Exploring the Relationship Between Futures Consciousness and Connectedness: A Psychological Perspective on Future-Oriented Thinking

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Module 12 Bachelor Thesis PCPT (202000381)

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01.07.2025

Author's Note

The present study used OpenAI's ChatGPT-4o for data analysis support. The author takes full responsibility for all findings, interpretations, and conclusions.

Abstract

This study investigated the relationship between Connectedness (Self, Social, Environmental) and Futures Consciousness (FC) and its subdimensions Time Perspective, Agency Beliefs, Systems Perception, Openness to Alternatives, and Concern for Others among university students. Both Concepts and its subdimensions were assessed. The sample consisted of 97 students from diverse backgrounds, being mainly western European. Cross-sectional, correlational survey study design was used assess the validated scales (Futures Consciousness Scale, Watts Connectedness Scale), which measure the concepts and the beforementioned subdimension. Connectedness to the Self was positively linked to Agency Beliefs, Concern for Others, and negatively associated with Systems Perception The findings also showed that Connectedness to the Others was not related to FC or any of its subdimensions. Connectedness to the World positively related to FC and the subdimensions Concern for Others and Agency Beliefs. This highlights the importance of Connectedness to the Self and the World in future-oriented thinking. Limitations in this study are the sample size, sample background, and low internal consistency for some of the FCS subscales. The findings of this study suggest that interventions in educational settings should consider targeting Connectedness to the Self and Connectedness to the World on a nature and broader systems level and connectedness to promote FC.

Introduction

Political conflicts, environmental issues, and uncertain technological advancements are the problems the world is facing increasingly. These challenges are a major driver in shaping societal concerns (Climate change and COVID-19, 2021; Global risks report, 2024; Tai, 2020). Since addressing these challenges requires present behavior for future outcomes, research on futures thinking has sparked growing interest. According to Sools (2020), futures thinking has a significant influence on the present behavior by aligning current actions in accordance with long term goals and futures. While this is not about predicting the future, it is about behavior guided by the imagination of meaningful futures leading to higher agency, resilience, and adaptive behavior in uncertain contexts. Similarly, Bettiga and Lamberti (2020) claim that future-oriented thinking critically influences decision-making and consumer behavior. Future emotions, such as anticipated happiness, significantly impact people's willingness to act, particularly in uncertain first-time encounters with products. However, this form of short-term futures thinking can be manipulated through marketing and external influences. This emphasizes the need to differentiate between reactive futures thinking and more reflective and internal approaches to futures engagement.

One psychological construct that aims at conceptualizing and measuring such deeper future-oriented thinking is Futures Consciousness (FC). It refers to the "human capacity to understand, anticipate, prepare for, and embrace the future" (Lalot et al., 2024). Previous research on it revealed that people with higher FC tend to show greater pro-environmental behavior as well as greater well-being among others (Lalot et al., 2024). Existing studies on futures-thinking among students suggest that it can be acquired through structured learning (Levrini et al., 2021; Rasa et al., 2022). While these studies do not focus on the concept of FC

specifically, they suggest that important future-oriented properties can be fostered through education and learning. One possible relating or even overlapping construct is connectedness. Watts et al. (2022) describes it as an "individual's sense of belonging to self, others, and the environment". While higher connectedness, similar to higher FC, has been linked to higher well-being and environmental concern (Dornhoff et al., 2019), their potential relationship or even overlap has not yet been fully established and thoroughly investigated. Exploring this connection might lead to a greater understanding of how individuals engage with the future on a cognitive, relational and emotional level. Since FC puts emphasis on dimensions such as agency, systems thinking, and concern for others as an explicit ethical dimension (Ahvenharju et al., 2018), while Connectedness highlights ethical awareness and emotional belonging (Watts et al., 2022), investigating them in a combined manner could reveal how psychological resources contribute to more sustainable and future-oriented thinking across multiple domains of human functioning. Despite their conceptual overlap, the relationship of these specific two construct has not yet been investigated. This study aims at exploring this gap in research of whether connectedness and FC are related and, if so, in which way. The goal is to contribute to a deeper understanding of the psychological concepts in order to improve shaping future-oriented thinking.

Relevance and the Concept of Futures Consciousness (FC)

To understand this possible relationship more in-depth one must understand the concepts of Futures Consciousness (FC) and connectedness and how they are measured. As previously stated, FC is defined as the "human capacity to understand, anticipate, prepare for, and embrace the future" (Lalot et al., 2024). Since the term is often used interchangeably with related concepts like anticipation and future orientation, Ahvenharju et al. (2018) developed a framework to specifically define FC as a concept. This framework is called the *Five Dimensions of Futures*

Consciousness. It consists of the following subdimensions: Time perspective, Agency belief, Openness to alternatives, Systems perception, and Concern for others. Time perspective refers to the ability to connect past and present actions to possible future outcomes to foster and engage in futures-thinking. The dimension agency beliefs describes the confidence in the personal ability to influence and shape future outcomes. Openness to alternatives defines the willingness to consider possible future outcomes in order to adapt to that change and accept a certain level of uncertainty in futures-thinking. In addition to these dimensions, systems perception reflects the capability of understanding complex global systems and how they interconnect in shaping long-term outlooks. Besides these dimensions, the construct of FC introduces an additional ethical and social dimension. Concern for others reflects an individual's consciousness of how their personal actions might affects their peers or even the general society's future. Additionally, it displays the responsibility to act in ways that preserve or promote long-term well-being in society (Ahvenharju et al., 2018).

