How Do People See Their Future? – An Examination of Gender Differences in Futures Consciousness in Connection with Optimism and Compassion

Sara Rapp (2748088)

Department of Psychology, University of Twente

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First supervisor: Merlijn Koch

Second supervisor: Dr. Gerben Westerhof

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Abstract

Background. Fostering Futures Consciousness (FC) is important for addressing global challenges to facilitate well-being across generations. It involves understanding and preparing for the future and enhancing proactive behaviours. While women show higher FC levels, the underlying reasons for these gender differences remain unclear.

Aim. This academic exposition aims to explore and investigate how compassion and optimism mediate gender differences in FC among adults.

Methods. This study used a cross-sectional design with a quantitative questionnaire to investigate gender differences in FC and the mediating effects of compassion and optimism. The sample comprised 92 participants aged 18-72 years. Followingly, the data was analysed using descriptive statistics, reliability analysis, and mediation analysis.

Results. Results yielded no significant difference in FC between men and women. Furthermore, the mediation analysis revealed that optimism did not mediate gender differences in the agency beliefs dimension of FC, contradicting the hypothesis. Mediation analyses revealed that compassion significantly mediated gender differences in the concern for others dimension of FC.

Discussion. The findings suggest the importance of considering educational levels and age in future research to better understand gender differences in FC. Additionally, strengths, such as the use of validated measures, as well as methodological limitations including sample size and sampling method need to be considered. Practically, findings can aid in designing tailored interventions to enhance FC in each gender through the use of compassion and optimism, crucial for addressing global and societal challenges.

Keywords. Futures Consciousness (FC), optimism, compassion, gender differences, agency beliefs, concern for others, cross-sectional design

Introduction

In a world where we are faced with multiple challenges affecting the future, fostering an awareness about possible future scenarios is pivotal. It does not only influence our present actions but also lays the foundation for the well-being of current and future generations. Therefore, in this academic exposition, the concept of Future´s Consciousness (FC) will be defined and further investigated.

Future studies as a field of scientific research are considered important to understand an individual´s future imagination and to use findings to shape the future. There is a growing consensus that research about the future should be considered in various disciplines, such as sociology, psychology, and anthropology (Sools, 2020). Findings of future studies can for example be utilised in social sciences to shape the future and to understand individual´s future images for more effective social practices (Gergen, 2015, as cited in Sools, 2016; Mische, 2009, as cited in Sools, 2016). The importance of the relationship between the future and the present is stressed and the following goal is formulated: understanding future imagination and its influence on present cognition and behaviour (Sools, 2016). Related to this, Seligman et al. (2016) delved deep into the human ability, called "prospection" to foresee the future as a fundamental trait of humanity and culture. Prospection is the cognitive process of imagining and evaluating possible future scenarios and using them as a guide for decision-making and behaviour in the presence (Seligman et al., 2016). Moreover, the research found that the level of detail in the envisioned future images depends highly on the time horizon (Sools, 2016). More precisely, short-term futures are being imagined with greater precision and, related to prospection, greater precision is related to higher motivation to plan (Sools, 2016). Hence, future studies research an individual´s capacity to imagine the future and utilise these insights to influence forthcoming events.

Two related terms are especially used to study this individual´s capacity, "Futures Literacy" (FL) and FC. The UNESCO (2023) rather uses the term FL which can be described as the skill that aids people to understand the role of the future in their behaviour and perception. Related to FL, FC, as defined by Galtung (1982), is the awareness of possibilities, probabilities, and preferred outcomes in the future. Ahvenharju et al. (2018) define FL as a concept that prioritises enhancing the anticipatory abilities of both organisations and societies. Furthermore, they emphasise that FC, in contrast to FL, encompasses a broader spectrum of psychological processes beyond cognition, such as emotional and behavioural processes (Ahvenharju et al., 2018). The aim is to investigate this future awareness on an individual level including

psychological processes. Therefore, the term FC will be further used and this concept will be explained in more detail in the following.

Individuals with higher FC levels are enabled to think about and plan considering their future. FC is labelled as the individual´s capacity to understand, anticipate as well as prepare for the future (Lalot et al., 2020). Additionally, FC is enumerated as the action-oriented and dynamic viewpoint concerning the present, past, and future, along with their interconnections (Rubin, 2002, as cited in Ahvenharju et al., 2018). It allows individuals to adapt their current behaviour aimed at shaping the future (Ahvenharju et al., 2021). FC is seen as a combination of individual dispositions and the flexibility to situational changes, with the latter enabling individuals to practice their FC (Reuchlin, 1978, as cited in Ahvenharju et al., 2021). It is imperative to demarcate the term consciousness in this research paper (Ahvenharju et al., 2021). Ahvenharju et al. (2021) stress the importance of considering FC as a capacity rather than typically associating it with human consciousness, as is commonly used in cognitive psychology and neuropsychology. Subsequently, FC denotes an individual´s capacity to foresee, understand, and prepare themselves for future occurrences.

FC encompasses five dimensions. These are called: Time perspective, agency beliefs, openness to alternatives, systems perception and concern for others (Ahvenharju et al., 2021; Lalot et al., 2021). Definitions and related psychological concepts to each dimension are provided in Table 1 (Ahvenharju et al., 2021).

Table 1

The Five Dimensions of FC

	Definition	Psychological Constructs
Time perspective	Directing one´s attention towards the future and the capacity to envision the consequences of behaviours	Future orientation Consideration of Future Consequences
Agency beliefs	Believing in the effectiveness of one´s actions and the ease with which change can be accomplished	General Self-Efficacy Locus of Control Optimism
Openness to alternatives	One´s receptiveness to alternate futures and questioning existing truths	Openness to Experiences Critical Thinking
Systems perception	Thinking holistically and understanding the connectedness to the world, such as recognising that actions within one system can lead to consequences for another system	Systems Thinking Ecopsychological Self
Concern for others	Understanding the organism´s connectedness, motivation to enhance the world and identification with other people, despite physical and temporal distances	Self-Transcendence Values Identification with All Humanity

Ahvenharju et al. (2021) proposed in their paper one way to understand links between the dimensions. The authors were able to divide the dimensions into three blocks: One block consists of systems perception and concern for others, the second block shows a link between time perspective and agency beliefs, while the last block consists solely of openness to

alternatives and serves as a link between the other two blocks (Ahvenharju et al., 2021). Thus, FC adheres to a five-dimensional concept.

Possessing FC leads to a variety of desired consequences, such as more engagement with ecological and sustainable values. FC is believed to be reliant on "feedback loops", leading to individual learning by comparing one´s current situation with the desired one, resulting in behavioural adjustments (Locke & Latham, 2006, as cited in Ahvenharju et al., 2020; Seligman et al., 2013, as cited in Ahvenharju et al., 2020). Additionally, FC fosters creativity, innovation, and openness to solutions, enabling individuals to address pressing global challenges such as climate change, racism, pandemics, gender oppression etc. (UNESCO, 2023). Lalot et al. (2021) highlight the correlation between FC and future-oriented actions, such as reduced procrastination and increased pro-environmental behaviours, which contribute to societal benefits. Moreover, individuals can envision future scenarios as predetermined or flexible, with both options not opposing each other (Mische, 2009, as cited in Sools, 2020). This uncertainty allows individuals to possess goals but remain advantageously receptive to future possibilities and paths rather than controlling them (Sools, 2020). Accordingly, possessing FC is essential for individuals to envision the society´s and environment´s future and to develop according to values, making this investigation relevant.

