his current obligations.

> *"But when I'm free to think generally, I think to the things I have to do that very much. […] But it is linked to the fact that the present is very busy. So, I have to do many, many things, both in work and in the family. I manage both these aspects of life is not easy. […] So, I manage many things. I am very, very, very multi-tasking. But it is the only way I find to reach some of my objectives."*
>
> *(Interviewee 14)*

> *"I mean, there's so much going on in the present and there are things to worry about for the future. I don't really have a lot of time to think about the past. […] It's a need-based thing, like they're the ones who draw my attention because they're the ones who need something right now. It's a very pretty [inaudible]. But if I'm alone, I'm going around and I start thinking about those bigger things like the environment and that kind of stuff, so yeah."*
>
> *(Interviewee 11)*

> *"The time frame is usually not so big. So, it's kind of OK, what will be in work today? How was work today? What will be there tomorrow and what's up on the table for the next weeks or at home and the family? What do you have to do? Oh, you have to go shopping. How did that go in the meeting? That didn't really go well. What was what was shit? What should I do?"*
>
> *(Interviewee 9)*

Out of the four interviewees who rated the inter-present to be their most meaningful spot, three also kept their inter-personal focus when thinking about the future (Interviewee 9, 11, and 13). At the same time, only one assumed a broader future social scope (Interviewee 3).

Reversely, none of the future-focusing participants named the inter-present playing a role in their socio-temporal schema (Interviewee 1 and 2).

Furthermore, when inter-personally informed identities of parents needed an update in the light of increasingly independent children, a process of detachment and quest for new meaning was observed:

> *"So, if it's working so hard to get those goals, I didn't think about what was going to come next. So, I think that's another thing. What happens when your kids are now happy and successful on their own and your career is where it should be? What else is there? That's a hard place to be, I think. I mean, it sounds whiny. It's a good place to be. But it's an it's almost a purposeless place to be too, paradoxically."*
>
> *Interviewee 4*

> *"... a way to my son and my daughter. [...] Teach them the ... how to make decisions following the values that me and my husband have transmitted to them. And in this moment is very, very difficult because they are adolescents and they want to do the things and on their own. And so, I have to observe and be quiet and hear them, listen to them and wait. And I would like to do more. But I cannot. [...] So, I have to offer a different point of view to them with my examples, with my effort, with my involvement. And that ... with my honesty."*
>
> *(Interviewee 14)*

There is interest in the extra-present, but also dislike

Although bearing somewhat interesting news, the extra-present appeared to be the least mind-wandered social level in the present. The downside of the extra-present, according to some interviewees, resided in its outraging information about injustice on broader societal levels.

> *I tend to be more interested in the broader things, like I'm fascinated by politics right now.*
>
> *(Interviewee 6)*

> *What do they think about, you know, that organization and the job they've advertised and that kind of thing. You know, much more interesting. So, I don't like to spend a lot of time agonizing about me because I'm just a little dot on the planet, really. You know, it is much more interesting things to entertain your mind with, really.*
>
> *(Interviewee 10)*

It's really bad. And we could achieve so much more ... as a society. So, it's pretty, you know, that there is general injustice.

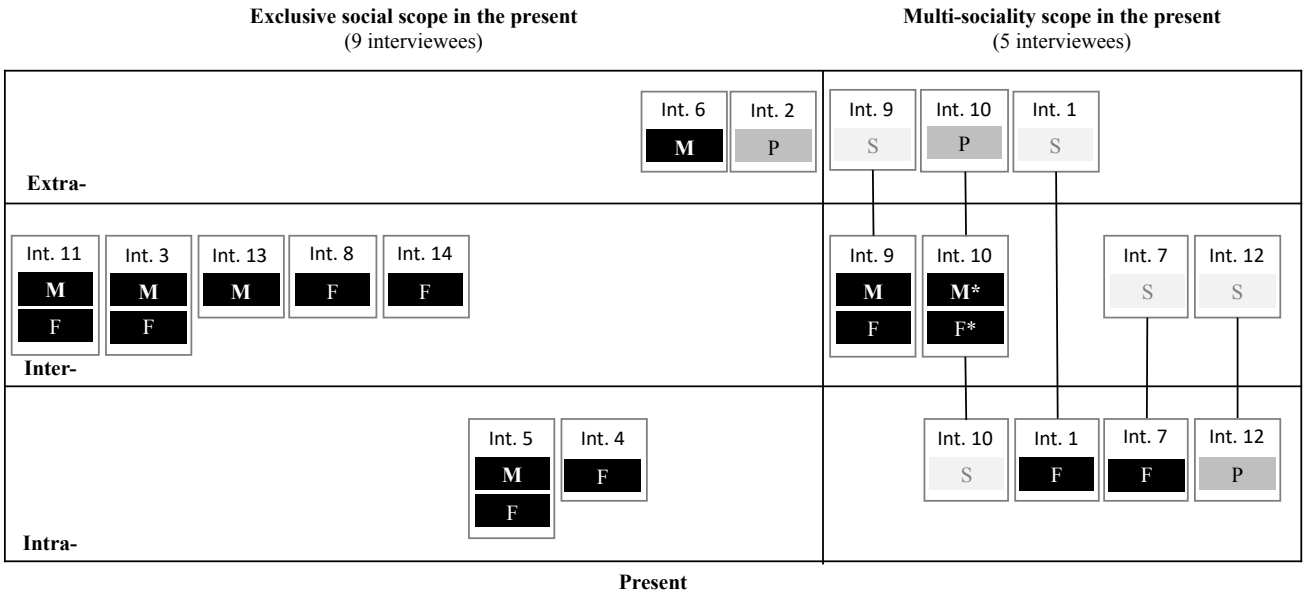
(Interviewee 2)

Well, I mean, it can be quite negative because I often see things that I don't like. So, I really don't like injustice. Right. And you can't open a newspaper without reading about injustice and fraud and meanness and crime, you know, really don't like that. So, I have to [inaudible] when I'm at. Because otherwise I could feel quite outraged that so much of it seems to be going on.

(Interviewee 10)

The inter-present is rarely combined with other social levels in the present

Five interviewees indicated that they covered more than one social level in the present (see Figure 4 on the right side; for details, see Legend at the bottom of Figure 4). The majority (nine interviewees; see left-hand part of Figure 4), however, left a more one-sided picture by only mentally inhibiting one present-related socio-temporality. As Figure 4 further illustrates, most of these exclusive social scopes in the present occurred in the inter-present (five interviewees; see left-hand part of Figure 4 in the middle row). There was merely one single occurrence (Interviewee 10) of social coherence in the present, i.e., covering all the intra-, inter-, and extra-personal aspects of this temporal mode simultaneously (see Figure 4 on the right-hand side ‘Int. 10’).



Legend:
- M: Overall highest meaning (in the whole socio-temporal matrix)
- F: Overall highest frequency
- P: Primary social preference within the present (if not already covered by M or F)
- S: Secondary social preference within the present (if not already covered by M or F)
- *: For this interviewee highest meaning and frequency was temporally distributed (past, present, and future)

Figure 4. Social scopes in the present

Main theme 3: Mind-wandering to the extra-future

Temporal coherence as a precondition for social coherence

Both social and temporal coherences were found throughout the sample, demonstrating that it is possible to integrate one's mind-wandering along the temporal and social dimensions across all the respective social and temporal modes (see Figure 5). Five socio-temporal schemas did not display any coherence in that sense. Three individuals had only a temporal coherence with no social coherence at all. Across all interviewees, there existed ten temporal coherences as compared to six social coherences. The interviewee exhibiting the most coherences displayed each two social and two temporal coherences (Interviewee 10). Across the whole sample, social coherence did only co-exist with temporal coherence. In that sense, having at least one temporal coherence appeared to be a precondition for the creation of one or more social coherences in an individual's socio-temporal mental schema.

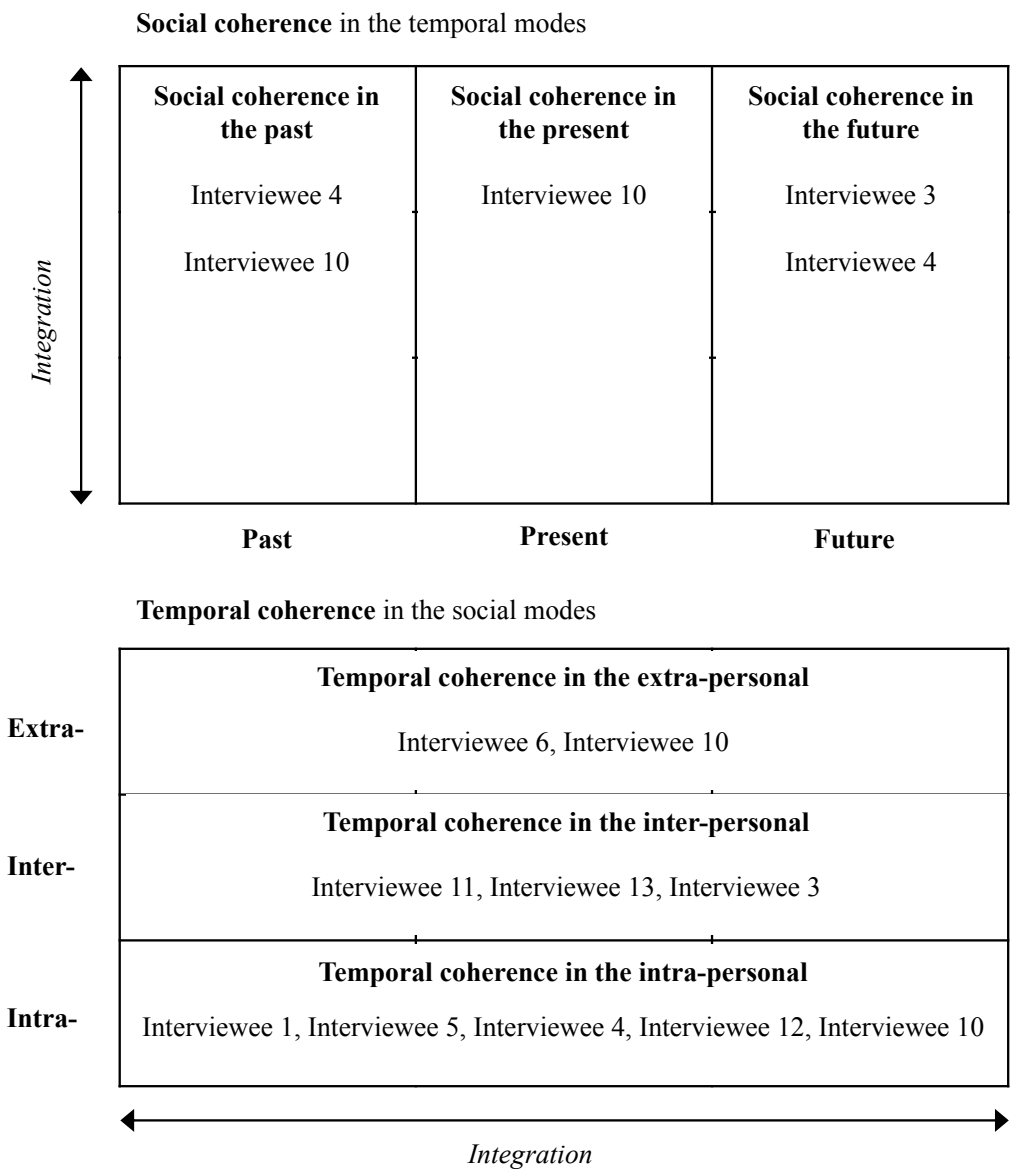


Figure 5. Social and temporal coherence

Perceived meaningfulness from socio-temporal integration (coherences)

According to the word of below-quoted interviewees, creating coherences might involve creating balances between pleasant and unpleasant feelings and the integration of mental experiences of both more and less comforting nature.