Expanding on its theoretical framework, research on FC has shown applicability to real-world scenarios. An example for that is that higher levels in individuals have been linked to pro-environmental behavior, stronger reslilience to uncertainty and greater higher well-being among others (Lalot et al., 2024). These findings strengthen the assumption that futures-thinking not only plays a critical role in rational thinking and decision-making but also in emotional involvement with possible futures.

Besides research suggesting the importance of FC, the FutureMakers Model developed by Youngworks & Radboud Universiteit (2024) highlights that students do not engage with and see the future in a uniform way. The model identifies five different types of students and their engagement with future-thinking ranging from highly proactive students to more hesitant/passive

students. Even though some students take strong actions towards making a change in the world, a significant number tends to stay passive based on their uncertainty of their capabilities of meaningfully influencing long-term future. This is especially relevant in the focus of growing global challenges, such as climate change or pandemics, which require prosocial engagement and collective action. Many students feeling powerless or disengaged highlights the potential gap in the development and research of FC within educational domains.

In the scope of this research, this previous finding underscores how crucial the understanding of FC in students is. It is not only important for understanding how it manifests in students, but also what factors influence or enable its development. The FutureMakers Model's identification by Youngworks & Radboud Universiteit (2024) of the amount of passive and hesitant students reveals the need for targeted interventions. Since Ahvenharju et al. (2018) describes FC as a capacity, it suggests that it can be cultivated and enhanced through interventions. This would mean that complex societal issues could be addressed by developing the necessary skills and confidence to tackle them and that this could be achieved by successfully fostering higher FC in educational settings. Therefore, the passivity observed in some students is not only descriptives but rather an incentive for educators and governmental authorities to aim at building futures conscious generations.

Connectedness

Beyond structured learning playing a crucial role in shaping FC, psychological constructs like connectedness might also relate to FC due to their similarity in nature. It refers to "individual's sense of belonging—to oneself, to others, and to the natural world" (Watts et al., 2022). Since FC and connectedness share the dimensions of responsibility for other individuals, environmental engagement and an awareness of interconnected systems, they may have a

relationship or even overlap. Connectedness can be examined though three interrelated dimensions: Self-Connectedness, Social Connectedness, and Nature/Environmental Connectedness. Self-Connectedness/Connection is defined as an "awareness of oneself, acceptance of oneself based on this awareness, and alignment of one's behaviour with this awareness" (Klussman et al., 2021). Previous research on it indicates that it might contribute to higher well-being and stronger mental health. Social connectedness can be understood as the intensity of social ties between people and entire communities (Bailey et al., 2018). A study by Jose et al. (2012) revealed that, at least for adolescence, higher levels of social connectedness can be connected to high levels of well-being. Nature/Environmental connectedness is explained as to the level in which people perceive themselves as a part of the environment and the natural world, influencing their personal decisions and behaviours (Schultz et. al., 2003; Mayer & Frantz, 2004). Besides being associated with higher well-being on the social, emotional, and psychological dimension (Howell et al., 2011), it also is associated with a higher likelihood of pro-environmental actions and greater environmental concern (Dornhoff et al., 2019). Due to the beforementioned similarities in nature, this study aims to explore the potential relationship between the concepts of Futures Consciousness and Connectedness.

The guiding research question is therefore: *How does the psychological construct of Connectedness (Self, Social, Environmental) relate to Futures Consciousness (FC) among students?*

Theoretical Relationships between Connectedness and Futures Consciousness

Having defined and explained Connectedness and FC, the following section is going to outline and draw possible relationships between. The beforementioned conceptual overlaps in areas such as ethical responsibility and moral concern indicate that there may be a meaningful

association between Connectedness and its subdimensions and FC and its subdimensions. This section develops hypotheses for each dimension of Connectedness (Self, Others, World) and their expected associations with overall FC and its subdimensions.

According to Ketonen-Oksi and Vigren (2024), the ethical dimension within FC particularly underscores responsibility towards others and the environment, which resonates with the Watts scale's emphasis on connection and responsibility. Given that both connectedness and Futures Consciousness involve the awareness of a broader system, responsibilities for others and society and the individual's engagement with the environment, it is plausible that they might be connected and related. However, they differ in the way they emerge. Connectedness as described and conceptualized by Watts et al. (2022) has a strong experiential and affective basis, rooted in impactful personal experiences or practices like psychedelic-assisted therapy rather than cognitive training. FC on the other hand, is something that rather be developed than experienced. However, even though there might be a theoretical relationship due to previous research outcomes, the exact interrelation remains unexplored. Conceptually, it can be hypothesized that *H1: Higher levels of Connectedness (Self, Social, and Environmental) are positively associated with greater Futures Consciousness.*

Farrow (2020) highlights the importance of an open mindset in futures thinking. The study shows that a more open mindset results in improved proactive behavior and adaptability to future scenarios, which is crucial in dealing with future scenarios and obstacles. That goes strongly in line with the concept of self-connectedness by Klussman et al. (2021), which emphasizes that self-connectedness consists of acceptance, awareness, and alignment with one's subjective values and identity. The open mindset mentioned by Farrow (2020) can be reflected in the subdimension *Openness to Alternatives* of the concept of Futures Consciousness. It describes

the capacity to consider diverse outcomes and possibilities and embrace such uncertainty (Ahvenharju et al., 2018). Individuals that exhibit higher self-connectedness often are more grounded in their internal values. Therefore, they are often more open to engaging with uncertain situations and futures. This strong structure and internal coherence may enable people to consider more perspectives and show faster adaptability to unexpected changes.