Women possess higher FC levels than men. Ahvenharju et al. (2021) stress the individual differences in the manifestation and progression of FC. According to research, people with higher age and education demonstrate higher levels of FC (Ahvenharju et al., 2021; Lalot et al., 2021). Importantly, research also yielded higher levels of FC in women than in men and the authors also accentuate the need to investigate this relationship further as the reasons for gender differences remain unclear (Ahvenharju et al., 2021; Lalot et al., 2021). Regarding this, Ahvenharju et al. (2021) offer an illustration wherein one could explore whether the higher FC levels in women than in men arise from fixed, inherent individual factors, e.g. some biological or hormonal elements associated with sex, or from psychological or sociological factors that co-occur with gender. As it is essential to fully understand people´s FC and their variabilities, further research that gives more light on possible third variables influencing the found relationships, e.g. between FC and gender, is needed (Ahvenharju et al., 2021; Lalot et al., 2021). For instance, findings could be used to understand to which extent FC can be trained and to understand the most important factors in developing FC in different groups, such as men and women. This could help in designing efficient social practices based on the individual´s characteristics and shape their environment to foster the development of FC. Furthermore, the research could help in understanding whether different characteristics might prevail for

different dimensions of FC, which, again, can be used to increase one´s FC by focusing on the essential dimensions in practice. In short, women possess higher FC levels than men and investigating this relationship can aid in developing efficient ways to increase FC levels.

Research yielded higher levels of optimism in women than in men. Optimism can be described as a mindset where one anticipates favourable outcomes and tends to believe that positive events are more likely to occur than negative ones (Ahvenharju et al., 2021). Furthermore, optimism is enumerated as the strong belief that our actions have a sufficient influence on the future outcome (Ahvenharju et al., 2021). It can also be defined as a dispositional trait that influences the relationship between external factors and how the person interprets them (Seligman & Csikszentmihalyi, 2000). Higher levels of optimism are associated with better physical well-being, success and prevention of illnesses (Ahvenharju et al., 2021). Considering that optimism relates to believing in one´s action´s effectiveness, this concept is associated with the dimension of agency beliefs suggesting that higher levels of optimism are related to higher levels of FC. However, this relationship with agency beliefs is far from simple (Ahvenharju et al., 2021). In some situations, optimism can also lead to undesired outcomes, such as little behaviour change or apathy (Ahvenharju et al., 2021). For example, people with high levels of optimism may not show desired behaviour as they believe positive outcomes will occur regardless of their behaviour, increasing apathy. Nevertheless, higher optimism levels are expected to be related to higher FC levels. Researchers have not only found higher levels of FC in women, but also they found that women are generally more optimistic (Yue et al., 2017). Hence, further research aims to investigate gender differences in optimism and its connection to gender differences in FC, assuming that optimism is associated with agency beliefs.

Similarly, higher levels of compassion in women can be associated with higher levels of FC in women, considering that compassion belongs to the dimension of concern for others. The dimension of concern for others emphasizing the interconnectedness of several societal and environmental systems is believed to include self-transcendence values (Ahvenharju et al., 2021). These are enumerated as the motivation to improve the society´s and the environment´s situation or setting, e.g. showing altruistic behaviour (Ahvenharju et al., 2021). According to research, the possession of self-transcendence values is associated with compassion, which is elucidated as caring about others and being motivated to alleviate their suffering or improve their situation (Tamir et al., 2016). In contrast to empathy, compassion encompasses feeling for other people instead of feeling with them (Singer & Klimecki, 2014). This implies that a person shows empathy if they feel the other person´s feelings, but shows compassion if they do not confuse their feelings with another person´s feelings (Singer & Klimecki, 2014). Based on the

definition of Singer and Klimecki (2014), compassion is therefore deemed as being comprised in the dimension of concern for others of FC. Given the necessity for deeper investigation of gender differences in FC, it is essential to emphasise that research has also uncovered higher scores in compassion for others in women than in men (McDonald & Kanske, 2023; Salazar, 2015; Strauss et al., 2016; Yarnell, 2015). It is declared that higher compassion in women is an emotion originating from evolution (Goetz et al. 2010). Subsequently, findings are congruent in women possessing higher levels of compassion and FC.

It is essential to look into the relation of compassion as well as optimism and FC across men and women. So far, the underlying concepts related to gender differences in FC are unclear. Exploring these concepts makes an efficient design of practices possible. For example, if men only score lower on FC because their compassion level is low, it might be helpful to target their compassion levels to enhance FC levels. Hence, different groups might need different support to develop a higher FC. So far, the five-dimensional scale including several psychological concepts was developed to measure FC and to find relationships between FC and other factors (Ahvenharju et al., 2021; Lalot et al., 2021). With this scale, research has yielded gender differences in FC levels, with women scoring on average higher on FC than men (Ahvenharju et al., 2021). Ahvenharju et al. (2021) stress the importance of further exploring the gender differences of FC as little is known about the nature of this relationship. Furthermore, it is known that women score higher on compassion, belonging to the dimension of concern for others, and that women score higher on optimism, related to agency beliefs (Ahvenharju et al., 2018, Ahvenharju et al., 2021). However, no study to date has compared the relationships between compassion or optimism and FC levels in each gender group, females and males. Gaining knowledge about what influences FC levels in men and females can be useful to understanding these relationships and to facilitate efficient practising of FC.

This study will investigate to what extent levels of compassion and optimism mediate gender differences in FC. Hence, the research question is stated as follows: "To what extent are compassion and optimism associated with gender differences in FC among adults?". To answer the research question seven hypotheses were formulated:

1. Women have a significantly higher level of FC than men.
2. Women have a significantly higher level of optimism than men.
3. Women have a significantly higher level of compassion than men.
4. FC, in particular the dimension of agency beliefs, correlates positively with optimism.
5. FC, in particular the dimension of concern for others, correlates positively with compassion.

6. Optimism mediates gender differences in FC, in particular in the dimension of agency.

7. Compassion mediates gender differences in FC, in particular the dimension of concern for others.

Methods

Design

This study was part of a larger collaborative research project. All data were collected with one survey instrument but each research team used different parts of the survey to gain the relevant data for their research question. Regarding the design, a cross-sectional study with a quantitative questionnaire was chosen. The aim was to investigate the relationship between gender differences in FC and the variables of compassion as well as optimism in a Dutch sample. The BMS Ethics Committee of the University of Twente approved this research (request number: 240209).

Participants

In this sample, inclusion requirements for participation were proficiency in the Dutch language and a minimum age of 18 years. This study comprised a sample of 92 participants aged 18 to 72 (see Table 2). The majority of the participants were Dutch and female. Regarding the educational level, the two most reported educational levels were the Master's (HBO/ WO) degree and the Bachelor's (HBO/ WO) degree. The majority of the sample were employees, followed by full-time students. The study programmes of participants were for example psychology, communication science and electrical engineering. Furthermore, given universities were the Avans University in Breda, the University of Groningen, the University of Technology in Delft and the University of Twente in Enschede.

Table 2

Descriptive Statistics of the Demographics

	N	%	M	SD
Age			43.0	16.0
Gender				
Female	54	58.70		
Male	36	39.13		
Non-binary	2	2.17		
Prefer not to say	0	0.00		
Nationality				
Dutch	84	91.30		
German	5	5.43		
Other	3	3.26		
Educational Level				
No diploma	0	0.00		
Primary education	3	3.20		
VMBO	1	1.08		
HAVO	4	4.35		
VWO	11	11.96		
MBO	6	6.52		
Bachelor (HBO/ WO)	18	19.57		
Master (HBO/ WO)	43	46.74		
Doctor, PhD	6	6.52		
Profession				
Part-time student	1	1.01		
Full-time student	14	15.22		
Employee	66	71.74		
Other	11	11.96		

Note. Total *N* = 92; Mean (*M*); Standard Deviation (*SD*).