"I think I'm now trying to find a balanced way of thinking about myself, my need, my desire, and also be kind, compassionate and then try to kind of meet the needs of those who are with me."

(Interviewee 13)

"I think being open to the suffering and the pain and experiencing it is just as important as the enjoyment of it. But I also want balance. I don't want to be, you know, too cynical and hurting, but I don't want to be too comfortable with the injustices in the world. […] I've proposed and looking for what are people leaving out, are people leaving out the body and focusing only on the transpersonal and being imbalanced that way. Or people focusing only on the present and their most immediate social connections and leaving out the broader concern about humanity and looking at therapy."

(Interviewee 6)

The next statements provide a testimony for the meaningfulness of integrating past, present, and future mind-wandering into temporal coherence.

"They're not separate. Because I tell my students in planning for their future, they have to integrate their past. Yeah. OK. They're not separate."

(Interviewee 8)

"Which part is most important? Maybe it's the global versus local scope and maybe a shift in perspective from looking at the individual parts to try to look at them all together. That actually creates the meaning, which is what you're kind of saying. But, I think when you start to take more global perspective, some of the details in the specific parts, whether it's the past, present or future, get lost maybe in a good way that allows you to integrate things that couldn't be integrated before. So, you lose the details, but you gain the ability to integrate."

(Interviewee 11)

Agency in addressing worries

How worries related to the intra- and inter-future are addressed

Table 4 collects different categories of future-related worries, as mentioned by the participants, listed per future socio-temporalities.

Table 4

Categories of future worries

Intra-future	Inter-future	Extra-future
• Economic situation, losing job • Being alone • Health and dying • Meaning and achievement	• Not getting along with working colleagues • Worry about losing close others, not having them, being isolated • Not making close people happy, not being able to take care of them (e.g., in case of health issues)	• Power imbalance, rigged game, greed, destruction, cruelty • Others don't know, don't understand

Strategies mentioned to address worries related to the intra- and inter-future included the following:

- Acting in the present,
- indulging in mindfulness and esotericism,
- working on inter-personal competencies,
- doing the best and enjoying the present,
- accepting one's limited influence and control, as well as
- trusting that other people are doing well.

Low and high agency in addressing worries related to the extra-future

Four interviewees' elaboration on worries related to the extra-future revealed differing beliefs about agency and empowerment compared to how commonly intra- and inter-future worries were approached. Therefore, the below-cited comments are categorized into a 'Belief in low agency' and 'Belief in high agency' group to contrast the differing viewpoints towards extra-future worries. Looking at these interviewee's socio-temporal schemas, the high-agency individuals placed high meaning and frequency of mind-wandering on the extra-future socio-temporality. In contrast, the low-agency individuals emphasized the past and present in their schemas. Furthermore, while the low-agency group had future worries on all social levels, the high-agency group exhibited at least one intra- or inter-future worry-free mental zone.

Belief in low agency

> *Yeah, the whole macro political economic situation shreds, I think that ... that is not positive. I mean, it might kind of get me to call my representatives and congressmen and stuff like more, more regularly. But other than that, it just it's so hard. It's just ... I feel so helpless with the massive structural problems that we're looking at.*
>
> *(Interviewee 3)*

> *Trying to get out of the United States before it comes [inaudible]. And I don't say that in just that's a very serious concern that I have.*
>
> *(Interviewee 7)*

Belief in high agency

> *The only hope in everything is I feel some agency in is that that the infrastructures that we have are really problematic. So, if I have any power, it's to challenge the infrastructure to break down some of these things which keep the power. You know, so it maybe I've got a role in the management or the reorg, the restructuring of some of these. And then then, then what? Then let it play. Let it play out.*
>
> *(Interviewee 2)*

> *We've taken people who were educated in a particular model of Western democracy in the 1980s. And we've put them in charge and they're doing what they've always done. But it's not quite radical enough. And then the alternatives are so disruptive, but also from certain backgrounds in the 1980s, you know, that if any similar groups of people. And it's there's a lot there about personal power, domination and so on. So, so we're working towards it. So, new forms of collaboration.*
>
> *(Interviewee 10)*

Socio-temporal worldviews

Factors that hinder imagining the future

One limitation in creating a more diverse socio-temporal worldview, as underlined by the following citations, was due to the inability to imagine the future:

> *"So, if I think about where I am thirty years from now, I'll be eighty-four. And that's just I can't I can't think about that. You know, I can't, that's unfathomable to me. So, I can't even think about what 60 forward feels like"*
>
> *(Interviewee 4)*

> *"Yes, I would like to be more oriented toward the future. I have difficulty imagining the future. And I'm ... I have fear about the future."*
>
> *(Interviewee 14)*

> *"In the future part, I guess the future part. It's kind of like a ghost you're chasing. […] ... the future seems so far away that it's so daunting that it seems like it's not even real, you know."*
>
> *(Interviewee 3)*

Another factor that might hinder temporal coherence was found in the belief of the present to be not in the causation of the future beyond more practical things. Furthermore, the scientific vacancy of proof was adduced to justify disbelief in the creative power of thought.

> *"What is it about the future? Is it a social construct that you've just been taught to believe there is no future or, you know, is there something else? Is there a way of opening the future that in ways that people don't think possible? You know, like I guess when I'm explaining to you about my future, they're very practical concerns. They're not the they're not the kind of the dream world things, you know."*
>
> *(Interviewee 4)*

> *"Someone had to imagine the electric light bulb in order for that electric light bulb to exist. Absolutely true. […] But you know what you're suggesting about our thinking creating external reality out there ... You know, that might be true, but I don't think that's ever been proven."*
>
> *(Interviewee 5)*

A different view held that life takes a predetermined course. For one participant, such an idea caused anger.

"I really do believe that there is a sense of unconscious coherence when one moves forward, whether you call it fate or whatever. I look back and I think it all makes sense. Guess this couldn't have been more perfect. Even though I realize these are probably random events that I'm ascribing meaning to."

(Interviewee 4)

"My worries regard ... the control I can have about the future. It's that I can do that in first person to determine their future. And I am ... I don't like to think that someone else or the destiny could decide for me. So, this is how I get angry for these things."

(Interviewee 14)

Personal extrinsic desires could be determinants for the motivation to mind-wander in the extra-future. Mentions like 'waiting' and 'moving into the direction of my personal wanting and achievement' may suggest possible roots of demotivation for thinking about the (more distant and extra-personal) future. Although a more substantial link was not established here, the schemas of the cited interviewees indeed showed no mental engagement with the extra-future at all (Interviewee 12 and 14), or at least not allocating general importance or quantity to the socio-temporality of the extra-future (Interviewee 3).

"Yeah, for sure, I love money and I love power. I mean, I prefer to command than being commanded, you know, as I suppose that most people. And money is a ... is a means for almost everything, perhaps, right?"

(Interviewee 12)

"And so, I had to wait for my doctorate because of some other colleague were before me. Then I had to wait to become a researcher. And now I am waiting to become associate professor. But I am qualified for this."

(Interviewee 14)

"... because if it's something positive, then oftentimes you're like, oh, look, I want to be moving in that direction. Right. So that's the motivational force. So, like, I want to publish it. What about the book? I want to get tenure. I want to, you know, travel."

(Interviewee 3)

Aging was mentioned to cause feelings of irrelevance that potentially prevented thinking and acting for future generations.

"Am I being devalued by others because I appear to be a certain age? Do I lose my, you know, self-worth because I'm aging? […] So, so maybe it's more of my generation feeling irrelevant. I don't I don't think we're gonna do anything to help them. I think they're going to help themselves."

(Interviewee 4)

Values

Meaningful higher callings to benefit the world

Interviewee 10 described the effort it takes to think proactively for finding and following a coherent (meaningful) worldview for the common good.

"Well. There's a lot of thinking to do. And, you know, you can't just sort of make it up. You know, it's got to be rooted in something. So, you have to backfill that with a lot of carefully selected information and, you know, make it coherent and congruent and, you know, give it to quality thinking, rather than just reactive, subjective thinking. And it feels a bit like a job of work that needs to be done. And that one has a sort of higher calling, and it's your vocation to do this and find ways of making a meaningful contribution to the benefit of everybody else."

(Interviewee 10)

Empathy that is limited to the inter-personal

An expert in empathy research explained his standpoint of a person-tied and fleeting concept of empathy. On the other hand, a value can also be put on a social scope beyond the inter-personal, as was stated as well.

I don't think empathy is the right word because it's too it's too much tied to a person. And it's too short. It goes away really fast. So, yeah, I would think I can say I value humans. Or I value dogs or whatever, but I don't say I would ... I feel compassion for all dogs or empathy for all humans or something. I wouldn't say that.

(Interviewee 11)

The same interviewee 11 exhibited a socio-temporal mental schema that was quite exclusively and coherently focusing the inter-personal with a clear establishment in the present (see Table 3), which would be in line with a sense of empathy-focused identity.

Other interviewees' socio-temporal schemas witnessed a contrasting worldview that completely dismisses the inter-personal (Interviewee 1, 2, and 6). Interviewee's 2 schema structure, in combination with the below-cited explanation, revealed that the strong emphasis on the extra-personal socio-temporality suppressed empathy.