Based on that, it is assumed that individuals with higher levels in the subdimension self-connectedness of Connectedness might also exhibit greater levels of *Openness to Alternatives* and general levels of Futures Consciousness. Therefore, it can be hypothesized that:

H2a: Higher levels of self-connectedness are positively associated with greater Futures Consciousness. H2b: Higher levels of self-connectedness correlate with higher levels of openness to alternatives within Futures Consciousness.

In addition to its potential influence on openness to alternatives, self-connectedness may also be positively related to the agency belief subdimension of Futures Consciousness. Agency beliefs refer to the confidence in one's ability to influence and shape future outcomes (Ahvenharju et al., 2018). Since self-connected people tend to have stronger values and internal clarity, this may foster stronger feelings of control and capability of enacting in meaningfully changing things. Individuals with strong feelings of connection to themselves might therefore demonstrate greater agency beliefs when engaging with the future. Based on this conceptual overlap, the following hypothesis can be formulated:

H2c: Higher levels of self-connectedness are positively associated with agency beliefs within Futures Consciousness.

Additionally, the relationship of the subdimension concern for others (FC) and social connectedness (connectedness to others) can be explored. Bailey et al. (2018) state that social

connectedness may foster empathy and a sense of responsibility towards other, aligning closely with the subdimension concern for others (FC) which addresses one's consciousness of how their actions may impact their peers of the future society (Ahvenharju et al., 2018) This raises the question of whether individuals who score high on *Social Connectedness* also tend to exhibit a broader moral concern that includes not only those close to them, but also people in the wider society and the future. On that basis, the following hypotheses have been formulated: *H3a: Higher levels of Connectedness to Others (Social Connectedness) are positively associated with overall FC. H3b: Higher levels of Connectedness to Others (Social Connectedness) are positively associated with the Concern for Others dimension within Futures Consciousness.*

In addition, it is plausible that this relationship is not limited to social connectedness alone. A broader form of ethical awareness that extends beyond the environment itself may also be fostered by Environmental Connectedness. A deeper connection to the natural world within people often demonstrates stronger concern for the well-being of society. Additionally, these people also engage stronger in altruistic actions that influence future generations or display greater pro-environmental behavior (Dornhoff et al., 2019). These behavioral patterns reflect a general moral orientation that aligns closely with the ethical dimension of FC. Therefore, the following hypotheses are proposed: H4a: *Higher levels of Connectedness to the World (Nature/Environmental Connectedness) are positively associated with overall Futures Consciousness. H4b: Higher levels of Connectedness to the World (Nature/Environmental Connectedness) are positively associated with the Concern for Other dimension within Futures Consciousness.*

Another possible theoretical relationship can be established between nature/environmental connectedness and the FC subdimension "Systems Perception".

Nature/Environmental connectedness describes how behavior and personal decisions are influenced by the extent to which they perceive themselves as part of the environment (Mayer & Frantz, 2004; Schultz et al., 2004). This goes in line with subdimension of "Systems Perception", which reflects the skill to understand complex global systems and how they are connected and interconnected in shaping long-term futures (Ahvenharju et al., 2018). Therefore, individuals with a strong feeling of nature/environmental connectedness might also demonstrate higher levels of "Systems Perception", due to their higher understanding of the complex interconnection of human actions and environmental consequences. The following hypothesis is formulated:

H4c: *Higher levels of Connectedness to the World (Nature/Environmental Connectedness) are positively associated with the Systems Perception dimension within Futures Consciousness.*

Methods

Design

The study followed a cross-sectional correlational design to examine the relationship between FC, Connectedness, and their respective subdimensions. The study was part of a broader collaborative project conducted by two bachelor students. Both used the Futures Consciousness Scale (FCS), while only this study employed the Watts Connectedness Scale (WCS). Participants were recruited using a convenience-based self-selection sampling strategy, via the University of Twente's SONA system and through student social media and group chats, where the Qualtrics survey link was distributed. Participating in the study was voluntary and informed consent was obtained electronically before beginning the survey. The study was conducted entirely in English to ensure accessibility and consistency across participants. The research project was reviewed and approved by the BMS Ethics Committee of the University of Twente (250752). The survey

was administered via Qualtrics (https://www.qualtrics.com), and all responses were collected anonymously. Upon completion of the study, all data was securely stored on the University of Twente's OneDrive and will be retained for a minimum of ten years in accordance with institutional data management policies.

Participants

The final sample consisted of $N = 97$ participants who completed and fulfilled at least 80% of the Futures Consciousness Scale (FCS) and the Watts Connectedness Scale (WCS). Participants with a lower response rate than 80% and participants that do not meet the requirements at least pursuing a bachelor's degree were either automatically or manually excluded from the study. The final sample consisted of 63 female participants, 32 male participants, and 2 non-binary/other or unspecified individuals. Participants in the study ranged in age from 18 to 33 years with a $M = 21.98$ and a *Median* = 22. The nationalities in the preprocessed sample consisted of 51 people identifying as German, 13 as Dutch. The remaining 33 participants had diverse nationalities including Spain, Mexico, and Italy, among others. Out of the 97 participants in the final sample, 72 were pursuing a bachelor's degree, 17 a master's degree, and 8 did not specify their current level of education.

Materials

Futures Consciousness was measured using the Futures Consciousness Scale (FCS; Lalot et al., 2019), which assesses five theoretically derived dimensions previously described. The scale consists of 20 items rated on a 5-point Likert scale from 1 ("Not at all like me") to 5 ("Very much like me"). Each subscale includes four items, except for Openness to Alternatives, which consisted of three items in this study, and Concern for Others, which included five items based on theoretical alignment. Example items include: "I am willing to sacrifice my immediate

happiness or well-being in order to achieve something in the future" (Time Perspective) and "I show concern and care for peers" (Concern for Others). Two negatively worded items (QID46_12 and QID46_19) were reverse-coded due to their negative formulation prior to analysis.