Materials

The study was conducted through Qualtrics, an online survey platform (BMS DataLab, 2024). Therefore, a technical device with internet access was required to participate in the study. The study comprised a cross-sectional study, including the consent form, the demographic questionnaire, the Compassion Scale (CS), the questionnaire for the assessment of Personal

Optimism and Social Optimism - Extended (POSO-E) and the Futures Consciousness Scale (FCS). In the demographic questionnaire, participants were asked about their age, nationality, identified gender, highest educational level and profession. To answer the question about the identified gender, four answering options were given: male, female, non-binary, and prefer not to say. If participants indicated to be a student, they were further asked about their study programme and their university. In the following, the aforementioned scales will be described in more detail.

Futures Consciousness Scale (FCS)

Individual differences in FC levels were assessed with the FCS. The FCS, a psychometric instrument with 20 items grounded on five dimensions, was developed to measure FC on a 5-point Likert scale (1 = "not at all like me" and 5 = "very much like me") (Ahvenharju et al., 2021; Lalot et al., 2021;). The scale was published in 2019, revised in 2021, showed sufficient reliability as well as internal and external validity, and can be applied in various global settings and on student as well as non-student samples (Lalot et al., 2020, Lalot et al., 2021). For this study, the FCS was translated into Dutch with the research group using the backward translation method (see Appendix A). To compute FC scores, items 6, 7 and 12 were reverse-coded. The overall FC score was calculated by taking the mean of all items. Furthermore, the scores for each dimension were calculated by taking the mean of only the items belonging to that dimension (time perspective: items 1-4, agency beliefs: items 5-8, openness to alternatives: items 9-12, systems perception: items 13-16 and concern for others: items 17-20). The Dutch FC questionnaire had reliability of $\alpha = .81$ and the reliability of the dimensions of time perspective, agency beliefs, openness to alternatives, systems perception and concern for others ranged from $\alpha = .70$ to $\alpha = .79$. In contrast, the dimension agency beliefs had low reliability ($\alpha = .18$). A factor analysis using the minimum residual method with varimax rotation showed that the five factors represent the data adequately with an explained variance of 48% and an RMSR of .04. Generally, items correlated with the factors. However, one item measuring time perspective, two items belonging to agency beliefs, one item of openness to alternatives and one item of systems perception did not load on the expected factor.

Personal Optimism and Social Optimism - Extended (POSO-E)

The POSO-E were utilised to assess the participants´ optimism with two subscales, namely personal optimism and self-efficacy optimism (Gavrilov-Jerković et al., 2014). The 9-item questionnaire was translated into Dutch with the backward translation method by the research group. Participants were asked to answer these items on a 4-point Likert scale (0 = completely incorrect, 3 = completely correct) (see Appendix B). Items 4, 5, 7, and 9 reflected

personal optimism while items 1, 2, 3, 6, and 8 reflected self-efficacy optimism (Gavrilov-Jerković et al., 2014). The scale showed acceptable reliability for personal optimism (α = .78) and good reliability for self-efficacy optimism (α = .82). Furthermore, adequate concurrent and convergent validity of the shortened scale was found (Gavrilov-Jerković et al., 2014). To compute the POSO-E score, the mean was calculated after items 5 and 7 were reverse-coded. A Cronbachs Alpha of $α = .71$ was found for the POSO-E, the Cronbachs Alpha for the scale of personal optimism is $α = .80$ and for self-efficacy optimism $α = .82$. The two-factor model adequately explained the data structure in the Dutch POSO-E with an explained variance of 52% and an RSMR of .03. Generally, the items correlated with the factors, however, one item related to the personal optimism scale did not load on the expected factor.

Compassion Scale (CS)

To assess the participants´ compassion levels, they were asked to answer the CS (Pommier et al., 2020). The scale was similar to the FCS translated into Dutch by the research group with the backward translation method (see Appendix C). 16 items were answered on a 5-point scale from 1 = "almost never" to 5 "almost always". To get more intuitive responses, the answering options for responses 2, 3, and 4 were left open-ended (Pommier et al., 2020). Compassion was measured along four dimensions kindness, common humanity, mindfulness items and indifference items. Regarding the computation of compassion scores, a grand mean of all items needed to be calculated after items 3, 7, 11, and 15 were reverse-coded. The compassion scale showed strong psychometric properties. Pommier et al. (2020) emphasise sufficient evidence for content, construct, divergent, convergent, and known-groups validity as well as good reliability. In this sample, a reliability value of $α = .86$ was found for the CS. Regarding the reliability of each dimension, the following Cronbachs Alpha were found: $α = .78$ for kindness, $α = .59$ for common humanity, $α = .69$ for mindfulness and $α = .73$ for indifference. A sufficient four-factor model fit was found as the explained variance is 49% and the RSMR is .04. The items loaded on the expected factors, however, two items related to kindness and one item related to common humanity did not load on the expected factors.

Procedure

Participants were recruited with the convenience sampling method through the researchers´ and the supervisors´ social network, including family, friends, colleagues and students. Due to this, participants from several cities and different age groups were reached. Study details including a brief description, the aim and the Qualtrics link (BMS DataLab, 2024) were published on social media platforms as well as on SONA, an online experiment management system (Sona Systems, 2024), and the Microsoft Teams´ teacher´s platform of

Avans University of Applied Sciences (Microsoft, 2024). Participation was unpaid, but participants recruited with the SONA System received 0.25 SONA credits in return for their participation. After clicking on the link, the participants were provided with more detailed general information about the study including the study´s goal, procedure, data handling and contact information. Participants were also informed that they could withdraw from the study at any time without justification or explanation. Next, the participants signed the informed consent form before their participation. Followingly, participants answered the demographic questionnaire. Furthermore, participants were asked to fill out the FCS, the POSO-E, and the CS. Finally, participants were informed about the end of the survey and were again given the researchers´ contact information for remarks or questions.

Data Analysis

The dataset was exported from Qualtrics and transformed into a .sav file to make it suitable for the software R version 4.3.3 used for statistical analyses. Before all computations, participants who did not meet the inclusion requirements were removed from the sample. Furthermore, the statistical assumptions of normality, linearity, independence, and equal variance were tested.

Followingly, the means of FC, compassion and optimism for both groups male and female were computed. This was essential to test the first hypothesis "Women have a significantly higher level of FC than men", the second hypothesis "Women have a significantly higher level of optimism than men" and the third hypothesis "Women have a significantly higher level of compassion than men" with the Welch´s t-test. In addition, the means and standard deviations of the five FC dimensions were also calculated for each group to check the assumption that the dimensions of agency beliefs and concern for others show gender differences in FC levels.

Next, correlations between the FC subscales and optimism as well as compassion were calculated. This was essential to test the fourth hypothesis "FC, in particular the dimension of agency beliefs, correlates positively with optimism" and the fifth hypothesis "FC, in particular the dimension of concern for others, correlates positively with compassion". Correlation coefficients were interpreted according to Mukaka (2012) (Table 3).

Table 3

Interpreting the Size of a Correlation Coefficient

Size of Correlation	Interpretation
.90 to 1.00 (-.90 to -1.00)	Very high positive (negative) correlation
.70 to .90 (-.70 to -.90)	High positive (negative) correlation
.50 to .70 (-.50 to -.70)	Moderate positive (negative) correlation
.30 to .50 (-.30 to -.50)	Low positive (negative) correlation
.00 to .30 (-.00 to -.30)	Negligible correlation

Note. Adapted from "A guide to appropriate use of correlation coefficient in medical research" by M. Mukaka, 2012, *Malawi Medical Journal: The Journal of Medical Association of Malawi*, 24(3), pp. 69–71.