> *"I've been told I got high drive. So, my drive, unfortunately, suppresses my empathy. So, I'm seen as having someone who's got high drive and I'll say, hey, let's do this today. But I'm very bad by chemically or by an alternative socially ... recognizing people's needs. So, I can say let's go out tonight and people will want to come. But I might not recognize that they've got certain conditions, health or personal, that it means they don't want to come or they can't come. So, I'm quite good at driving, but I'm really bad at making sure that I take people with me."*
>
> *(Interviewee 2)*

Wisdom and developing human potential

Below, citations evidenced interviewees' valuing of sources of meaning that were related to well-being guided by wisdom, fulfilling one's human potential, and not wasting the gift of given talents.

> *"What do people really want in life? Most people want peace. Peace of mind. They would like to have that. They would like to feel in a state of well-being. They would like to experience love. And they would like to be guided by wisdom."*
>
> *(Interviewee 5)*

> *"I wonder personally whether I'm masochistic and self-defeating. And that I should just enjoy and experience the beauty that there is now and not feel so identified with the larger pattern. But I also think that if I were to ignore let's say the suffering of children who are dying because not that there isn't food available, but because we don't have the systems in place to distribute our abundance of food. Or that people are killing entire species out of their greed and their ignorance. If I didn't care if I just enjoyed it as a flow, I think that would diminish me as a as a more human being. So, I understand my sense of sadness and also my social and environmental activism, my outrage. I see these as part of how I play a role in the universe."*
>
> *(Interviewee 6)*

> *"Well, I feel grateful for that I was born with the ability to become conscious and self-reflect as a human being that I am. I'm envious of a cat and their gracefulness and their power. But I think as a human being I was born with certain potentials and as part of nature, I feel obligated to be a steward of the things that I value and to not use my talents*

in ways that I think wouldn't be useful, I think would be squandering a gift that was given to me."

(Interviewee 6)

Positive and negative thoughts

Both pessimistic and optimistic positions towards the future surfaced among the participants. The following two examples could be considered optimists. As their schemas displayed, they didn't think only about the future, though. Interviewee 6 featured a strong, and Interviewee 1 a somewhat balance between their past- and future-related thoughts.

"If I'm solving a problem that has to do with a human adaptation to the future, of course I'm going to be doing mental stimulations of future planning scenarios. And that's highly adaptive."

(Interviewee 6)

"And I mean, in terms of meaning, what I'm doing now is to get and advance the future. That's how I feel. So, I don't feel like the best is in the past. It doesn't. It's, I mean, it's a part of me, but it doesn't give me meaning. The meaning is lies in the future. I'm saying it's at least in my stage of life. I feel like my major work or contribution is still ahead of me. And that's the making. That's what gives my life meaning."

(Interviewee 1)

Usefulness of the socio-temporal framework

The analysis showed that sufficient data per interviewee was collected to draw a socio-temporal mental schema for each of them. In a few cases, some terms and definitions had to be clarified. Despite some encounters of different conceptualizations of time (i.e., non-linear notion), all participants completed the explorations of their socio-temporal worldview schema.

Table 5 summarizes the received feedback regarding the usefulness of the socio-temporal matrix as a tool for self-reflection in the eyes of the interview participants. Overall, the framework proved to be useful both in terms of relevance and usability. Also, there were several suggestions for refinements, further clarifications, training, and future research as well.

Table 5

Summary feedback: Usefulness of the socio-temporal matrix as a tool for self-reflection

Socio-temporal matrix feedback categories	Mentioned by
Relevance	
1. New and original theory/model	Interviewee 9
2. Relevant & comprehensive enough temporal and social dimensions	Interviewees 1, 2, and 6
3. Practical, narrow framework	Interviewee 5
Usability	
4. Intuitive 7	Interviewee 7
5. Helpful for effective and enjoyable self-reflection	Interviewees 4, 10, 13, and 14
6. Allows for free thinking without too much directing	Interviewee 1
7. Cognitive and affective aspects	Interviewee 7
Suggestions for refinements	
8. Need to consider the non-linear realm	Interviewee 5
9. Need to specify the boundaries/horizon of the matrix	Interviewee 7 and 12
Need for further clarifications and training	
10. Need to clarify regarding abstraction levels and terms	Interviewee 9
11. Need to train users of the socio-temporal matrix	Interviewee 2
Future research	
12. Potentially helpful for cultural studies	Interviewee 11
13. Potentially helpful for aging studies	Interviewee 4
14. Consideration of additional context information	Interviewee 11
15. Adding quantitative research	Interviewee 1
No specific mention	Interviewee 3 and 8

Discussion

Introduction

The main objectives of this research study were to describe the conceptualization of the novel socio-temporal matrix, which supports the visualization of how one constructs socio-temporal mental schemas and related meanings on a worldview level. The discussion section provides an interpretation of the study results. It elaborates on why the findings are relevant to the research and relates the findings to previous research. The findings of this study are based on structured interviews of fourteen expert participants between the age of thirty-six and seventy-two who have published on the topic or related topic.

The study participants were informed about the model of the socio-temporal matrix before the interview began. All interviewees confirmed that they had understood this frame of reflection and could answer the interview questions.

The interpretations made by this study do not *judge* people's meaning-making overall. The socio-temporal schemas in this research can only constitute summaries of recounts of thought patterns along stages of life transitions.

Obstacles to self-reflective learning from the intra-past

Overview

Learning as a means to create a person's identity occurred as a common topic throughout the sample. As Doetzel (2018) argues, the acquisition of knowledge is learner-led and requires conditions of freedom. The intra-past socio-temporality may carry the most meaning because of its relevance for the process of updating one's identity and remaining adaptive going forward. Three possible limitations to learning from the intra-past appeared (Figure 6): (1) The bias on inter- and extra-personal historical aspects, (2) mindfulness too exclusively centering a mental schema in the intra-present, and (3) a self-neglect tendency from over-identifying oneself with the inter-present, as will be illustrated in the following.

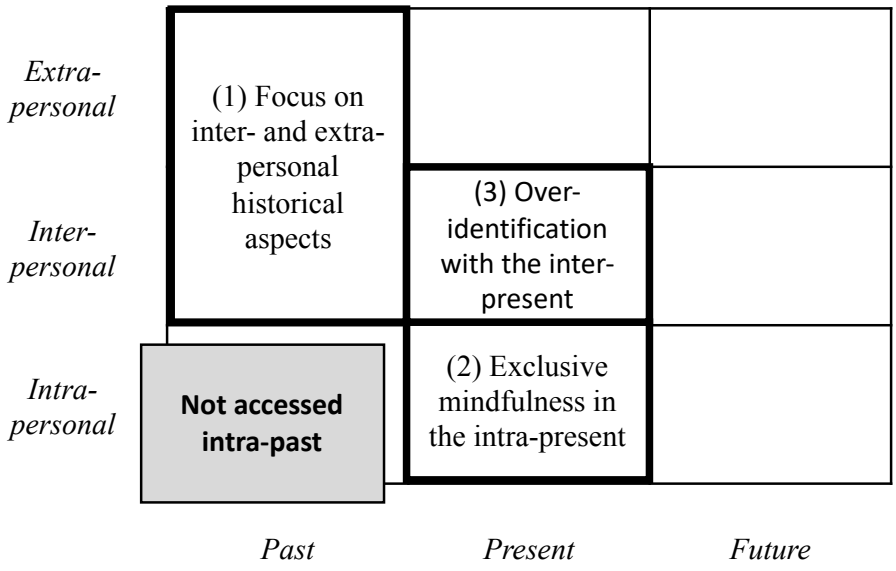


Figure 6. Limiting factors for learning from the intra-past

Focus on inter- and extra-personal past aspects

Previous empirical research found a propensity of older people towards retrospective non-self-related thoughts as compared to more future and self-oriented younger cohorts (Irish et

al., 2019). Applied to the socio-temporal framework, this would speak for a tendency of older people to prefer mind-wandering to the inter- or extra-past. One study participant's socio-temporal mental schema exhibited a strong emphasis on family history and ancestral heritage, indeed. The same interviewee also showed little future-related thoughts. Such an others-related focus on the past may hold an individual back from updating one's self-concept meaningfully as required for adaptations to current and future situations. Previous studies suggest that age can cause a weakened ability to recall individual past experiences (De Beni et al., 2013). And memories of past events and the imagination of future ones depend on the same cognitive agency (De Beni et al., 2013). In the case above, a possible lack of episodic memory could, therefore, have prevented a concurrent mind-wandering to the intra-past and future.

Exclusive mindfulness in the intra-present

High self-awareness about one's mental states, e.g., on different social levels and across time that is beyond focusing attention to the present moment only, positively influences social competence and social care (Ferrajão & Oliveira, 2014). Mindfulness as an experience of flow in the present moment that disconnects from a chronological sense of time, as Goel, Johnson, Junglas, and Ives (2013) depict it, was also reported by study participants. Mindfulness might help people in functioning in the present moment, specifically, through avoiding past-related ruminations and future-related worries (Zhe et al., 2017). Despite this well-recognized advantage of mindfulness, disregarding the past for the sake of present-moment mindfulness might also constitute a limiting factor for learning from the past.

Over-identification with the inter-present

Parenthood and family obligations were an essential part of some Interviewees' worldview. Edmondson (2018) posits that the need for close family connections is paramount for one's fulfillment of meaningfulness in life. On the other hand, if, for example, a person too heavily relies on descendants for self-enhancement purposes (Grysman, Prabhakar, Anglin, & Hudson, 2015), this may have detrimental effects on creating a wholesome identity that is inclusive of the intra-personal. Hence, learning from the intra-past could be compromised.

Coherence around the inter-present

The challenge of creating coherences

By analyzing the socio-temporal mental schemas produced after the interviews, the pattern of coherent matrix fields could be observed, namely in the horizontal and in the vertical direction, technically speaking. Emphasizing all the temporal modes, for example, on the intra-personal level, would represent temporal coherence. Likewise, highlighting all the social layers in a particular temporality would accomplish social coherence. Full coherence only exists when the whole range of time or social scope in the respective type of coherence is covered. Such an interpretation, at the example of temporal coherence, might be appropriate and vital, as previous research suggests that finding coherent meaning benefits from involving a person's past, present, and future life (Waaktaar, Christie, Helmen Borge, & Torgersen, 2004).

The interviewees recounted different types of identity shifts that influenced their socio-temporal mental schemas. For example, parenthood moves a person's scope from the intra- to the inter-personal, which is understandable considering the great responsibility and joy accompanied by being with a family. Another example is having grown-up children, which then typically

allows a person to shift away from an inter-present identification with one's children towards an identity that includes, as for the present, for instance, more thinking about the intra-present and extra-present. Including the intra-present and the extra-present together with the inter-present, would create social coherence in the present (see Figure 7).

