# The Influence of Values, Beliefs and Norms on the Engagement in Behaviours Aimed at Systemic Change

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## Abstract

Addressing global environmental challenges requires systemic change at individual, organisational, and governmental levels. The transition to a circular economy presents a promising approach, emphasizing the reduction, reuse, and recycling of resources to mitigate environmental impact. While individual sustainable behaviours are crucial, striving for collective engagement is essential for systemic transformation. A cross-sectional questionnaire, in the form of an online survey, was distributed via social media and flyers. The final sample consisted of 125 participants, whose biospheric values, agreeableness, and engagement in circular citizenship behaviours were assessed using validated Likert-scale measures. Regression analysis revealed a small positive effect of biospheric values on circular citizenship behaviours and a small negative effect of agreeableness on circular citizenship behavior. However, both effects were found not to be significant. Moreover, the hypothesized moderating effect of agreeableness on the relationship between biospheric values and circular citizenship behavior was not supported. Even though no significant results were found and a few limitations, the study offers a great foundation to work from regarding future research about what influences individuals' circular citizenship behaviors. In short, the study contributes to the emerging research on circular citizenship behaviours by highlighting the complex interplay between values and personality traits in driving systemic environmental engagement.


*Keywords:* circular citizenship behavior, biospheric values, agreeableness, circular economy, systemic change

# The Influence of Values, Beliefs and Norms on the Engagement in Behaviours Aimed at Systemic Change

It is widely recognized that human behaviour plays a significant role in driving global environmental challenges (IPCC, 2022a). Factors such as population growth, unsustainable consumption patterns, resource exploitation, and poor waste management are key contributors to environmental degradation (The World Bank, 2023). Rising global temperatures contribute to more frequent and severe extreme weather events including hurricanes, floods and droughts which pose significant risks to human safety and result in substantial economic losses (IPCC, 2023). These consequences underscore the need for transformative change across multiple levels, such as the individual, organisational and governmental level of society (Pacheco et al., n.d.). There is an urgent demand for enhanced environmental engagement at each of these levels (Upadhayay et al., 2024). However, more gains will be made when all levels work collectively towards the same goal (Masson & Fritsche, 2021).

## The circular economy as promising approach to tackle environmental problems

Considering the escalating climate crisis, moving towards a circular economy has become one of many critical approaches to actively fight climate change (Bansal & Song, 2017; He et al., 2016; Mi et al., 2020). The *circular economy* is an economic system aimed at minimizing waste and resource use (Kirchherr et al., 2017). By designing products and processes that enable the reuse, repair, recycling, and regeneration of materials, a closed-loop system could be created (Kirchherr et al., 2017). Striving towards a circular economy offers an effective approach by focusing on three key principles: reducing, reusing, and recycling (Camacho-Otero et al., 2018; Kirchherr et al., 2017).

*Reducing* involves using less materials and minimizing the consumption of resources (Bocken et al., 2016; Kirchherr et al., 2017; Nikolaienko, 2019). Minimizing resource consumption can be achieved by increasing practices such as carpooling or by organizations

optimizing production efficiency, both of which align with *narrowing* the circular economy loop (Bocken et al., 2016; Kirchherr et al., 2017).

*Reusing* mainly focuses on utilising a product to extend the product's life (Kirchherr et al., 2017). By optimising the quality of a product or arranging behavioral training enhancing green measures, organizations can encourage consumers as well as their own employees to embrace and adopt sustainable behaviours (Stern., 2000; Zhang et al., 2013). Adding to that, consumer behavior plays a crucial role in this process, as purchasing second-hand products, or donating items instead of discarding them ultimately reduces waste (Camacho-Otero et al., 2018; Kirchherr et al., 2017; Nikolaienko, 2019). This phenomenon is also known as *slowing down* the loop (Kirchherr et al., 2017; Nikolaienko, 2019).

Furthermore, processing used products or materials into different products will contribute to less environmental pollution and will lead to less resource depletion (Camacho-Otero et al., 2018; Kirchherr et al., 2017). The term used to describe the processing of products or materials from products to put into another product is *recycling* and is a way of *closing* the loop (Kirchherr et al., 2017). Both Camacho-Otero et al. (2018) and Kirchherr et al. (2017) stress the fact that reducing, as well as reusing is more effective in the long term, as both concepts address the root cause of resource depletion. While reducing, reusing, and recycling are essential behaviors in promoting *circularity*, achieving large-scale systemic change requires active engagement beyond individual actions (Camacho-Otero et al., 2018; Kirchherr et al., 2017; Pacheco et al., n.d.). This is where circular citizenship behavior plays a crucial role, as it goes beyond adopting sustainable practices (Camacho-Otero et al., 2018; Kirchherr et al., 2017; Pacheco et al., n.d.).