Last, mediation analyses using PROCESS macro (Model 4) by Preacher & Hayes were conducted to test the relationship between the independent variable gender, the dependent variable FC levels, in particular agency beliefs and concern for others, and the mediator variables compassion and optimism (Hayes, 2022). The significance values on each path of the variables were calculated. The A-path regarded the relationship between the independent variable, gender, and the mediator variables, optimism or compassion. The B-path showed the relationship between the mediator variables and the dependent variables, agency beliefs or concern for others. Last, the C′-path showed the direct effect of the independent variable, gender, on the dependent variables agency beliefs or concern for others. With this, the sixth hypothesis "Optimism mediates gender differences in FC, in particular in the dimension of agency" and the seventh hypothesis "Compassion mediates gender differences in FC, in particular the dimension of concern for others" were tested. To test these relationships for mediation, bootstrap confidence intervals were used: If zero was not included in that interval, the indirect effect was significant, showing a mediator effect (Hayes, 2022). To answer all hypotheses a p-value of .05 was chosen.

Results

Assumption Testing

The statistical assumptions of normality, linearity, homoscedasticity and independence were tested. To test the normality assumption the Shapiro-Wilk Test was used. The p-values for FCS ($p = .43$), POSO-E ($p = .22$), and CS ($p = .17$) suggest that the assumption of normality was not violated.

To test linearity, boxplots, scatterplots and partial residual plots were used (see Appendix D). Looking at the boxplots, a clear difference in the median in the two groups, male

and female, was found for the variables FC and compassion, but not for optimism. Furthermore, the scatterplots showing FC against optimism and FC against compassion, revealed a strong deviation from the straight line for optimism as well as for compassion, supporting a violation of the linearity assumption, especially for the optimism variable. Last, partial residual plots were further used to test the linearity assumption. For optimism, the scatter plot did not follow the desired linear pattern and the line showed a curved pattern. For the mediator variable compassion, a curved pattern was also found in the partial residual plot. Overall, the linearity assumption was violated, especially for the variable optimism.

Next, homoscedasticity was tested with Levene´s test. For the dependent variable FC a p-value of $p = .16$ was found. For the variable optimism, a p-value of $p = .07$ and for compassion, a p-value of $p = .31$ was found. Therefore the assumption of homoscedasticity held.

To test the assumption of independence the Durbin-Watson test was used. For the variable optimism, a Durbin-Watson value of 1.88 was found. For the variable compassion, a Durbin-Watson value of 2.17 was found. The Durbin-Watson value for FC mediated by optimism is 1.88 and for FC mediated by compassion is 2.17. Given the acceptable range of 1.5 to 2.50, the assumption of independence was not violated (SAP Library, 2016).

Conclusively, the assumptions of normality, homoscedasticity and independence were not violated. However, the linearity assumption was especially for optimism violated. Therefore, Spearman´s rho and Pearson´s correlation coefficients were compared to check differences in the dataset with the violated assumption of linearity.

Descriptive Statistics of the Questionnaires

Descriptives of the scales including subscales per gender group were calculated and Welch´s t-test was used to test the hypotheses (see Table 4).

Table 4

Mean and Standard Deviations of the Scales and Subscales for Females and Males and Results of the Welch´s Two Sample t-test

	female	male	α	t	df	95% CI min	95% CI max	p
FC			.81	1.50	82.26	-0.04	0.32	.14
M	3.8	3.6						
SD	1.0	1.0						
Time perspective			.70	-0.57	81.71	-0.23	0.13	.57
M	3.9	3.8						
SD	0.8	0.9						
Agency beliefs			.18	-0.36	74.59	-0.21	0.14	.72
M	3.3	3.3						
SD	1.0	1.0						
Openness to alternatives			.70	1.00	77.79	-0.11	-0.33	.32
M	3.7	3.8						
SD	1.1	1.0						
Systems perception			.74	-1.05	81.50	-0.34	0.11	.30
M	4.0	3.9						
SD	1.1	1.1						
Concern for others			.79	-3.69	68.02	-0.89	-0.26	< .001
M	4.1	3.5						
SD	0.9	1.0						
Optimism			.71	-.49	67.28	-0.21	0.13	.71
M	1.9	1.9						
SD	0.8	0.9						
Compassion			.86	3.67	67.4	0.18	0.6	< .001
M	4.1	3.8						
SD	0.9	1.0						

Note. Mean (*M*); Standard Deviation (*SD*); Cronbachs Alpha (*α*); Test statistic (*t*); Degrees of Freedom (*df*); Confidence Interval (*CI*), p-value (*p*).

Hypothesis 1

With this, the first hypothesis "Women have a significantly higher level of FC than men" could be answered. Due to no significant gender differences, the hypothesis was rejected. Importantly, a significant difference in gender differences was found in the dimension concern for others with women scoring higher than men. There were no significant gender differences found in the other dimensions of FC.

Hypothesis 2

Next, the second hypothesis "Women have a significantly higher level of optimism than men" was tested. Insignificant gender differences in optimism were found. Hence, the second hypothesis was rejected.

Hypothesis 3

For the third hypothesis "Women have a significantly higher level of compassion than men", the Welch´s t-test revealed significant gender differences in compassion. With these results, there was sufficient evidence to conclude that women scored higher on compassion than men. The hypothesis was accepted.

Correlations of the FC Dimensions and Optimism and Compassion

As seen in Table 5, correlations between each FC dimension and optimism and compassion were calculated. Additionally, Spearman´s rho was calculated to compare the values with Pearson´s correlation coefficients and the results revealed only small differences (see Appendix E). Due to their ease of interpretation, Pearson´s correlation coefficients were presented in this context.

Table 5

Correlations of the FC Dimensions and Optimism and Compassion

	Optimism	Compassion
	r	r
Time perspective	.19	.36***
Agency beliefs	.39***	-.01
Openness to alternatives	.20	.34***
Systems perception	.05	.37***
Concern for others	-.03	.65***

Note. Correlation *(r)*; p-value (*p*).

* $p < .05$. ** $p < .01$. *** $p < .001$.

Hypothesis 4

Next, the fourth hypothesis "FC, in particular the dimension of agency beliefs, correlates positively with optimism" was tested (see Table 5). The analysis yielded a significant, low positive correlation between the dimension of agency beliefs and optimism (Mukaka, 2012). Regarding the correlation between other dimensions of FC and optimism, no significant correlations were found. Therefore, the hypothesis was accepted.

Hypothesis 5

Followingly, the fifth hypothesis "FC, in particular, the dimension of concern for others correlates positively with compassion" was tested. As seen in Table 5, a significant and moderate positive correlation between concern for others and compassion was found (Mukaka, 2012). The other dimensions of FC, except agency beliefs, were also found to correlate significantly with compassion, however, compassion and concern for others had the highest correlation. Hence, the fifth hypothesis was accepted.

Mediation Analysis for the Mediator Variable Optimism

Hypothesis 6

To test the sixth hypothesis "Optimism mediates gender differences in FC, in particular, in the dimension of agency", a mediation analysis was undertaken (see Table 6) (Hayes, 2022). There was neither a significant effect of the A-path nor the C-path. However, a significant effect was found in the B-path. Contradicting the hypothesis, there was no significant indirect effect found, as the analysis revealed a bootstrap confidence interval that included zero (95% CI [-0.04, 0.07]).