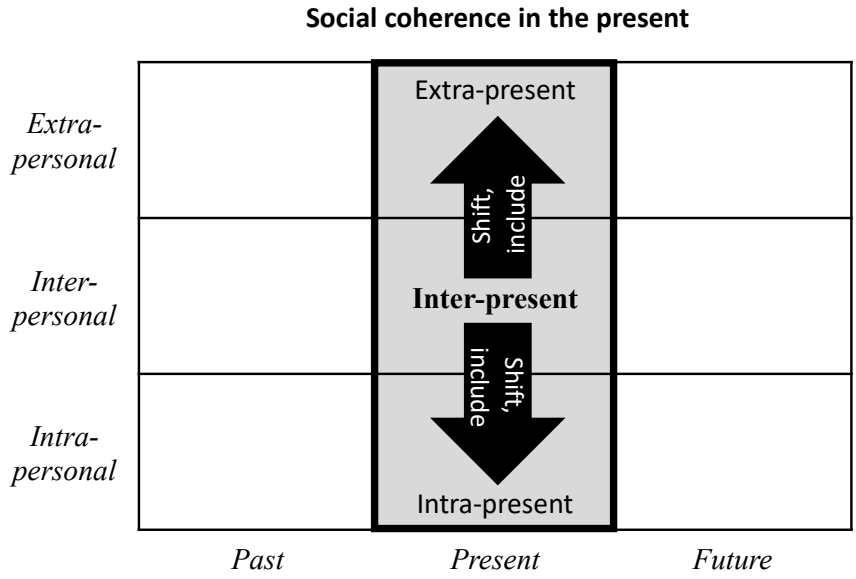


Figure 7. Creating social coherence in the present

In this study's sample, the extra-present was the least essential socio-temporality. Some participants characterized the extra-present to be of distracting and outraging information about social issues, for example, injustice, fraud, and crime. Also, considering the potentially highly occupying feature of the inter-present, one may not have the energy left to reflect on such extra-personal matters. For some participants, though, the extra-personal scope was also entertaining in a positive sense. For example, organizations, the job world, and politics. However, across the whole sample, the inter-personal orientation in the present was predominant, and only one participant indicated all three present-related social levels to be significant. In summary, having an inter-personal focus appeared to be most excluding of the other social aspects in the present.

Developing agency

Changes in a person's life situation can rearrange one's socio-temporal schema in such a way that new coherences emerge. One may coherently focus the self in the whole range of time to create temporal coherence. Or, one may add the intra-personal to the already prioritized inter- and extra-personal in the present to attain social coherence. Thereupon, a person may become enabled to follow coherently through on the chosen/valued temporal or social focus, which might represent a form of agency. Indeed, agency, as defined in Sharp (2014, p. 348), can be understood as follows:

> Human Agency is the deliberative, reflective activity of a human being in framing, choosing, and executing their action toward a valued goal in a way that is not fully determined by factors and conditions other than their own understanding and reasoning.

Creating more coherence and, therefore, potentially also more agency might be a learnable capacity. For instance, as Craparo, Magnano, Paolillo, & Costantino, 2017) suggest, perceived self-efficacy develops through changing one's patterns of thinking, which could be of the like of, for example, the above-illustrated changes in one's socio-temporal mental schema.

All possible types (i.e., temporal and social) and sub-types of coherences (i.e., on all three respective levels of each of the temporal and social dimensions) could be observed in the schemas generated by this study. Also, the results suggest that temporal coherence may be a precondition for social coherence as the latter only existed together with its temporal occurrence: social coherence did not exist in isolation. In any case, both social and temporal structures are crucial for mentally modelling the world (Squiers, 2014) and for becoming a temporally integrated and socially whole agent in life (Selman, 2008).

The interviewees often reported inter-personal worries about the future to be uncontrollable and addressed these by avoidance strategies (e.g., not thinking about it). The

extra-personal bigger-scope concerns like global injustice and cruelty, contrarily, appeared, although perceived as unpleasant too (e.g., sad), often motivating to act, empower others, to research, and to teach. The individuals in this study who effectively addressed the extra-personal broader issues of the world also placed high importance and frequency of their mind-wandering on the extra-future socio-temporality. Agency, therefore, may include the willingness and belief in one's ability to solve extra-future problems. The 'low-agency' group, in contrast, featured mental schemas with a present- and past-related characteristics. To critically self-reflect on one's psychological components (i.e., here, including the extra-future) was found to be vital as an opportunity to build agency and grow as an activist (Campbell, 2019).

Consequently, it might be vital to not only mentally cover past- and present-related facets, but also the extra-personal socio-temporality, specifically in one's schema, to increase agentic strength and flexibility. Van Dijk and Withagen (2016) posit that one can only make sense of the world when acknowledging that there is not only the present 'here and now,' but connected structures, which, if not augmenting the current moment, disable agentic mobility in these structures. Besides, according to Martin et al. (2008), sociality based on reflections about abstract and general social commitments, along with the intra-, inter-, and extra-personal perspectives, are associated with more sophisticated problem-solving.

From inter-personal empathy to extra-personal value

Expert interviewees in this current study stated that empathy might be an inter-personal construct. However, two interviewees explicitly also added that there would still be the possibility to put a value on broader social constructs or to 'love all humans.' By adopting such a differentiation, this study's data showed worldviews possibly driven by empathy and others likely being motivated by values. To clarify, in minimum on an organizational level, collective

empathy with unknown (but identified with, through the organization) others, seems possible (Muller, Pfarrer, & Little, 2014). And although empathic concern increases altruism, empathy still relates to recognizing others' feelings (Lozada, D'Adamo, & Fuentes, 2011), whose presence in terms of all humanity might be questionable.

Empathy, as more recently restated by Dvash and Shamay-Tsoory (2014), does comprise of a cognitive and an affective component. As this study was looking at the distribution of one's thinking across the socio-temporal matrix, a primarily cognitive approach was chosen. However, questions like "How does that make you feel?" were complementary. The tendency of prioritizing an extra-personal scope over an inter-personal in the socio-temporal matrix was the result from such a cognitive perspective-taking. Gilin, Maddux, Carpenter, and Galinsky (2013) state that "perspective-takers were more accurate in cognitive understanding of others, whereas empathy produced stronger accuracy in emotional understanding" (p. 3). If empathy is limited to the inter-personal, it might be cognitively derived meaning that encourages a person to relate to the extra-personal level. It is not the goal of this discussion here to further deepen this matter. Still, it could hopefully successfully be exemplified how socio-temporal mental schemas can contribute to the reflection on how people create meaning from their patterns of thoughts and emotions.

Connecting to the extra-future

The satisfaction from addressing extra-future worries/concerns

Prior research found that a self-construal based on inter-personal relationships tends to be more extrinsically motivated and that broader, more spiritual thoughts, in that sense, are related to more intrinsic motivation (Dooley, Jones, & Zupko, 2010). Indeed, the value of connecting to

a more significant and even anonymous extension of sociality can directly and positively influence one's meaning in life through psychological well-being (Gabriel et al., 2017).

However, before the satisfaction of psychological and self-fulfillment desires, a person may want to content more basic needs like close relationships and friends, as well as security and safety needs (Oved, 2017). For example, worrying about losing close others and, as a result, becoming isolated, as was mentioned by some interviewees, seems to belong to more basic needs categories like safety and love. Maslow (1943) explains, however, that a person's thinking and behavior still can deviate from those needs and that additional values can comprise, for example, of high ideals and high social standards. It's therefore not unrealistic that anybody can strive for realizing the benefit of addressing extra-future worries (or concerns for that matter) in a wholesome way regardless of the presence of unpleasant feelings. However, overall, for the sample of academics who participated in this study, not only the extra-present was the least thought-about socio-temporality but also the extra-future did not appear more prominent than the intra- and inter-future. Besides, the people with an extra-future focus displayed comparatively fewer intra-and inter-future types of worries than others. These observations suggest that it is generally challenging to assume a 'big picture' view as, for example, a combined extra-personal temporal and a future social coherence would establish.

Believes and values

Some participants expressed difficulties in imagining the future. Others hold the belief that the future is unpredictable anyway. The preference to think about future personal wanting and achievement was another type of mention. And one interviewee felt irrelevant as an agent for the next generation because of her age. All these participants did typically not expand their

socio-temporal worldviews towards the extra-future. In contrast to the individuals who did so, they thought more about worries in the intra- and inter-future overall.

Thinking about and imagining the extra-future might be most challenging. Positive thoughts about the past do often occur unconsciously, but optimistically looking forward requires effortful intention (Cuhls, 2017). Earlier research suggests that mental simulation benefits increased meaning and psychological well-being (Waytz et al., 2015). Furthermore, the ability to project the fruits of present actions into the future helps to delay rewards (Gold & Kyratsous, 2017). And Baumeister, Vohs, Aaker, and Garbinsky (2013) purport that happiness comes from the present while thinking about, respectively, imagining the future is about long-lasting meaning; they also found that a more long-term view creates even more meaning (Baumeister et al., 2013). Although more short- and more long-term perspectives surfaced in the participants' worldviews, this specificity of data was not systematically gathered and analyzed in the present research.

Having pointed out some benefits of mind-wandering to the extra-future, one could get the impression that a singular focus on it would represent a meaningful and wholesome mental schema. Two study participants' schemas who displayed positive future thoughts (e.g., seeing the future as a purposeful journey) still showed a balance between mentally frequenting the past and the future. Did they waste mental capacity by practicing mind-wandering to the past? For example, Beaty, Seli, and Schacter (2019) found that optimists do equally often think about the past and the future. Therefore, from an optimist's perspective, a past-future balance might be meaningful. In that sense, looking at an abstract representation of a socio-temporal mental schema alone might not be enough to understand a person's worldview in detail. Instead, considering the underlying believes and values that led to a particular schema is necessary to

interpret it in the context of the individual's situation and personality. Future research has to show whether and which schema constellations can be generalized to what extent.

A holistic tool for personal development

According to the knowledge of this study, it is the first time that all the specific modalities of socio-temporal cognition (i.e., the past, present, and future, and the intra-, inter-, and extra-personal) have been logically and systematically connected within one coherent framework. The broad range of topics covered in the interviews, the depth of data gathered, and the positive feedback received, confirmed the suitability of the framework's ontology to explore human meaning-making on a worldview level.