In this sample, internal consistency (Cronbach's alpha) was $\alpha = .38$ for Time Perspective, $\alpha = .52$ for Agency Beliefs, $\alpha = .54$ for Openness to Alternatives, $\alpha = .49$ for Systems Perception, and $\alpha = .63$ for Concern for Others. Even though the values were below the conventional threshold of .70, the original five-dimensional structure was retained based on its strong scientific basis. The overall FCS total score, calculated as the mean across all items, showed good internal consistency with $\alpha = .83$. A parallel factor analysis confirmed the five-dimensional structure, supporting the scale's construct validity. Previous research also supports the FCS's test–retest reliability of $r = .76$. Cronbach's alpha values ranged from .89 to .92 across several different language versions (Lalot et al., 2019).

Connectedness was measured using the Watts Connectedness Scale (WCS; Watts et al., 2022), which assesses individuals' sense of psychological connectedness across three domains: to Self, to Others, and to the World. The scale consists of 21 items, each rated on a visual analog scale ranging from 0 ("Not at all") to 100 ("Entirely"). The items are grouped into three subscales: items 1 to 7 assess Connectedness to Self, items 8 to 14 measure Connectedness to Others, and items 15 to 21 capture Connectedness to the World. Example items include: "I have felt connected to my body" (Self), "I have felt connected to all humanity" (Others), and "I have felt connected to nature" (World). This structure enables a comprehensive assessment of the multifaceted nature of connectedness.

In the present sample, the WCS demonstrated acceptable to good internal consistency, with Cronbach's alpha values of $\alpha = .66$ for Connectedness to Self, $\alpha = .73$ for Connectedness to Others, and $\alpha = .80$ for Connectedness to the World. Subscale scores were computed as the mean of the corresponding items, and a total WCS score was calculated by averaging across all 21 items. All items were included in the scoring. Five negatively coded items were recorded in WCS and reverse-coded prior to analysis. Subscales and total were also computed using the "rowMeans()" function in R for the FCS and the WCS.

Procedure

Participants were informed that the survey aimed to investigate on potential relationships between FC, Connectedness, and other theoretical concepts. They were also informed that completing the survey would take approximately 15-20 minutes. The survey was administered via Qualtrics (https://www.qualtrics.com) and could be accessed using either a smartphone or a computer. Prior to participation, informed consent was obtained. All participants completed the same version of the questionnaire. After providing consent, participants first answered demographic questions (e.g., age, gender, nationality) and questions about their current pursued education (e.g., bachelor, master), followed by questionnaires measuring FC and Connectedness. Two additional questionnaires were included at the end of the survey for the purpose of the other student's study and are not relevant to the present research.

Data Analysis

The data analysis was conducted using R (version 4.4.0). The following packages were utilized to support the different stages of the analysis: "tidyverse" for data manipulation and wrangling, psych for reliability analyses, descriptive statistics, and

correlations, “GPArotation” and “nFactor”s for factor analysis, “ggplot2” for potential visualization, and “apaTables” for formatting correlation matrices according to APA guidelines.

Descriptive statistics were calculated using the describe() function from the psych package. This included means (M), standard deviations (SD), skewness, and kurtosis for all key variables. The Shapiro–Wilk test was applied to all total and subscale scores of both the FCS and WCS to assess normality. Results indicated minor deviations from normality for several FCS subscales (FC_Total: $W = 0.97$, $p = .037$; FC_TimePerspective: $W = 0.96$, $p = .007$; FC_Openness: $W = 0.96$, $p = .002$; FC_Systems: $W = 0.97$, $p = .009$; FC_Concern: $W = 0.96$, $p = .004$) and for WCS_Self ($W = 0.96$, $p = .004$). The other subscales and total scores showed no significant deviations (all $p > .05$). Despite these statistically significant p-values, skewness and kurtosis for all variables were within acceptable bounds, and the sample size justified the use of parametric methods in all subsequent analyses. A correlation matrix including 95% confidence intervals and significance levels was generated using the apa.cor.table() function and is reported in Table 1 in the Results section.

Bivariate associations were assessed to test H2-H4. Used were the Pearson correlation analysis and the simple linear regressions, as they yield equivalent results for two variables in a cross-sectional design. For each hypothesis, the relevant subscales of the WCS and FCS were tested as independent variables (IV) and dependent variables (DV). Due to the more complicated nature of the multivariate analysis, H1 was assessed after the bivariate analyses of H2-H6. It was tested using a multiple regression model, where the three types of Connectedness (WCS_Self, WCS_Social, WCS_Environment) displayed the IVs and the overall FCS score displayed the DV. All regression were analyzed using the “lm()” function in R.

Results

Descriptive Statistics and Correlations

The descriptive statistics for all study variables are presented in Table 1. On average, participants reported moderate to high levels of Futures Consciousness and its subdimensions. Scores on the Watts Connectedness Scale subscales indicated moderate connectedness for Self, and World domains. Standard deviations indicate moderate variability in responses across all subscales.

Notably, several significant associations and relationships within both subscales have been found. Connectedness to the World was associated with overall FC and the subdimension Concern for Others. Self-Connectedness was significantly associated with the subdimension Agency Beliefs and Concern for Others. Additionally, there is a significant negative association Self Connectedness and Systems Perception. Agency Beliefs consistently correlated with all three dimensions of Connectedness.