Table 6

Results of the Mediation Analysis with Optimism as the Mediator Variable

Path	Variables	*b*
A	Gender - Optimism	0.04
B	Optimism – Agency beliefs	0.25*
C′	Gender - Agency beliefs	0.13

Note. Unstandardised regression coefficient (*b*); p-value (*p*).

* $p < .05$. ** $p < .01$. *** $p < .001$.

Mediation Analysis for the Mediator Variable Compassion

Hypothesis 7

Similarly, the seventh hypothesis "Compassion mediates gender differences in FC, in particular, the dimension of concern for others" was tested with the mediation analysis (see Table 7) (Hayes, 2022). A significant effect was found on the A- and B-path but not on the C-

path. Most importantly, the confidence interval did not include zero, indicating a significant indirect effect, which supported the hypothesis (95% CI [0.08, 0.31]).

Table 7

Results of the Mediation Analysis with Compassion as the Mediator Variable

Path	Variables	*b*
A	Gender - Compassion	0.39***
B	Compassion – Concern for others	0.48***
C′	Gender – Concern for others	-0.05

Note. Unstandardised regression coefficient (*b*); p-value (*p*).

* $p < .05$. ** $p < .01$. *** $p < .001$.

Discussion

Summary of Findings

This thesis aimed to explore the relationship between the independent variable gender (male and female), the mediator variables optimism and compassion and the dependent variable FC, more specifically, its dimensions of agency beliefs and concern for others. Several hypotheses were formulated to test this relationship: The first hypothesis "Women have a significantly higher level of FC than men" was rejected due to insignificant gender differences in FC scores. Regarding optimism, the second hypothesis "Women have a significantly higher level of optimism than men" was also rejected. However, optimism was found to be significantly correlated with agency beliefs but not with other FC dimensions, which led to accepting the fourth hypothesis "FC, in particular, the dimension of agency beliefs correlates positively with optimism". Finally, the sixth hypothesis "Optimism mediates gender differences in FC, in particular in the dimension of agency" was rejected. Regarding compassion, the seventh hypothesis "Compassion mediates gender differences in FC, in particular the dimension of concern for others" was accepted. Additionally, the third hypothesis "Women have a significantly higher level of compassion than men" and the fifth hypothesis "FC, in particular the dimension of concern for others, correlates positively with compassion" were confirmed. Importantly, other dimensions of FC, except agency beliefs, were also found to significantly correlate with compassion, but the highest correlation was found between compassion and concern for others. Conclusively, a mediator effect was found for compassion but not for optimism.

Interpretation

Research yielded higher levels of FC in women than in men (Ahvenharju et al., 2021; Lalot et al., 2021). This contrasts the findings of this research paper, as there were no significant gender differences in FC levels found, but women had significantly higher levels of concern for others. Insignificant gender differences in FC can be explained by taking into account the participants´ educational levels. Almost half of the participants from this sample reported having a Master´s (HBO/ WO) degree and additionally, almost 20% reported having a Bachelor´s degree (HBO/ WO), indicating a high educational level of this sample. Importantly, the levels of psychological constructs mentioned in FC are affected by education (Ahvenharju et al., 2021; Lalot et al., 2020). For example, research has found enhanced critical thinking levels, related to the dimension of openness to alternatives, in educated participants, influencing FC levels (Arslan & Demirtas, 2016, as cited in Ahvenharju et al., 2021). Additionally, highly educated people are more likely to engage in systemic thinking, included in the dimension of systems perception (Thibodeau et al., 2016, as cited in Ahvenharju et al., 2021). However, taking gender differences in FC into account, no study to date has investigated the relationship between gender differences in FC and education levels. Hence, a plausible explanation of how varying levels of education might influence gender differences in FC will be provided. With the educational level being a significant indicator of FC levels and the high educational level of this sample, gender differences might not be present in a sample with high educational levels. This indicates a possible moderating effect of educational levels on gender differences and FC levels.

Although insignificant gender differences were found in overall FC levels, women had higher levels in the dimension of concern for others, as expected. Thus, educational levels may not affect the relationship between gender and concern for others levels, but the relationship between gender and other dimensions of FC. This would explain nonsignificant gender differences of FC in a higher educated sample and higher concern for others levels in women, aligning with current research despite the high educational level. Furthermore, there were no significant gender differences found in the dimension agency beliefs. Similarly, educational levels due to their large impact on FC levels can have an impact on agency beliefs. Importantly, findings related to agency beliefs have to be interpreted carefully. Reliability analysis of agency beliefs resulted in a low reliability value for this dimension, which could have also influenced the relationship between gender and agency beliefs. Hence, a significant gender difference in FC levels and encompassing dimensions, except concern for others, might not be found due to educational levels, diminishing the effect of gender on FC levels.

Mediator Effects of Optimism on the Relationship between Gender and Agency Beliefs

First, no significant gender difference in optimism levels was found, contrary to current research which states that women tend to be more optimistic than men (Yue et al., 2017). Looking into the sample characteristics of Yue et al. (2017) revealed a possible explanation for this. A sample of 5648 undergraduates aged 17 to 29 was used to find higher optimism in women than in men. Hence, educational level as well as age differed in this study´s sample and the sample of Yue et al. (2017), giving contrary findings. Educational level and age influencing optimism levels are supported by research conducted by Bharti & Rangnekar (2019), who found high levels of optimism in middle-aged employees compared to younger employees. They, however, found middle-aged men to be more optimistic than middle-aged women and higher optimism levels in young women, with the latter findings supporting the research of Yue et al. (2017). Educational level as well as age could both moderate the relationship between gender and optimism. For instance, higher age and higher educational levels can affect gender differences in optimism, resulting in women and men possessing similar optimism levels in later life stages. This elucidates the discrepancy between the findings of this thesis and those of current research. Generally, there is a consensus about the complex interplay of optimism, educational levels, gender and age, highlighting the need for further research, that includes these variables.

Due to insignificant gender differences in optimism levels and agency beliefs, there was no mediating effect of optimism found. Therefore, interpreting the results focuses on the relationship between optimism and agency beliefs. Ahvenharju et al. (2021) stress that optimism can have a positive effect on agency beliefs, but they also emphasise the possible complex relationship between optimism and agency beliefs. In this sample, a low positive correlation between the dimension agency beliefs and optimism was found, supporting research findings. In summary, no significant gender differences in optimism as well as in agency beliefs and no mediating effect of optimism on the relationship between gender and agency beliefs were found. However, optimism was found to significantly correlate with agency beliefs.

Mediator Effects of Compassion on the Relationship between Gender and Concern for Others

Gender was found to be related to compassion significantly and compassion was found to significantly relate to the dimension of concern for others. Furthermore, women had significantly higher compassion levels than men. This is in line with research that yielded higher compassion scores in women (McDonald & Kanske, 2023; Salazar, 2015; Strauss et al., 2016;

Yarnell, 2015). Importantly, women had higher levels of concern for others, but the relation between gender and concern for others was no longer significant when compassion was taken into account, indicating a full mediation. Overall, compassion was found to be a significant mediator in the relationship between compassion and concern for others in this sample.

Strengths and Limitations

Critically assessing this study reveals strengths and limitations that need to be considered in future research. One strength of this study is the use of multiple, validated instruments, namely the FCS, the POSO-E and the CS. This way reliable and well-established measures are utilized to investigate the relationships between the variables. These scales were translated into Dutch with the Backward Translation Method to facilitate reliability and validity. Although low reliability was calculated for the dimension of agency beliefs, this is still considered a strength of the study.