It might serve well to acknowledge that having found a more consistent way of graphically representing the socio-temporal matrix put it successfully at the test. The participants sometimes adopted the new labels offered by this study for the different socio-temporalities (e.g., the intra-past, inter-present, and extra-future) themselves already during this first round of interviews. It was possible to systematically explore the socio-temporal schemas with all interviewees, therefore confirming, overall, the socio-temporal framework's external validity as a tool for self-reflection.

Some interviewees mentioned concepts like non-linear time, including a state of 'non-thinking' and a relational scope beyond humanity (e.g., including nature and the cosmos). These were examples of how the boundaries and definitions of the socio-temporal framework needed accommodation. For example, thinking about the self in non-linear time was allocated to the intra-present. However, non-thinking was not located in the socio-temporal model at all. Thinking about all humanity, nature, and the cosmos fitted into the extra-personal realm. Had

these thoughts not comprised of humanity as well, they wouldn't have been represented by the matrix.

According to some participants' comments, the interview experience created therapeutic self-knowledge. Given potential users can be sufficiently trained to agree on the scope and definitions of the socio-temporal matrix, to work with the intra-, inter-, and extra-personal parts of the self across time may be, according to the lessons from this study, useful for holistic personal development interventions in individual and group settings, ethical reflections, and conflict resolutions.

Conclusion and recommendations

This study explored the socio-temporal mental schemas of fourteen expert interviewees between thirty-six and seventy-two years regarding their meaning-making on a worldview level. The interviewees' responses showed that the socio-temporal matrix overall offers a useful tool for reflecting on a person's self-concept as related to socio-temporal thought patterns.

This current research suggests that factors like beliefs, values, feelings of obligations, and responses to worries shape people's socio-temporal worldview schemas. Socio-temporal mental schemas can change over time, mainly when shifts in identities (e.g., triggered by critical life events) occur. All the fields of the socio-temporal matrix proved to be able to carry meaning for individual worldviews. However, nobody in this study's sample put equal weight on all of them, nor could any schema be observed that covered all the socio-temporalities simultaneously.

The study results propose that worldviews in this sample, first of all, depended on degrees of temporal coherence in a person's socio-temporal mental schema, i.e., the integration of mind-wandering into the past, thinking in the present, and imagining the future. Secondly, social coherences through balancing intra- and extra-personal perspectives around inter-personal relationships and addressing positively extra-future related worries were found to be an essential factor, for example, especially for developing agency. While empathy involves emotional responses from inter-personal interactions, extra-future matters appeared to be instead addressed with a cognitive stance with the advantage of reducing their potential negative affective load and optimistically keeping harnessing the power of imagination. By overriding more basic desires with higher values of pro-sociality, meaning in the form of satisfaction could ensue.

Sternberg et al. (2007) posit that wisdom is the consequence of applying intelligence for the benefit of the broader good that is attained through adaptation to pre-existing, interaction

with current, and creation of new surroundings, all in the sense of equilibrating limited and expanded time. Applied to a socio-temporal worldview as presented in this study, these elements of wisdom would be temporal coherence through learning from the past, interacting with the present in a socially balanced way, and solving problems to creating a future for all. Further, they see the wisdom to emerge from balancing intra-, inter-, and extra-personal awareness and engagement (Sternberg et al., 2007). In terms of the socio-temporal framework, this stresses the benefit of social coherences. In that sense, the ability to reflect on and mentally cover the whole socio-temporal scope of the world might well be called socio-temporal awareness intelligence.

It would be interesting to compare whether and how more positively composed alternative interview questions (e.g., asking more directly for values instead of asking about worries and obligations) would impact the results. Although it seemed to be no problem for the participants of this study to talk about their professional and private life to be both integral to their worldviews, a separate investigation for each of one's work and life self-concept could disclose more detailed information. Also, if time had allowed, digging deeper into the effects of life changes on socio-temporal mental schemas would be expected to reveal additional insight into interdependencies between the different fields of the socio-temporal matrix. Besides, although the interviewees were asked about their most important and most frequently mind-wandered socio-temporalities, this distinction could have been further stressed and examined for understanding possible discrepancies and related meaning. And lastly, investing more time to gather additional data about affective states related to socio-temporal thought preferences and practices would have helped to gain further knowledge about motivations for and emotional consequences from specific socio-temporal mental schemas.

Strengths and limitations

Having used a consensual recruitment process hopefully resulted in interpretations that are closest to the intended meaning of the participants' words. The choice of expert interviewees and structured yet dynamically individualized interview-style facilitated productive and sincere conversations to ensue as appropriate for an exploratory study.

No literature exists that describes the socio-temporal matrix. Having explored a novel framework is a strength of this study. This exploratory study, therefore, provides a starting point from which it is possible to investigate more specific properties and mechanisms of socio-temporal mental schemas.

However, a limitation of this study lies in the fact that its findings can't be generalized to other cohorts or individuals because the non-representative sample comprised only of the interviewees who participated in this study. All the participants were assessed as expert interviewees and were not younger than thirty-six years, and the sample consisted of White Westerners from the US and Europe only. Consequently, future research is required to validate the initial findings of this study.

Another limitation of this study concerns internal validity. The results of this study could have been more stable and reliable had the interviewees, for example, also participated in prior training about the socio-temporal matrix. Furthermore, participant verification of the data analysis to confirm the accuracy of their assertions would have contributed to internal validity as well. Interviewee verification was not used in the course of this study, which provides a potential for improvement for future qualitative research.

A systematic research process ensured groundedness in the data. However, restraint could come from potential interviewer bias. Although strong measures were taken to avoid obscuring

the research process, the personality of the researcher likely caused particular inclinations. One aspect to consider is the interview approach. Perhaps the interviewer's biases, inherent to the interview questions, prevented the participants from responding differently. All of these limitations are aspects of consideration and caution in future research.

Future research

The further refinement of the socio-temporal matrix, according to its current limitations, would benefit from an additional second round of qualitative research. The same holds for a more concise method to explain the fundamental concepts behind the matrix. Larger and more diverse sample size could add to more depth and accuracy of findings. It could be expected that differences exist for populations of different education, age, socio-economic class, ethnicity, and gender. Future research could incorporate quantitative research methodologies to investigate relationships between socio-temporal worldviews and various concepts such as self-awareness, empathy, altruism, satisfaction with life, and cultural orientation, to name only a few. Future research that addresses the development of a measure based on the socio-temporal framework could be especially useful when linking cognitive schemas, affective states, and behavioral data together.

Reference List

Aguirre, R., & Santiago, J. (2017). Do Potential Past and Future Events Activate the Left-Right Mental Timeline?. *Psicologica: International Journal Of Methodology And Experimental Psychology, 38*(2), 231-255.

Avital, M. (2000). Dealing with Time in Social Inquiry: A Tension between Method and Lived Experience. *Organization Science*, (6), 665.

Baumeister, R. F., Vohs, K. D., Aaker, J. L., & Garbinsky, E. N. (2013). Some key differences between a happy life and a meaningful life. *The Journal Of Positive Psychology, 8*(6), 505-516.

Beaty, R. E., Seli, P., & Schacter, D. L. (2019). Thinking about the past and future in daily life: an experience sampling study of individual differences in mental time travel. *Psychological Research*, (4), 805.

Benoit, R. G., Berkers, R. J., & Paulus, P. C. (2018). An adaptive function of mental time travel: Motivating farsighted decisions. *Behavioral And Brain Sciences, 41*

Bhattacharya, A. (2011). Meaning in Life: A Qualitative Inquiry into the Life of Young Adults. *Psychological Studies, 56*(3), 280.

Braun, V. and Clarke, V. (2006) Using thematic analysis in psychology. *Qualitative Research in Psychology, 3* (2). pp. 77-101

Butler, L. D., Mercer, K. A., McClain-Meeder, K., Horne, D. M., & Dudley, M. (2019). Six domains of self-care: Attending to the whole person. *Journal of Human Behavior in the Social Environment, 29*(1), 107.

Campbell, T. H. (2019). Building Better Science Activists: with Insights from Disney, Marketing, and Psychological Research. *Skeptical Inquirer, 43*(4), 34.

Castleberry, A., & Nolen, A. (2018). Thematic analysis of qualitative research data: Is it as easy as it sounds?. *Currents in Pharmacy Teaching and Learning, 10*(6), 807-815.

Bryant, A., & Charmaz, K. (2007). *The SAGE handbook of grounded theory*. SAGE Publications.

Chen, S. X., Fok, H. K., Bond, M. H., & Matsumoto, D. (2006). Personality and beliefs about the world revisited: Expanding the nomological network of social axioms. *Personality and Individual Differences, 41*(2), 201–211

Craparo, G., Magnano, P., Paolillo, A., & Costantino, V. (2017). The Subjective Risk Intelligence Scale. The Development of a New Scale to Measure a New Construct. *Current Psychology, 37*(4), 966–981.

Cuhls, K. E. (2017). Essays: Mental time travel in foresight processes—Cases and applications. *Futures, 86*118-135.

Dag, N., Høifødt, R. S., Bohne, A., Landsem, I. P., Arfwedson Wang, C. E., & Thimm. J. C. (2019). Early maladaptive schemas as predictors of maternal bonding to the unborn child. *BMC Psychology*, (1), 1

Davis, A. C., & Stroink, M. L. (2016). The Relationship between Systems Thinking and the New Ecological Paradigm. *Systems Research & Behavioral Science, 33*(4), 575–586.

De Beni, R., Borella, E., Carretti, B., Zavagnin, M., Lazzarini, L., & Milojevi, G. (2013). Remembering the past and imagining the future: age-related differences between young, young-old and old-old. *Aging Clinical And Experimental Research, 25*(1), 89–97.

Denzin, N. K. & Lincoln, Y. S. (1998). Collecting and interpreting qualitative materials. Thousand Oaks, CA: Sage.

Doenyas, C. (2017). Self versus other oriented social motivation, not lack of empathic or moral ability, explains behavioral outcomes in children with high theory of mind abilities. *Motivation and Emotion*, 1–15.

Doetzel, N.-A. (2018). Cultivating Spiritual Intelligence: Honoring Heart Wisdom and First Nations Indigenous Ways of Knowing. *Interchange (0826-4805), 49*(4), 521–526.

Doherty, C. (2017). The Imagination: A Path to Personal and Planetary Individuation. *Journal Of Jungian Scholarly Studies, 12*(1), 1-21.