Table 1

Descriptive Statistics and Intercorrelations Among Study Variables

Variable	*M*	*SD*	1	2	3	4	5	6	7	8
1. WCS_Self (Self)	63.81	13.71								
2. WCS_Social (Others)	56.78	17.84	.54** [.39, .67]							

3. WCS_Environment (World)	50.99	20.46	.41**	.38**						
			[.23, .57]	[.19, .54]						
4. FC_Total	3.77	0.40	.14	.16	.34**					
			[-.06, .33]	[-.04, .35]	[.15, .50]					
5. FC_TimePerspective	3.80	0.53	.05	.03	.21*	.62**				
			[-.15, .25]	[-.17, .23]	[.01, .39]	[.48, .72]				
6. FC_Agency	3.59	0.61	.36**	.43**	.28**	.66**	.26**			
			[.17, .52]	[.25, .58]	[.09, .45]	[.53, .75]	[.07, .43]			
7. FC_Openness	3.76	0.63	-.14	.03	.18	.68**	.31**	.31**		
			[-.33, .07]	[-.17, .23]	[-.02, .37]	[.56, .77]	[.12, .48]	[.13, .48]		
8. FC_Systems	3.85	0.65	-.21*	-.13	.01	.68**	.25**	.23*	.45**	
			[-.39, -.01]	[-.33, .07]	[-.19, .21]	[.55, .77]	[.06, .43]	[.04, .40]	[.28, .59]	
9. FC_Concern	3.83	0.63	.27**	.10	.37**	.67**	.31**	.32**	.28**	.27**
			[.07, .44]	[-.10, .30]	[.19, .53]	[.54, .76]	[.13, .48]	[.13, .48]	[.09, .45]	[.08, .44]

Note. *N = 97*. *M* and *SD* represent mean and standard deviation, respectively. Correlations are Pearson's r with pairwise deletion. Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval reflects a plausible range of population correlations that could have produced the observed sample correlation (Cumming, 2014). $p < .05$. $p < .01$. WCS = Watts Connectedness Scale; FC = Futures Consciousness. WCS_Total was excluded due to redundancy with subscale scores.

Hypothesis Testing

To explore the relationships between the dimensions of Connectedness and Futures Consciousness (FC), a series of bivariate and multivariate analyses were conducted, starting from the bivariate analyses for H2-H4 and ending with the multivariate analysis for H1.

H2a tested whether Connectedness to Self correlates overall Futures Consciousness. The relationship between Self-Connectedness and overall Futures Consciousness was not statistically significant, $r = 0.14$, $t(95) = 1.40$, $p = .164$. This hypothesis was not confirmed as it did not yield significant results.

H2b examined the association between Connectedness to Self and Openness to Alternatives, a subdimension of FC. This hypothesis was not supported. No significant relationship was found between Self-Connectedness and Openness to Alternatives, $r = -0.14$, $t(95) = -1.33$, $p = .187$. This hypothesis was not confirmed as it did not yield significant results.

H2c predicted a positive association between Connectedness to Self and Agency Beliefs. There was a significant positive relationship between Self-Connectedness and Agency beliefs, $r = 0.36$, $t(95) = 3.73$, $p < .001$. This hypothesis was confirmed, as it did yield significant results.

H3a assumed a positive correlation between Connectedness to Others (Social) and overall FC. Social connectedness did not yield as significant relationship with overall FC, $r =$

.16, $t(95) = 1.56$, $p = .122$. This hypothesis was not confirmed as it did not yield significant results.

H3b posited that Connectedness to Others (Social) would be positively related to the FC subdimension Concern for Others. Social Connectedness did not yield a significant relationship with Concern for Others, $r = 0.10$, $t(95) = 1.01$, p = .317. This hypothesis was not confirmed as it did not yield significant results.

H4a assumed a positive relationship between Connectedness to the World (Environmental) and overall FC. A significant positive relationship was observed, $r = .34$, $t(95) = 3.56$, $p < .001$. This hypothesis was confirmed, as it did yield significant results.

H4b tested the relationship between Connectedness to the World (Environmental) and Concern for Others. Environmental Connectedness does have a significant relationship to Concern for Others, $r = 0.37$, $t(95) = 3.93$, $p < .001$. This hypothesis was confirmed, as it did yield significant results.

H4c examined whether Connectedness to the World was related to Systems Perception. This hypothesis was not supported, as World Connectedness did not have a significant relationship with Systems Perception, $r = 0.01$, $t(95) = 0.10$, p = .925. This hypothesis was not confirmed as it did not yield significant results.

H1 posited that higher levels of Connectedness to Self, Others (Social), and the World (Environmental) would be positively associated with overall Futures Consciousness. In the multiple regression, only Connectedness to the World was a significant predictor of overall Futures Consciousness ($\beta = 0.33$, $t(93) = 3.02$, p = .003). Self-Connectedness ($\beta = -0.02$, p = .863) and Social Connectedness ($\beta = 0.05$, p = .682) were not significant.

Discussion

Summary of Main Findings

The present study aims at exploring and investigating the relationship between Connectedness (Self, Others, World) and Futures Consciousness (FC) and its respective subdimensions. In regard to the expected significant findings, H2c showed that Connectedness to Self does correlate with the subdimension Agency Beliefs, whereas H2a and H2b did not show a significant relationship with overall FC and Openness to Alternatives. Regarding the findings surrounding Connectedness to Others, neither H3a nor H3b showed significant association with overall FC and Concern for Others. Connectedness to the world, on the other hand, significantly correlated with both overall FC (H4a) and the subdimension Concern for Other (H4b), but not with Systems Perception (H4c). In the multivariate analysis for H1, Connectedness to the World emerged as the only significant relation to overall FC, while Connectedness to Self and Others were insignificant.