Nonetheless, the limitations need to be acknowledged. Except for agency beliefs, the factor analysis and reliability analysis showed sufficient psychometric characteristics. However, according to the factor analysis a few items of the FCS, one item of the POSO-E and two items of the CS can be further revised to achieve even higher reliability and validity values. According to some participants, some items of the survey were not relatable to their daily experiences or difficult to understand. Misunderstanding an item or answering randomly can have an impact on the results. To guarantee honest and accurate answers in the Dutch questionnaire, participants should be given the option to provide feedback so that according items can be revised.

Next, utilizing the convenience sampling method can be considered as a limitation. As the researcher´s social network was used to recruit participants, the results were not representative of the broader population. Initially, the study aimed to recruit participants proficient in the Dutch language, encompassing a diverse range of educational levels, ages, and professions, as well as covering both genders, male and female. However, this sample comprised participants with high educational attainment, as the majority held either a Master´s (HBO/ WO) or a Bachelor´s degree (HBO/ WO). Given that educational level influences FC levels, this factor could have influenced the results of the thesis (Ahvenharju et al., 2021). Furthermore, more than two-thirds of the sample were employees, followed by full-time students. The homogeneity in the study programs and universities of the students in this sample supports the limited representativeness of the sample. Hence, to get a heterogenous sample a different sampling method might be advantageous.

Future Research and Implication for Practice

Considering the findings, as well as the strengths and limitations several implications for future research should be considered. Most importantly, future studies need to delve deeper into investigating the effects of educational levels and age on gender differences in FC levels, considering optimism and compassion. For acting against global challenges all humankind needs to be included, therefore, taking into account age, different educational levels and their impact on gender differences in FC is pivotal. Future studies need to inquire about gender differences in FC and possible third variables in more heterogeneous groups, e.g. with lower educational levels or different age groups. For this, a different sampling method, such as stratified random sampling or cluster sampling, and a larger sample size can provide a more representative sample for the wider population.

Additionally, the Dutch questionnaires need to be further tested with participants to guarantee understanding from participants. This testing needs to include feedback from participants to gather information on where participants experience difficulties in answering the items to be able to revise items accordingly. Although overall sufficient reliability and validity values were achieved, some items need to be further tested. The factor analysis revealed that a few items of the FCS, one item of the POSO-E and two items of the CS could be revised to achieve even higher validity and reliability values. This is especially important to work on the low-reliability score of agency beliefs. Regarding optimism, future studies need to explore the complex relationship between optimism and agency beliefs, considering the variables, gender, age and educational level. In doing so, researchers need to consider the two subscales of the POSO-E, personal optimism and self-efficacy optimism to test this relationship in more depth. This also aids in achieving higher reliability and validity values. As this paper revealed a significant mediating effect of compassion, further research needs to investigate this relationship on a wider, more heterogenous sample, to check if compassion is indeed a mediator.

Research findings can be used in a variety of settings. First, findings can be utilized to continuously improve Dutch measurement tools to assess FC, optimism and compassion levels in the Dutch population. Additionally, future studies can aid in designing effective practices to increase FC scores in each gender group. Tailored interventions and gender-specific workshops can be developed, considering the need of each group to achieve higher FC by focusing on compassion or optimism. For instance, with compassion mediating the relationship between gender and concern for others, interventions for men can focus on compassion to enhance FC levels. Regarding optimism, research findings can be used to develop and implement

workshops or training programs that specifically focus on fostering optimism skills across various demographic groups. If, for example, optimism was found to be a mediator variable for gender differences in FC and women are found to be more optimistic in populations of lower age and lower educational levels, interventions tailored to this population need to include optimism to enhance FC levels. Hence, practices can be designed specifically for various groups of educational levels, genders or ages. Different sectors can be included to implement these practices. Interventions can take place in healthcare institutions, working environments or educational settings, such as schools or universities. Furthermore, policies can support the implementation of interventions by providing funding and creating regulations, that, for instance, guarantee a high quality of practices and fair access to these interventions. In summary, advancing research on the given relationships holds promise for designing tailored interventions to promote positive societal and global outcomes.

Conclusion

Conclusively, this thesis has contributed valuable insights into the complex interplay between gender, optimism, compassion, and FC, particularly its dimensions of agency beliefs and concern for others. No significant gender differences were found in overall FC, however, optimism correlated positively with agency beliefs, and compassion emerged as a significant mediator in the relationship between gender and concern for others. The findings underscore the influence of educational levels and age on these relationships, suggesting a need for future research that includes diverse samples. Moreover, the strengths of using validated instruments and the study´s limitations yielded several implications for further research. Then, findings aid in designing interventions tailored to specific demographics, such as gender or age, using compassion and optimism to enhance FC. These interventions can be implemented across various settings including healthcare, workplaces, and educational institutions. Ultimately, continuing with this research promises to deepen our understanding of gender differences in FC and related concepts. This offers pathways for fostering compassion and optimism as catalysts for positive societal change.

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Appendix A

FCS Translation

Table A1

FCS Item Translation from English into Dutch

Item number	Original Scale Items English	Dutch Translation
1	I think about the consequences before I do something.	Ik denk na over de gevolgen voordat ik iets doe.
2	I think about how things might be in the future.	Ik denk na over hoe dingen in de toekomst zouden kunnen zijn.
3	I am willing to sacrifice my immediate happiness or well-being in order to achieve something in the future.	Ik ben bereid om mijn onmiddellijke geluk of welzijn op te offeren om iets in de toekomst te bereiken.
4	I consider how things might be in the future, and try to influence those things with my day to day behavior.	Ik overweeg hoe dingen in de toekomst zouden kunnen zijn en probeer die dingen te beïnvloeden met mijn dagelijkse gedrag.
5	I believe I can succeed at most any endeavor to which I set my mind.	Ik geloof dat ik kan slagen in bijna alles waar ik mijn zinnen op zet.
6	I hardly ever expect things to go my way.	Ik verwacht bijna nooit dat dingen gaan zoals ik wil.
7	I am usually able to protect my personal interests.	Ik ben meestal in staat om mijn persoonlijke belangen te beschermen.
8	I am always optimistic about my future.	Ik ben altijd optimistisch over mijn toekomst.
9	I often use new ideas to shape (modify) the way I do things.	Ik gebruik vaak nieuwe ideeën om de manier waarop ik dingen doe vorm te geven (aan te passen).
10	I am often on the lookout for new ideas.	Ik ben vaak op zoek naar nieuwe ideeën.

11	I often re-evaluate my experiences so that I can learn from them.	Ik evalueer mijn ervaringen vaak opnieuw, zodat ik ervan kan leren.
12	I find it boring to discuss philosophy.	Ik vind het saai om over filosofie te discussiëren.
13	I think that all the Earth's systems, from the climate to the economy, are interconnected.	Ik denk dat alle systemen op aarde, van het klimaat tot de economie, met elkaar verbonden zijn.
14	I have had the experience of feeling ''at one'' with nature.	Ik heb ervaren dat ik me één voelde met de natuur.
15	I think understanding how a chain of events occur is crucial.	Ik denk dat het cruciaal is om te begrijpen hoe een keten van gebeurt enissen ontstaat.
16	I easily see connections between events and things even when they first seem unrelated.	Ik zie gemakkelijk verbanden tussen gebeurtenissen en dingen, zelfs als ze op het eerste gezicht niets met elkaar te maken hebben.
17	I show concern and care for peers.	Ik toon bezorgdheid en zorg voor m ijn gelijken.
18	I believe in being loyal to all mankind.	Ik geloof erin loyaal te zijn aan de h ele mensheid.
19	When they are in need, I want to help people all over the world.	Als ze in nood zijn, wil ik mensen over de hele wereld helpen.
20	Benevolence (that is, helpfulness, honesty, forgiveness, loyalty, and responsibility) is an important life-guiding principle for me.	Welwillendheid (dat wil zeggen beh ulpzaamheid, eerlijkheid, vergeving sgezindheid, loyaliteit en verantwoo rdelijkheid) is voor mij een belangri jk leidend principe in mijn leven.