Dooley, M., Jones, D., & Zupko, E. (2010). Dissecting Faith: Comparing Religiousness and Spirituality to Self-Construal and Religious Orientation. *Psi Chi Journal of Undergraduate Research, 15*(4), 186–193.

Drew, J., & Ho, L. (2017). Transpersonal in the workplace: The organisation, the transpersonal, spirituality and values. *Transpersonal Psychology Review, 19*(2), 27-39.

Dvash, J., & Shamay-Tsoory, S. G. (2014). Theory of Mind and Empathy as Multidimensional Constructs. *Topics In Language Disorders, 34*(4), 282-295.

Ecklund, E. H., Peifer, J. L., White, V., & Chan, E. (2017). Moral Schemas in Articulation and Intuition: How Religious People Evaluate Human Reproductive Genetic Technologies. *Sociological Forum, 32*(2), 277–297.

Edmondson, P. (2018). The power of meaning: Finding fulfillment in a world obsessed with happiness. *Sufi*, (94), 60.

Ferrajão, P. C., & Oliveira, R. A. (2014). Self-awareness of mental states, self-integration of personal schemas, perceived social support, posttraumatic and depression levels, and

moral injury: A mixed-method study among Portuguese war veterans. *Traumatology, 20*(4), 277–285.

Friedman, H. L. (2018). Transpersonal psychology as a heterodox approach to psychological science: Focus on the construct of self-expansiveness and its measure. *Archives of Scientific Psychology, 6*(1), 230–242.

Fuochi, G., Veneziani, C. A., & Voci, A. (2018). Exploring the social side of self-compassion: Relations with empathy and outgroup attitudes. *European Journal of Social Psychology, 48*(6), 769–783.

Fusch, P. I., & Ness, L. R. (2015). Are we there yet? Data saturation in qualitative research. *The qualitative report, 20*(9), 1408.

Gabriel, S., Valenti, J., Naragon-Gainey, K., & Young, A. F. (2017). The psychological importance of collective assembly: Development and validation of the Tendency for Effervescent Assembly Measure (TEAM). *Psychological Assessment, 29*(11), 1349-1362.

Garcia, D., & Rosenberg, P. (2016). Out of Flatland: The Role of the Notion of a Worldview in the Science of Well-being.

Gerrans, P., & Kennett, J. (2017). Mental Time Travel, Dynamic Evaluation, and Moral Agency. *Mind, 126*(501), 259-268.

Gilin, D., Maddux, W. W., Carpenter, J., & Galinsky, A. D. (2013). When to Use Your Head and When to Use Your Heart: The Differential Value of Perspective-Taking Versus Empathy in Competitive Interactions. *Personality and Social Psychology Bulletin, 1*, 3.

Goel, L., Johnson, N., Junglas, I., & Ives, B. (2013). Predicting users' return to virtual worlds: a social perspective. *Information Systems Journal, 23*(1), 35-63.

Gold, N.)., & Kyratsous, M.). (2017). Self and identity in borderline personality disorder: Agency and mental time travel. *Journal Of Evaluation In Clinical Practice, 23*(5), 1020-1028.

Grotzer, T. A., Derbiszewska, K., & Solis, S. L. (2017). Leveraging Fourth and Sixth Graders' Experiences to Reveal Understanding of the Forms and Features of Distributed Causality. *Cognition And Instruction, 35*(1), 55-87.

Grysman, A., Prabhakar, J., Anglin, S. M., & Hudson, J. A. (2015). Self-enhancement and the life script in future thinking across the lifespan. *Memory, 23*(5), 774–785.

Heppner, P. P., Kivlighan, D. M., & Wampold, B. E. (1999). *Research design in counseling* (2nd ed.). Belmont, CA: Wadsworth.

Hertlein, K. M., & Weeks, G. R. (2017). The Logical and Clinical Argument for the Concept of Meta-Schema in Cognitive Therapy. *Journal of Family Psychotherapy, 28*(1), 4–22.

Hill, C. E. et al. (2005). Consensual qualitative research: An update. *Journal of Counseling Psychology, 52*, 196-205.

Irish, M., Goldberg, Z., Alaeddin, S., O'Callaghan, C., & Andrews-Hanna, J. R. (2019). Age-related changes in the temporal focus and self-referential content of spontaneous cognition during periods of low cognitive demand. *Psychological Research, 83*(4), 747–760.

Jayasuriya, R., Whittaker, M., Halim, G., & Matineau, T. (2012). Rural health workers and their work environment: the role of inter-personal factors on job satisfaction of nurses in rural Papua New Guinea. *BMC Health Services Research, 12*, 156.

Jung, C. G. (1960). On the nature of the psyche (R. F. C. Hull, Trans.). In H. Read et al. (Series Eds.), *The collected works of C. G. Jung* (Vol. 8, 2nd ed., pp. 168–170).

Karanika, K., & Hogg, M. K. (2016). Being kind to ourselves: Self-compassion, coping, and consumption. *Journal Of Business Research, 69*(2), 760-769.

Killingsworth, M. A., & Gilbert, D. T. (2010). A Wandering Mind Is an Unhappy Mind. *Science, 330*(6006), 932

Koltko-Rivera, M. E. (2004). The Psychology of Worldviews. *Review of General Psychology, 8*(1), 3–58.

Kucinskas, J., Wright, B. R. E., Ray, D. M., & Ortberg, J. (2017). States of Spiritual Awareness by Time, Activity, and Social Interaction. *Journal for the Scientific Study of Religion, 56*(2), 418–437.

Lear, G. (2017). Midlife Awakening: An Emergent Transformation of the Self. *Journal Of Transformative Education, 15*(4), 277-295.

Leary, M. R., Tipsord, J. M., & Tate, E. B. (2008). Allo-inclusive identity: Incorporating the social and natural worlds into one's sense of self. In H. A.Wayment & J. J.Bauer (Eds.), *Transcending self-interest: Psychological explorations of the quiet ego* (pp. 137–147). Washington, DC: American Psychological Association. 10.

Lozada, M., D'Adamo, P., & Fuentes, M. A. (2011). Beneficial effects of human altruism. *Journal Of Theoretical Biology, 289*, 12–16

Macrae, C. N., Christian, B. M., Golubickis, M., Karanasiou, M., Troksiarova, L., McNamara, D. L., & Miles, L. K. (2014). When do I wear me out? Mental simulation and the diminution of self-control. *Journal Of Experimental Psychology: General, 143*(4), 1755-1764.

Magee, R. G. (2012). Worldview Beliefs, Morality Beliefs, and Decision-Making Referents: Implications for the Psychology of Morality and Ethics Instruction. *International Journal of Ethics, 8*(3), 291–315.

Maglio, S. J., & Trope, Y. (2019). Temporal orientation. *Current Opinion In Psychology, 26*, 62–66.

Maij, D. R., van Harreveld, F., Gervais, W., Schrag, Y., Mohr, C., & van Elk, M. (2017). Mentalizing skills do not differentiate believers from non-believers, but credibility enhancing displays do. *Plos ONE, 12*(8), 1-31.

Marks-Tarlow, T. (2012). *Clinical intuition in psychotherapy: The neurobiology of embodied response*. New York, NY: W. W. Norton.

Mårtensson, E. (2017). Construal Level Theory and Moral Judgments: How Thinking Abstractly Modifies Morality. *Journal Of European Psychology Students, Vol 8, Iss 1, Pp 30-40 (2017)*, (1), 30.

Martin, J., Sokol, B. W., & Elfers, T. (2008). Taking and Coordinating Perspectives: From Prereflective Interactivity, through Reflective Intersubjectivity, to Metareflective Sociality. *Human Development, 51*(5-6), 294-317.

Maslow, A. H. (1943). A theory of human motivation. *Psychological Review, 50*(4), 370–396.

McCarroll, C. J. (2019). Navigating intertemporal choices: Mental time travel, perspectival imagery, and prudent decision-making. *Psychology of Consciousness: Theory, Research, and Practice, 6*(2), 200–213.

McGrath, C., Palmgren, P. J., & Liljedahl, M. (2018). Twelve tips for conducting qualitative research interviews. *Medical Teacher*.

Meilinger, T., & Vosgerau, G. (2010). *Putting Egocentric and Allocentric into Perspective.*

Montangero, J., Pons, F., & Cattin, J. (2000). The diachronic approach and solutions to interpersonal conflicts. *British Journal Of Developmental Psychology, 18*(3), 415-429.

Mousa, C., & Morteza, K. (2019). The Architecture of counselors' competencies in Counseling Centers and Psychology Services: qualitative-data based patterns (Study Case: Shamim counseling centers for IRI Armies). *Faṣlnāmah-i Farhang Mushavirah va Ravān/Darmānī*, (37), 1.

Muller, A. R., Pfarrer, M. D., & Little, L. M. (2014). A Theory of Collective Empathy in Corporate Philanthropy Decisions. *Academy of Management Review, 39*(1), 1–21.

Nelems, R. J. (2017). What Is This Thing Called Empathy? *At the Interface / Probing the Boundaries*, (92), 17–38.

Nilsson, A. (2014a). A non-reductive science of personality, character, and well-being must take the person's worldview into account. *Frontiers in Psychology*.

Nilsson, A. (2014b). Personality psychology as the integrative study of traits and worldviews. *New Ideas in Psychology*, 18.

Nilsson. (2018). A Q-methodological study of personal worldviews. *Journal for Person-Oriented Research*, (2), 78.

Norgate, S. H., Davies, N., Speed, C., Cherrett, T., & Dickinson, J. (2014). The missing dimension: The relevance of people's conception of time. *Behavioral And Brain Sciences, 37*(1), 93-94.

Obodaru, O. (2008). The Selves we could have been: How our Alternative Professional Identities Shape our Present and Future. *INSEAD Working Papers Collection*, (41), 1-36.

Oved, O. (2017). Rethinking the Place of Love Needs in Maslow's Hierarchy of Needs: III. Young Perspectives. *Society*, 1.

Peer, M., Salomon, R., Goldberg, I., Blanke, O., & Arzy, S. (2015). Brain system for mental orientation in space, time, and person. *PNAS Proceedings of the National Academy of Sciences of the United States of America, 112*, 11072–11077.

Perry, R., & Sibley, C. G. (2010). Dangerous and competitive schemas: A new Frequency Estimation Index of the Dual Process Model's Social Worldviews component. *Personality and Individual Differences, 49*(8), 983–988.

Pransky, J. & Kelley, T. M. (2017). How the formless comes into form: A process by which Universal Mind powers consciousness and thought to create people's psychological lives. *Cogent Psychology*, (1)

Reese, G., Rosenmann, A., & McGarty, C. (2015). Globalisation and global concern: Developing a social psychology of human responses to global challenges. *European Journal Of Social Psychology, 45*(7), 799-805.