In addition to the hypothesized results, several unexpected but significant correlations emerged. These include a positive relationship between Connectedness to the Self and Concern for Others. Moreover, a negative association has been found between Connectedness to the Self and Systems Perception has been found. Social Connectedness and Connectedness to the World both positively correlated with the subdimension Agency Beliefs. While H1, H2c, H4a, and H4b could be confirmed, other hypotheses were not supported, and some additional unexpected patterns were observed.

Interpretation of the Findings

The presented findings of the study indicate a partial conceptual overlap between Connectedness and Futures Consciousness (FC), primarily ethical orientation and Concern for

Others. Connectedness to the Self appears to play a relevant role in fostering confidence on an individual level regarding future action, as seen in its relationship with the subdimension Agency Beliefs. This finding supports the idea that properties like internal clarity or internal alignment can serve as a basis for people's subjective capacity to influence the future. Nevertheless, its missing association with overall FC or Openness to Alternatives indicates that only being connected to yourself might not be sufficiently translating into adaptive and reflective futures thinking.

On the other hand, Connectedness to Others did not show any of the expected relationships with FC or its subdimensions. These results indicate that feeling emotionally close to others or your peers may not be enough to translate that to an elicit concern for unknown others or future generations. Connectedness to Others may instead rather reflect a present-focused approach and not a broader moral concern for society.

Connectedness to the World emerged as having the strongest relationship with FC. It did not only yield a relationship with overall FC but also with Concern for Others, indicating the relevance for a feeling of belonging to the broader world and the environment in supporting an ethically driven and future-oriented mindset. This goes in in line with the belief that feeling part of a larger broader system and also the nature can help in promoting general responsibility or even engagement with future societal issues.

The unexpected findings offer additional insights into the relationship between the two concepts. The link between Connectedness to the Self and Concern for Others suggests that a feeling of internal self-awareness might in some cases translate into ethical concern for broader society. Conversely, the negative correlation that was observed between Connectedness to the Self and the subdimension Systems Perception could potentially indicate that a strong internal

focus might lead to some sort of detachment from the understanding of interdependent and interconnected broader systems. Lastly, the recurring relationship of all types of Connectedness and the subdimension Agency Beliefs supports a central role of perceived control and capabilities as the link between a present identity feeling and futures thinking,

Relation to Previous Research

The confirmation of H2c, associating Connectedness to the Self to Agency Beliefs go in line with previous research by Klussmann et al. (2021), linking a stronger self-alignment to higher well-being and empowerment. While prior literature by Farrow (2020) suggested that openness can arise from a stronger feeling of self-clarity, the findings of this study do not make this link. One possible reason for that could be the approach that openness can potentially be seen as a personality trait. McCrae and Greenberg (2014) argue that openness can be seen as a relatively stable personality trait, limiting the immediate relationship with a relatively fluid concept such as Connectedness to the Self. The Self-concept clarity theory (Campbell et al., 1996) might offer insights into the unexpected findings. The theory links internal clarity with a stronger orientation towards ethical and social issues. The unexpected negative correlation might be addressed by the issue of "self-absorption" leading to a limitation in broader contextual awareness, through an overly strong internal focus that has been shown to be a driver of several psychological issues (Trapnell & Campbell, 1999).

Contrary to Bailey et al. (2018) and Jose et al. (2012), this study did not confirm the link between social ties and empathy/moral concern. This finding can be partly explained by Eyal and Liberman (2012) argue that a moral concern often decreases with psychological distance, indicating that moral connection remains restricted to immediate peers and does not automatically expand to future generations.

The findings regarding Connectedness to the World as the strongest link between Connectedness and FC are strongly supported by the findings of Schultz et al. (2002) and Dornhoff et al. (2019), which strongly support that connection to the nature, which is a core part of Connectedness to the World, can be closely related to ethical awareness and pro-environmental concern. On the other hand, the relation between Connectedness to the World and Systems Perception could not be drawn. This raises the assumption that there might be an affective vs. cognitive gap between the two concepts. Ahvenharju et al. (2018) also supports that by indicating that the components of FC need training and awareness to be fostered, making them less affective but rather cognitive.

The unexpected strong link Agency Beliefs and all types of Connectedness suggest a strong role of personal efficacy. Yolles (2024) posited that agency beliefs often stem from internal alignment as well as external stimuli, which would explain the relationship pattern with Connectedness and its subdimensions. Overall, the results of the study support the multidimensionality of connectedness as well as FC in psychological theory.

Strengths and Limitations

One crucial strength of this study is the novel exploration between two conceptually overlapping constructs that have not been researched beforehand. Additionally, the study hypothesizes potential relationships grounded in already well-established models and framework, while using already validated scales (FCS and WCS) which supports the construct validity. The analysis combined bivariate and multivariate methods, providing nuanced and stronger supported insights. Both the expected and the unexpected findings in this study enrich the theoretical understanding of the concepts and general futures thinking, shedding an additional light on

potential relationships. Additionally, the findings of this research can strongly contribute to future discussion and interventions on futures thinking.

Limitations to this study are the poor internal consistencies for the FCS subscales. This could have led to the items not properly measuring the intended subdimension, decreasing the significance of the observed relations and also potentially leading to other relations not being present. Moreover, the sample consisted of only university students of some kind. This limits the extent to which the findings and interpretations can be generalized to other populations. While the sample consisted of people with diverse backgrounds and nationalities, the broad majority of the participants had a western/western-European background. This may make it difficult to replicate similar results in different cultural contexts. Another limitation is the design of the study. Cross-sectional design prevents causal inferences. Moreover, several subscales and total scores showed deviations from normality. Therefore, the results should be interpreted with caution, even though analyses are usually robust to mild violations/deviations. Besides that, self-report measures may always yield the risk of being subject to response biases or social desirability.