Appendix B

POSO-E Translation

Table B1

POSO-E Item Translation from English into Dutch

Item number	Original Scale Items English	Dutch Translation
	For each problem I will find a solution.	Voor ieder probleem vind ik een oplossing.
2	In difficult situations I will find a way.	In moeilijke situaties vind ik een uitweg.
3	I master difficult problems.	Ik kan goed omgaan met moeilijke problemen.
4	I am facing my future in an optimistic way.	Ik zie mijn toekomst optimistisch tegemoet.
5	I can hardly think of something positive in the future.	Het is moeilijk voor mij om iets positiefs in de toekomst te zien.
6	I can master difficulties.	Ik ben in staat moeilijkheden te overwinnen.
7	I worry about my future.	Ik maak me zorgen over mijn toekomst.
8	I always find a solution to a problem.	Ik vind altijd een manier om problemen op te lossen.
9	For each problem I will find a solution.	Vaak lijkt het alsof alles somber is.

Appendix C

CS Translation

Table C1

CS Item Translation from English into Dutch

| Item number	Original Scale Items English	Dutch Translation
1	I pay careful attention when other people talk to me about their troubles.	Ik besteed zorgvuldig aandacht wanneer mensen met me praten over hun problemen.
2	If I see someone going through a difficult time, I try to be caring toward that person.	Als ik zie dat iemand een moeilijke tijd doormaakt, probeer ik zorgzaam te zijn voor die persoon.
3	I am unconcerned with other people's problems.	Ik trek me niets aan van andermans problemen.
4	I realize everyone feels down sometimes, it is part of being human.	Ik realiseer me dat iedereen zich wel eens somber voelt, dat hoort bij het mens zijn.
5	I notice when people are upset, even if they don't say anything.	Ik merk het als mensen van streek zijn, zelfs als ze niets zeggen.
6	I like to be there for others in times of difficulty.	Ik sta graag klaar voor anderen in moeilijke tijden.
7	I think little about the concerns of others.	Ik denk weinig na over de zorgen van anderen.
8	I feel it's important to recognize that all people have weaknesses and no one's perfect.	Ik vind het belangrijk om te erkennen dat alle mensen zwaktes hebben en niemand perfect is.
9	I listen patiently when people tell me their problems.	Ik luister geduldig als mensen mij hun problemen vertellen.
10	My heart goes out to people who are unhappy.	Mijn hart gaat uit naar mensen die ongelukkig zijn.
11	I try to avoid people who are experiencing a lot of pain.	Ik probeer mensen die veel pijn ervaren te vermijden.

12	I feel that suffering is just a part of the common human experience.	Ik heb het gevoel dat lijden gewoon deel uitmaakt van de algemene menselijke ervaring.
13	When people tell me about their problems, I try to keep a balanced perspective on the situation.	Als mensen me over hun problemen vertellen, probeer ik een evenwichtig perspectief op de situatie te houden.
14	When others feel sadness, I try to comfort them.	Als anderen verdriet hebben, probeer ik hen te troosten.
15	I can't really connect with other people when they're suffering.	Ik kan niet echt contact maken met andere mensen wanneer ze lijden.
16	Despite my differences with others, I know that everyone feels pain just like me.	Ondank mijn verschillen met anderen, weet ik dat iedereen pijn voelt, net als ik.

Appendix D

Results of Testing the Linearity Assumption
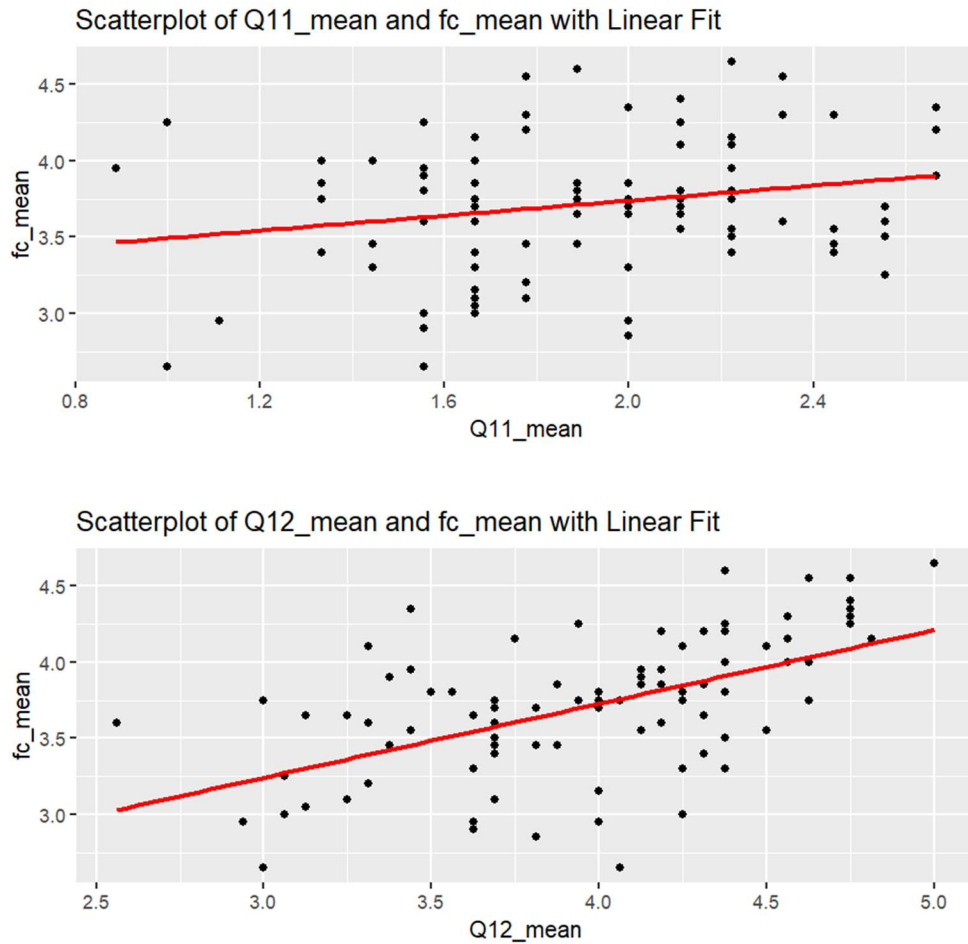
Figure D1