Rubinstein, R. L., Girling, L. M., Brazda, M., de Medeiros, K., & Hannum, S. (2015). Extending the Framework of Generativity Theory Through Research: A Qualitative Study. *Gerontologist, 55*(4), 548-559.

Ruby, F.)., Smallwood, J.)., Engen, H.)., & Singer, T.). (2013). How Self-Generated Thought Shapes Mood-The Relation between Mind-Wandering and Mood Depends on the Socio-Temporal Content of Thoughts. *Plos ONE, 8*(10)

Ryu, S., & Lee, O. (2016). Faith, spirituality, and values among Asian-American older adults: an exploratory factor analysis of the Multidimensional Measures of Religion and Spirituality. *Mental Health, Religion And Culture, 19*(8), 920-931.

Saunders, B., Sim, J., Kingstone, T., Baker, S., Waterfield, J., Bartlam, B., … Jinks, C. (2018). Saturation in qualitative research: exploring its conceptualization and operationalization. *Quality and Quantity*, (4), 1893.

Schipke, T. (2017). Narcissism, Ego, and Self: Kohut – A Key Figure in Transpersonal Psychology. *Journal Of Transpersonal Psychology, 49*(1), 3-21.

Schirmer, A., Penney, T. B., & Meck, W. H. (2016). The Socio-Temporal Brain: Connecting People in Time. *Trends In Cognitive Sciences, 20*(10), 760-772.

Selman, R. L. (2008). Through Thick and Thin. *Human Development, 51*(5-6), 318-325. 51, 407–415.

Sharp, R. (2014). Ready, steady, action: what enables young people to perceive themselves as active agents in their lives? *Educational Psychology in Practice, 4*, 347.

Shum, D., , , Chen, X., Liu, L., Wang, Y., & ... Shum, D. K. (2015). Chinese and Australians showed difference in mental time travel in emotion and content but not specificity. *Frontiers In Psychology, 6*

Sibley, C., & Duckitt, J. (2009). Big-Five Personality, Social Worldviews, and Ideological Attitudes: Further Tests of a Dual Process Cognitive-Motivational Model. *Journal of Social Psychology, 149*(5), 545–561.

Sociality. (n.d.) In *Merriam-Webster.com dictionary*. Retrieved March 1, 2020, from https://www.merriam-webster.com/dictionary/sociality

Squiers, A. (2014). Consciousness, Cognition and the Altering of Socio-temporal Order. *Consciousness, Literature & the Arts (1573-2193), 44*, 55–80.

Sternberg, R. J., Reznitskaya, A., & Jarvin, L. (2007). Teaching for Wisdom: What Matters Is Not Just What Students Know, but How They Use It. *London Review of Education, 5*(2), 143–158.

Sullivan, D., Stewart, S. A., & Diefendorf, J. (2015). Simmel's time-space theory: Implications for experience of modernization and place. *Journal of Environmental Psychology, 41*, 45–57.

Taves, A., Asprem, E., Ihm, E. (2018). Psychology, meaning making, and the study of worldviews: Beyond religion and non-religion. (2018). *Psychology of Religion and Spirituality*, (3), 207.

Temporality. (n.d.) In *Merriam-Webster.com dictionary*. Retrieved March 1, 2020, from https://www.merriam-webster.com/dictionary/temporality

Temporal. (n.d.) In *Merriam-Webster.com dictionary*. Retrieved March 1, 2020, from https://www.merriam-webster.com/dictionary/temporal

Tomlinson, R., Keyfitz, L., Rawana, J., & Lumley, M. (2017). Unique Contributions of Positive Schemas for Understanding Child and Adolescent Life Satisfaction and Happiness. *Journal of Happiness Studies, 18*(5), 1255–1274.

Van Dijk, L., & Withagen, R. (2016). Temporalizing agency: Moving beyond on- and offline cognition. *Theory And Psychology, 26*(1), 5-26.

Vannucci, M., Pelagatti, C., & Marchetti, I. (2017). Manipulating cues in mind wandering: Verbal cues affect the frequency and the temporal focus of mind wandering. *Consciousness and Cognition, 53*, 61–69.

Vannucci, M., Pelagatti, C., Chiorri, C., & Brugger, P. (2019). Space--time interaction: visuo-spatial processing affects the temporal focus of mind wandering. *Psychological Research*, (4), 698.

Waaktaar, T., Christie, H. J., Helmen Borge, A. I., & Torgersen, S. (2004). How Can Young People's Resilience be Enhanced? Experiences from a Clinical Intervention Project. *Clinical Child Psychology & Psychiatry, 9*(2), 167-183.

Waytz, A., Hershfield, H. E., & Tamir, D. I. (2015). Mental simulation and meaning in life. *Journal Of Personality And Social Psychology, 108*(2), 336-355.

Yang, Q., Liu, S., Sullivan, D., & Pan, S. (2016). Interpreting suffering from illness: The role of culture and repressive suffering construal. *Social Science & Medicine, 160*, 67–74.

Zhe, F., Logan, S., Cupchik, G., Ritterfeld, U., & Gaffin, D. (2017). A Cross-Cultural Exploration of Imagination as a Process-Based Concept. *Imagination, Cognition & Personality, 37*(1), 69-94.

Appendix I – Interview Questions

Obodaru (2008) describes three processes of thought generation that contribute to the formation of one's identity; these are (1) past-related self-reflection, (2) social interactions telling us about our potential, and (3) social comparison of what one could become.

1) How do you mostly construct your identity? Through self-reflection on past experiences, current social interactions, or thinking about who you could become like?

Coherent meaning across a person's past, present, and future can be important to overcome adversity (Waaktaar, Christie, Helmen Borge, & Torgersen, 2004). Furthermore, thinking about the present as a stage between the past and future was found favorable to problem-solving capabilities (Montangero, Pons, & Cattin, 2000).

2) How do you create coherence between your past, presence, and future?

According to Baumeister, Vohs, Aaker, and Garbinsky (2013), meaning comes from the integration of the past, present, and future. Free mental past- and future-related simulations were found to increase generally perceived meaningfulness (Waytz, Hershfield, & Tamir, 2015).

3) Which temporal mode (past, present, future) or combination of modes is most meaningful to you? And how do you experience the consequences from these mind-wanderings?

Mental time travel involves the memory of the past and the imagination of future happenings (Shum et al., 2015). Self-generated thoughts in the form of mind-wandering into the past and future can make half of the awake mentation (Ruby, Smallwood, Engen, & Singer, 2013).

According to Cuhls (2017), thinking positively about the past often happens unconsciously, while the same does not happen with mentalizing into the future.

4) In what temporal mode do you most of your waking time time-travel? Are you mostly thinking about the past, the present, or the future? Or is it a mix of what kind of proportions?

Thoughts related to the past and others were found to be linked to resulting in negative states of mind (Ruby, Smallwood, Engen, & Singer, 2013).

5)

   a. When you voluntarily mind travel into the past, are your thoughts mostly self-, inter-relational, or otherwise other-related?
   b. When your thoughts are related to either of the combinations (the intra-past, the inter-past, and the extra-past), how do these thoughts make you feel?
   c. Why do you think this is so?

Socio-temporality of thought and mood are interrelated (Ruby, Smallwood, Engen, & Singer, 2013).

6)

   a. Relating to the present: Whom respectively what group or social definition of your identity do you most think about?
   b. When your thoughts are related to either of the combinations (the intra-present, the inter-present, and the extra-present), how do these make you feel?
   c. Why do you think this is so?

Lu, Au, Jiang, Xie, & Yam (2013) found that people with a cooperative mindset value and practice a broader social inclusion than people with a comparatively competitive attitude.

7)

a. When you voluntarily mind travel into the future, are your thoughts mostly self-, inter-relational, or otherwise other-related?
b. When your thoughts are related to either of the combinations (the intra-future, the inter-future, and the extra-future), how do these make you feel?
c. Why do you think this is so?

Individuals who experience heightened levels of worry, stress, and anxiety were found to think a lot about the past and the future (Baumeister, Vohs, Aaker, & Garbinsky, 2013). Hostility might be an adaptive tactic in response to perceived danger and unpredictability (Arsenio, Preziosi, Silberstein, & Hamburger, 2012).

8)

a. What are your most significant worries about the future?
b. How do you react to these concerns?

Inter-personal engagements are regulated by the acknowledgment of entitlement and obligations that have their roots in past happenings (Benoit, Berkers, & Paulus, 2018). Also, obligations represent expectations into the future. This question is used to explore the degree to which a worldview is construed by a schema consisting of the intra-past, the inter-present, and the extra-future. For example, a high level of perceived obligations might indicate obligation-imposing

relationships as could be depicted by the inter-past and inter-future fields of the socio-temporal matrix (see Figure 1).

9)

   a. What are your biggest obligations?

   b. How do you feel in light of these obligations?

10) Do you think the socio-temporal framework would be a suitable tool to reflect on an individual's construal of worldview? Please justify your answer.