Implications and Suggestions for Future Research

The findings of the study yielded several theoretical and practical implications. It supports a differentiated view of Connectedness and Futures Consciousness. It suggests that the concept of FC could potentially be enhance by adding a subdimension that focuses on the self. This could potentially allow for a stronger overlap between the constructs, leading to more thorough research in the field. Additionally, the study indicates the need for research on concepts such as personal efficacy as a possible mediator to potentially bridge present identity with future-thinking. Additionally, the study suggests a possible need for refinement of the existing models

by integrating motivational or emotional concepts such as internal clarity or nature-based belonging. Moreover, future theoretical implications could also focus on researching Connectedness to the World in a nature related domain as well as in a broader system relatedness domain, better resembling the item content of this subdimension

The study implies the need to integrate nature-based focus in order to foster ethical concern and responsibility towards the future. Moreover, potential programs and interventions should focus on enhancing personal agency to develop confidence and cultivate the perceived capability to tackle future issues. It also indicates that in fostering FC, internal connectedness and connectedness to the world may be more critical than social connections, highlighting the need for domain specific futures-thinking programs.

Based on these limitations, suggestions for future research are to use a larger and more diverse sample to confirm the findings of this study. Additionally, one could use longitudinal or experimental designs in order to clarify causal relationships between the variables. It is also suggested to investigate why social connectedness did not emerge as a predict FC and its dimensions as expected and hypothesized. Furthermore, one could consider using alternative or improved measures or scales for FC and connectedness, especially for the subscales with low reliability. Lastly, potential mediators or moderators should be explored to find more underlying relationship (e.g., well-being, life satisfaction, or demographics factors).

Conclusion

The aim of the present study was to clarify how Connectedness and its respective subdimensions relate to the concept of Futures Consciousness and its subdimensions. One key takeaway from this study is that FC can be related to how connected one feels with themselves,

others, and the world. Connectedness to the Self and to the World, specifically in regard to the natural world, seem to relate more strongly to agency and ethical concern. Additionally, it might show that emotional belonging relates to future actions and future engagement more than just cognitive awareness by itself. While additional potential moderators or mediators would have given more insights on predictions and directions, this study presented a meaningful overlap between Connectedness and FC in parts of the respective subdimensions. This leads to stronger clarity on the underlying similarities and differences in nature and raises the need for interventions to target aspects like internal clarity and connectedness to the natural environment. Overall, the findings of this study show that fostering certain parts of Connectedness might offer a key pathway in enhancing and strengthening meaningful interactions with the future.