Boxplots of FC, Optimism and Compassion by Gender
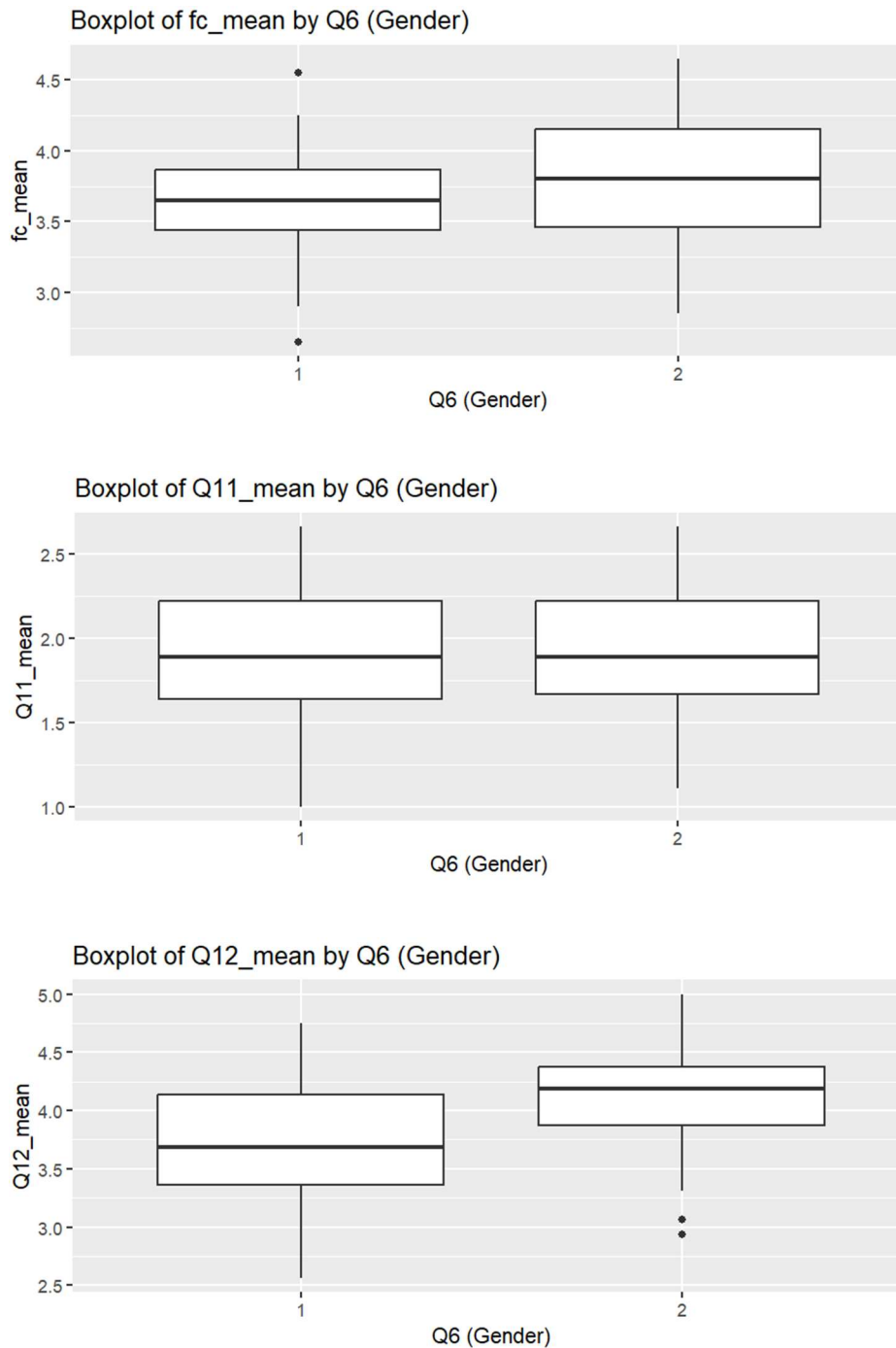
Note. FC Mean (fc_mean); Optimism mean (Q11_mean), Compassion mean (Q12_mean)

Gender (Q6); Male (1); Female (2).

Figure D2

Scatterplots of FC and Optimism and FC and Compassion

Scatterplot of Q11_mean and fc_mean with Linear Fit

Scatterplot of Q12_mean and fc_mean with Linear Fit

Note. FC Mean (fc_mean); Optimism mean (Q11_mean), Compassion mean (Q12_mean)

Gender (Q6).

Figure D3

Partial Residual Plots of FC, Optimism and Compassion by Gender

Note. FC Mean (fc_mean); Optimism mean (Q11_mean), Compassion mean (Q12_mean)
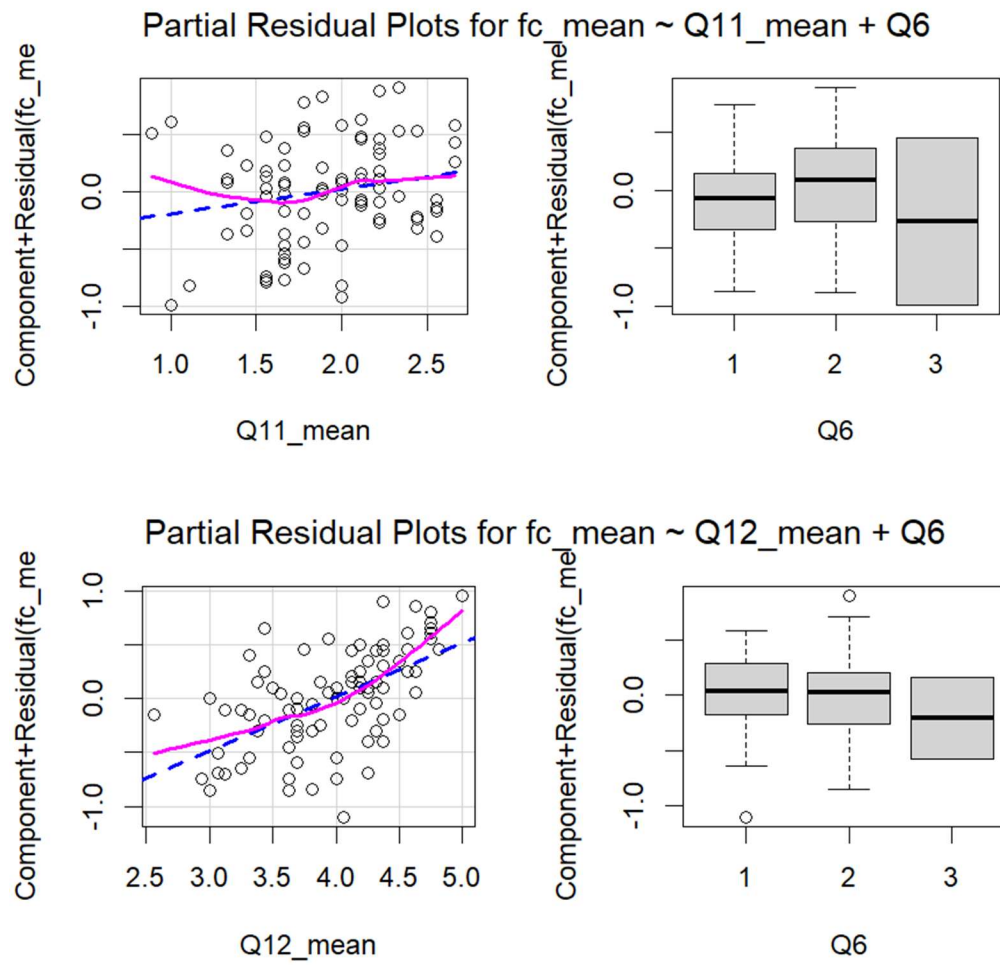Gender (Q6); Male (1); Female (2); Non-binary (3).

Appendix E

Comparison of the Spearman´s Rho and the Pearson Correlation Coefficient

Table E1

Spearman´s Rho and Pearson Correlation Coefficient of the FC Dimensions and Optimism and Compassion

	Optimism	Compassion
Time perspective		
r	.19	.36
ρ	.15	.4
Agency beliefs		
r	.39	-.01
ρ	.43	-.02
Openness to alternatives		
r	.2	.34
ρ	.16	.33
Systems perception		
r	.05	.37
ρ	.09	.39
Concern for others		
r	-.03	.65
ρ	-.04	.65

Note. Correlation *(r)*; Spearman´s rho (ρ).