Appendix II – Detailed socio-temporal schemas

Socio-temporal schemas for Interviewees 1 - 14

Legend:

Text:	Summaries/codes representing answers given
Text:	Future worries
Text:	*Obligations*
(*)	Worry/Obligation without a strategy other than avoidance
Gap "…":	Remark made by the interviewee indicating a possible shortcoming (e.g., lack of mind-wandering) related to the overall schema

Interviewee 1

	Quantity: Tasks, planning, problem-solving	**Meaning: Future achievement and contribution, strategizing, waiting**
Extra-personal	Problem-solving	Future contribution Motivating for taking action
Inter-personal	Mix of regret and nostalgia	Not making them happy, not being taken care of (*)
Intra-personal	Mix of regret and nostalgia	Solitary work Enjoying own immediate desires	Future achievement, strategizing, waiting Motivating for taking action
	Past	**Present**	**Future**

Strategies to address worries and obligations:

- Avoiding
- Disorientation addressed through focus on working

Interviewee 2

			Meaning: Instill change **Quantity**	**Strategies to address worries and obligations:**
Extra-personal		Depressing social issues	Happy to step back and invest/risk, trust in other people <u>Power imbalance, rigged game, greed, destruction, cruelty</u>	• Use power to empower
Inter-personal	Success nostalgia Tiring brand/reputation maintenance and slow progress	**Gap:** "So, I'm often accused as a director of being too ... too much drive. So, I say, let's go over there and let's do that grant. But often what I don't do is check whether people know where I want to go. And I leave them behind. "		
Intra-personal	Success nostalgia Tiring brand/reputation maintenance and slow progress			
	Past	**Present**	**Future**	

Interviewee 3

		Meaning: It's all there is **Quantity**		**Strategies to address worries and obligations:**
Extra-personal			Worry about climate change Depressing uncertainty about social issues, politics Power imbalance, rigged game, greed, destruction, cruelty Others don't know, understand (yet)	• Research and teaching • Fatalism
Inter-personal	Both sadness and happiness Annoyance	Lucky to have loving family focus *Work to reach potential as social expectation of the job* *Job social expectation, social comparison* *Helping with one's work* *Job security*	Worry about kids, loved ones Others don't know, understand (yet)	

Intra-personal		**Gap:** "If you have made me this question a year ago, probably would be like a lot of guilty feelings when I thought about my family, my relationship, because I was very absent from like the family life, writing up and things like that."	Motivational personal wanting Worries about personal uncertainty, death Meaning and achievement
	Past	**Present**	**Future**

Interviewee 4

	Meaning: Justifying regretful choices / Imaginary past	**Quantity**		**Strategies to address worries and obligations:**
Extra-personal	Triumph over adversity, survival, cultural narrative		Hopeful (no worries) about next generations' life Feeling oneself irrelevant	
Inter-personal	Embarrassment Blaming them	*Family obligations, care giving (*)*	Worry about kids, loved ones (health, enough money) Worry about losing, not having others, being isolated	• Absorbing in esotericism (philosophy) • Think more, feel less • Fleeing into consuming work / intra- and present • Need to communicate the intra-present • Need to protect the intra-past
Intra-personal	Success nostalgia	Struggle with own current age Meaning of current existence, absence of purpose, goals	Being isolated	
	Past	**Present**	**Future**	

Interviewee 5

		Meaning: It's all there is / Tasks, planning, problem-solving / Keeps on track, getting goals done **Quantity**		**Strategies to address worries and obligations:**
Extra-personal				
Inter-personal	Negatively perceived effects from relationships	**Gap: "…** relationships. That's how I usually get into trouble ..." **"**My blind spot is about relationships"	Worry about relationships <u>Worry about losing, not having others, being isolated</u>	• Being with the relationship in the best way • Not taking seriously, thinking in present • Knowing blind spots
Intra-personal		Empty mind, meditative state, embodies state of consciousness Capital I Intra	Death <u>Being isolated</u> <u>Economic situation, losing job</u>	• Taking action in the present • Not taking it seriously, thinking in present
	Past	**Present**	**Future**	

Interviewee 6

	Quantity: Learning from the past / Entertaining	**Meaning: It's all there is / Not worrying about the past and future**	**Quantity: Adaption, planning / Entertaining**	**Strategies to address worries and obligations:**
Extra-personal	Entertainment	Fascinating politics and global/planetary things Sadness because of destruction of nature/life forms (Humility, openness to non-comfort, eudaimonic happiness) *Obligation to the gift of life, the human species, and talent*	Entertainment Concern about humans, but there is also cosmos/energy Power imbalance, rigged game, greed, destruction, cruelty	• Research and teaching
Inter-personal				
Intra-personal				
	Past	**Present**	**Future**	

Interviewee 7

	Meaning: Landmarks that inform the present	**Quantity**		**Strategies to address worries and obligations:**
Extra-personal	Learning from archeology For orientation to more distant past	**Gap:** "If they don't want him, they don't want me"	Mission of better psychology, philosophy, effort to think Power imbalance, rigged game, greed, destruction, cruelty	• Fleeing (e.g., leaving the country) • Impulsively watch news
Inter-personal		Disorienting conflicts with others Introvert approach	Not making them happy, not able to take care (*)	
Intra-personal		Empty mind, meditative state, embodied state of consciousness *Access through body, awareness of awareness, emotions* *Past-related roots still (unconscious, need therapy)*	Economic situation, losing job (*)	
	Past	**Present**	**Future**	

Interviewee 8

	Meaning: Learning from the past **Quantity**	**Quantity**		**Strategies to address worries and obligations:**
Extra-personal	Survival, family history, education, and culture			
Inter-personal	Survival, family history, education, and culture	Living in the present doing *<u>Feeling the past through current conversations about the past</u>*		• Thinking about and defending the past
Intra-personal		Gap: "I sit in the front of the computer listening to [inaudible] songs and I'm crying, crying like a child, because it brings me back to what my life when I was younger."	<u>Meaning and achievement</u>	
	Past	**Present**	**Future**	

Interviewee 9

		Meaning: Keeps on track, getting things done **Quantity**		**Strategies to address worries and obligations:**
Extra-personal		Fascinating politics		
Inter-personal	Negatively perceived effects from relationships	Thinking about work and family *Doing things for others*	Thinking about work and family Not getting along with them (working colleagues)	• Finding solutions for how to interact with people
Intra-personal		**Gap:** "It's not too much self-dependent, so it's just the work, which has to be done"	Motivational personal wanting	
	Past	**Present**	**Future**	

Interviewee 10

	Meaning: The whole creates meaning **Quantity**			**Strategies to address worries and obligations:**
Extra-personal	Frustration because of interference with history	Interesting bigger picture behind the scenes Depressing social issues	Worry about climate change Mission of better psychology, philosophy, effort to think Exhausting big picture <u>Power imbalance, rigged game, greed, destruction, cruelty</u> <u>Others don't know, understand (yet)</u>	• Use power to empower • Avoidance because of limited power • Avoidance because of distance • Research and teaching • Fatalism • Reassuring, directing social class, culture, religion
Inter-personal		Waiting for others to act, managing less intelligent people <u>*Family obligations, care giving*</u>	<u>Others don't know, understand (yet) (*)</u>	
Intra-personal	Like observing another person	Feeling boring because not talking about oneself, but others	Motivational personal wanting Worries about personal uncertainty, death	
	Past	**Present**	**Future**	

Interviewee 11

		Meaning: Keeps on track, getting goals done **Quantity**	**Meaning: Future achievement and contribution, strategizing, waiting**
Extra-personal			Depressing uncertainty about social issues, politics
Inter-personal	Negative selection bias	More (immediate) impact in direct relationships Responding to needs of others, pleasing, entertaining Caring, enjoying for others *Relational obligations, relationships* *Little self-chosen obligations because of privilege of individualistic culture*	Hopeful (no worries) about future of loved ones Worry about kids, loved ones Worry about losing, not having others, being isolated Not making them happy, not able to take care (Health)
Intra-personal			Being isolated (*)
	Past	**Present**	**Future**

Strategies to address worries and obligations:

- Think more, feel less
- Accepting limited influence, do the best in the present
- Trusting they are doing well

Interviewee 12

	Meaning: Entertaining **(Quantity: not able to say)**		**Meaning: Entertaining** **(Quantity: not able to say)**	**Strategies to address worries and obligations:**
Extra-personal				
Inter-personal	Entertainment, not to be taken seriously	Not thinking, just enjoying Responding to needs of others, pleasing, entertaining *Family obligations, care giving (*)*	Being in contact with my kids Worry about close people (health)	• Trusting they are doing well
Intra-personal	Entertainment	Pleasurable experiences (mind and body) *Educated, learning to be happy and thankful*	Motivational personal wanting Not worried (about material things) Being alone Health and dying	• Not thinking about it because of lack of control • Investing into motivation for exercising • Meditation, mindfulness, avoid future worrying though
	Past	**Present**	**Future**	

Interviewee 13

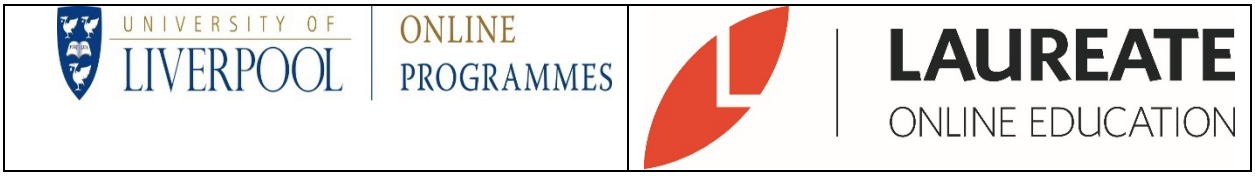
	Quantity	Meaning: Living the lessons learned from the past		Strategies to address worries and obligations:
Extra-personal				
Inter-personal	Mix of regret and nostalgia	Responding to needs of others, pleasing, entertaining Lucky to have loving family focus *Family obligations, care giving*	Shared decisions, control Well feeling balance of individual and collective Not making them happy, not able to take care	• Accepting limited influence, do the best in the presence • See the positive side of it (staying in the present) • Seeing other parts of identity
Intra-personal	Mix of regret and nostalgia	**Gap**: "Maybe it's hard for me to ... like nowadays, I think I enjoy time alone. After I became a mom, I really appreciate the time that I just have with myself."	Well feeling balance of individual and collective Health (depression)	• Meditation, mindfulness, avoiding future worrying though • Reduce workload (distraction)
	Past	**Present**	**Future**	

Interviewee 14

	Meaning: Regret	**Quantity**		**Strategies to address worries and obligations:**
Extra-personal				
Inter-personal		Transmitting values to others (struggle of control and pickiness) Prejudices	Worried about uncertainty <u>Worry about close people</u>	• Taking action in the present
Intra-personal	Bias, selection of negative feelings Regret	*<u>Personal, moral obligations (*)</u>* *<u>Educated, learning to be happy and thankful (*)</u>* **Gap:** "I'm obliged toward me. My biggest problem is me ... is myself. And so, my freedom is limited by myself."	Angry (not fearful) to not be in control <u>Economic situation, losing job</u>	• Seeing freedom depending on self • Leaving regret behind • Thankful, proud for past, seeing everything as growth
	Past	**Present**	**Future**	

Appendix III – Transcripts

Appendix V – Ethics Committee Approval



Psychology Virtual Programme Research Ethics Committee

DATE: 17th December 2019

Application Reference Number: H00060713

Project title: A qualitative exploration of socio-temporal mental schemas to investigate meaning-making on a worldview level.

Dear Mathias Sager,

I am writing to you on behalf of the Psychology Virtual Programme Research Ethics Committee and am pleased to inform you that the Committee has now approved the application above.

Please ensure that you inform your Dissertation Advisor in the first instance if any changes are made to your research project, and note that this may require you submit a revised application for a further review.

Good luck with your research project!

Akhtar Wallymahmed

Chair, Psychology Virtual Programme Research Ethics Committee