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Appendix

R-Code

```
# ------------------------------------------------

# 1. Load Required Packages

# ------------------------------------------------

library(tidyverse)

library(psych)

library(GPArotation)

library(nFactors)

library(ggplot2)

library(apaTables)


# If standardized beta coefficients are needed:

# install.packages("lm.beta")

library(lm.beta)


# ------------------------------------------------

# 2. Load Cleaned Dataset

# ------------------------------------------------

df <- read.csv("FCS_WCS_97_CLEANED.csv")


# ------------------------------------------------

# 3. Reverse-Score Negatively Worded Items
```

```
# ------------------------------------------------
# FCS: Agency (QID46_12) and Systems (QID46_19)
df$QID46_12 <- 6 - df$QID46_12
df$QID46_19 <- 6 - df$QID46_19

# WCS: Reverse QID72_1, QID72_5, QID72_8, QID72_12, QID72_13 (scale 0-100)
reverse_wcs_items <- c("QID72_1", "QID72_5", "QID72_8", "QID72_12", "QID72_13")
df[reverse_wcs_items] <- 100 - df[reverse_wcs_items]

# ------------------------------------------------
# 4. Compute Subscale and Total Scores
# ------------------------------------------------
df <- df %>%
  mutate(
    # FCS Subscales
    FC_TimePerspective = rowMeans(select(., QID46_1, QID46_6, QID46_11, QID46_17),
          na.rm = TRUE),
    FC_Agency        = rowMeans(select(., QID46_2, QID46_7, QID46_12, QID46_18), na.rm =
          TRUE),
    FC_Openness      = rowMeans(select(., QID46_3, QID46_8, QID46_13), na.rm = TRUE),
    FC_Systems       = rowMeans(select(., QID46_4, QID46_14, QID46_19, QID46_20), na.rm
          = TRUE),
```

```
  FC_Concern       = rowMeans(select(., QID46_5, QID46_9, QID46_10, QID46_16,
      QID46_21), na.rm = TRUE),
  FC_Total         = rowMeans(select(., QID46_1:QID46_21)[, -15], na.rm = TRUE),  # Skips
      QID46_15
  # WCS Subscales
  WCS_Self         = rowMeans(select(., QID72_1:QID72_7), na.rm = TRUE),
  WCS_Social       = rowMeans(select(., QID72_8:QID72_14), na.rm = TRUE),
  WCS_Environment  = rowMeans(select(., QID72_15:QID72_21), na.rm = TRUE),
  WCS_Total        = rowMeans(select(., QID72_1:QID72_21), na.rm = TRUE)
)

# ------------------------------------------------
# 5. Reliability Analyses (Cronbach's Alpha)
# ------------------------------------------------
cat("FCS Subscales Reliability:\n")
alpha(df[, c("QID46_1",  "QID46_6",  "QID46_11", "QID46_17")])      # Time Perspective
alpha(df[, c("QID46_2",  "QID46_7",  "QID46_12", "QID46_18")])      # Agency
alpha(df[, c("QID46_3",  "QID46_8",  "QID46_13")])                  # Openness
alpha(df[, c("QID46_4",  "QID46_14", "QID46_19", "QID46_20")])      # Systems
alpha(df[, c("QID46_5",  "QID46_9",  "QID46_10", "QID46_16", "QID46_21")]) # Concern

cat("\nWCS Subscales Reliability:\n")
alpha(df[, paste0("QID72_", 1:7)])      # Self
```

```
alpha(df[, paste0("QID72_", 8:14)])     # Social
alpha(df[, paste0("QID72_", 15:21)])    # Environment


# ------------------------------------------------
# 6. Parallel Analysis (Factor Structure Check)
# ------------------------------------------------
fcs_items <- df[, c(paste0("QID46_", c(1:14, 16:21)))]
fa.parallel(fcs_items, fa = "fa")


# ------------------------------------------------
# 7. Descriptive Statistics & Correlations
# ------------------------------------------------
desc_vars <- df %>%
  select(WCS_Self, WCS_Social, WCS_Environment,
         FC_Total, FC_TimePerspective, FC_Agency,
         FC_Openness, FC_Systems, FC_Concern)

# Descriptive statistics
describe(desc_vars)

# Correlation matrix (with p-values)
cor_table <- corr.test(desc_vars)
round(cor_table$r, 2)     # Correlations
```

```
print(cor_table$p)        # p-values

# APA-formatted correlation table (optional, e.g., for appendix)
apa.cor.table(desc_vars, filename = "apa_correlation_table.doc")

# ------------------------------------------------
# 8. Normality Checks for Subscales and Totals
# ------------------------------------------------
normality_tests <- list(
  FC_Total          = shapiro.test(df$FC_Total),
  FC_TimePerspective = shapiro.test(df$FC_TimePerspective),
  FC_Agency         = shapiro.test(df$FC_Agency),
  FC_Openness       = shapiro.test(df$FC_Openness),
  FC_Systems        = shapiro.test(df$FC_Systems),
  FC_Concern        = shapiro.test(df$FC_Concern),
  WCS_Total         = shapiro.test(df$WCS_Total),
  WCS_Self          = shapiro.test(df$WCS_Self),
  WCS_Social        = shapiro.test(df$WCS_Social),
  WCS_Environment   = shapiro.test(df$WCS_Environment)
)

normality_summary <- sapply(normality_tests, function(x) c(W = round(x$statistic, 3), p =
          round(x$p.value, 4)))
```

```
normality_summary <- t(normality_summary)
print(normality_summary)

# Optional: Save normality results as data frame
normality_df <- data.frame(
  Variable = rownames(normality_summary),
  W = normality_summary[, "W"],
  p = normality_summary[, "p"]
)
print(normality_df)

# ------------------------------------------------
# 9. Regression Analyses (H1–H4c)
# ------------------------------------------------

# H1: FC_Total ~ WCS_Self + WCS_Social + WCS_Environment
summary(lm(FC_Total ~ WCS_Self + WCS_Social + WCS_Environment, data = df))

# H2a: FC_Total ~ WCS_Self
summary(lm(FC_Total ~ WCS_Self, data = df))

# H2b: FC_Openness ~ WCS_Self
summary(lm(FC_Openness ~ WCS_Self, data = df))
```

```
# H2c: FC_Agency ~ WCS_Self
summary(lm(FC_Agency ~ WCS_Self, data = df))

# H3a: FC_Total ~ WCS_Social
summary(lm(FC_Total ~ WCS_Social, data = df))

# H3b: FC_Concern ~ WCS_Social
summary(lm(FC_Concern ~ WCS_Social, data = df))

# H4a: FC_Total ~ WCS_Environment
summary(lm(FC_Total ~ WCS_Environment, data = df))

# H4b: FC_Concern ~ WCS_Environment
summary(lm(FC_Concern ~ WCS_Environment, data = df))

# H4c: FC_Systems ~ WCS_Environment
summary(lm(FC_Systems ~ WCS_Environment, data = df))
# ------------------------------------------------
# 10. Standardized Beta Coefficients for Each Hypothesis
# ------------------------------------------------
library(lm.beta)
```

```
# H1
model_h1 <- lm(FC_Total ~ WCS_Self + WCS_Social + WCS_Environment, data = df)
summary(lm.beta(model_h1))

# H2a
model_h2a <- lm(FC_Total ~ WCS_Self, data = df)
summary(lm.beta(model_h2a))

# H2b
model_h2b <- lm(FC_Openness ~ WCS_Self, data = df)
summary(lm.beta(model_h2b))

# H2c
model_h2c <- lm(FC_Agency ~ WCS_Self, data = df)
summary(lm.beta(model_h2c))

# H3a
model_h3a <- lm(FC_Total ~ WCS_Social, data = df)
summary(lm.beta(model_h3a))

# H3b
model_h3b <- lm(FC_Concern ~ WCS_Social, data = df)
summary(lm.beta(model_h3b))
```

```
# H4a
model_h4a <- lm(FC_Total ~ WCS_Environment, data = df)
summary(lm.beta(model_h4a))

# H4b
model_h4b <- lm(FC_Concern ~ WCS_Environment, data = df)
summary(lm.beta(model_h4b))

# H4c
model_h4c <- lm(FC_Systems ~ WCS_Environment, data = df)
summary(lm.beta(model_h4c))
```