**Circular citizenship behaviours to promote systemic change towards a CE**

Actively encouraging others, whether that be friends and family members, businesses, or governments, to support a circular economy could promote a circular economy (Pacheco et

al., n.d.). *Circular citizenship behaviours*, as defined by Pacheco et al., (n.d.), refer to individual and collective actions aimed at influencing others to support circularity. By actively shaping societal systems the narrowing, slowing, and closing of resource loops is supported (Kirchherr et al., 2017; Pacheco et al., n.d.). Circular citizenship behavior, as opposed to circular consumption, emphasises change at a *systemic* level (Pacheco et al., n.d.). Additionally, circular citizenship behaviours involve convincing others to collectively support the transition to a circular economy (Pacheco et al., n.d.). For example, individuals could use social media to influence others to engage in circular behaviours (Sloot et al., 2018; Stern, 2000). Within organizations, employees can set up green committees that strive for more circularity within the organisation (Zhou et al., 2022). On a governmental level, individuals' voting behaviour or protesting could influence and support systemic change towards a circular economy (Pacheco et al., n.d.). Encouraging others does not only motivate individuals but also adds to the communal sense of responsibility in providing positive change towards circularity (Pacheco et al., n.d.; Sloot et al., 2018). Given the urgent need for systemic change to effectively tackle climate change, understanding what drives engagement in circular citizenship behavior is crucial (Pacheco et al., n.d.). The sense of individuals to not solely consume more circular, but also motivate others to embrace circularity more, often stems from deeper values prioritizing global wellbeing (Masson & Fritsche, 2021; Sloot et al., 2018). Therefore, it's interesting to deepen the underlying understanding behind values and their influence on engagement in circular citizenship behavior.

**Biospheric values as possible determinants of circular citizenship behaviours**

Gouldner & Rokeach (1975) and Schwartz (1992) propose values as guiding principles that stay the same throughout our whole lives. Values are often shaped through the socialization process or developed independently through individual experiences (Schwartz, 1974). Additionally, values guide an individual's goal orientation, serve to justify certain

behaviours, and influence evaluation of specific events (Schwartz 1992, 1994). For those reasons, many psychologists argue that values are important constructs and are critical in explaining behaviour (Gouldner & Rokeach, 1975; Schwartz, 1992, 1994; Schwartz & Bilsky, 1990). Schwartz's categorization of values appeared in hierarchy to have 10 different dimensions, each representing a different motivational goal (Schwartz 1992, 1994). Besides that, Schwartz came up with two concepts that cover the 10 dimensions, namely the self-transcendence and self-enhancement concept (Schwartz 1992, 1994). The Self-transcendence concept is most relevant for this research, because it contains values emphasizing acceptance of others as equals and concern for their welfare and nature (Schwartz 1992, 1994). This dimension covers the benevolence as well as universalism domain (Schwartz 1992, 1994). Stating that benevolence is about the care for other close people's well-being and universalism translates in understanding, appreciation and protection for other people's welfare and nature (Schwartz 1992, 1994). Even though Schwartz does not come with a direct definition for the concept of biospheric values, other researchers state that biospheric values refer to a person's concern for the well-being of the environment and nature (Steg and de Groot., 2012; Stern, 2000). According to Schwartz (1992; 1994) and Steg and Vlek (2009), the concept of *biospheric values* falls under the broader category of self-transcendence values and overlaps with the universalism domain. Schultz et al. (2005) suggest that individuals that hold strong biospheric values tend to be more inclined to support environmental policies and initiatives, demonstrating a deeper commitment to pro-environmental actions that extend beyond self-interest. More research has found relations between biospheric values and sustainable behavior, stating that individuals with higher biospheric values are more concerned with recycling and waste management, and employees with higher biospheric values show more acceptance towards organisational green measures (Chaudhary, 2019; Stern et al., 1999). With the knowledge that values are important predictors of sustainable behavior,

it would be interesting to research the influence of biospheric values on circular citizenship behavior to emphasize on the distinction between sustainable behavior and circular citizenship behavior by looking into what drives individuals to influence other to support circularity (Pacheco et al., n.d.; Schwartz, 1992,1994).

Based on Schwartz' value theory and previous research findings showing a relationship between biospheric values and sustainable behaviour, we hypothesize the following:

H1*: Individuals with stronger biospheric values are more likely to engage in circular citizenship behavior.*

**The relation of agreeableness with biospheric values and circular citizenship behaviours**

As mentioned above, values play a significant role in shaping an individual's behavioural intentions and often values guide as lasting principles (Schwartz, 1972, 1974). While values guide what the individual considers to be important, personality traits too serve as foundational psychological constructs that influence behavior (Costa & McCrae, 1990; Schwartz, 1972, 1974). Focusing on personality traits, Costa and McCrae (1990) define them as enduring patterns of thinking, feeling, and behaving that differentiate individuals and remain stable over time. The Big Five personality traits framework is one of the most widely used models for classifying these characteristics (Costa and McCrae, 1990). According to the Big Five theory, individuals that score higher on agreeableness tend to demonstrate greater prosocial behaviour (Barrick & Mount, 1991; Caprara et al., 2011; Costa & McCrae, 1990). *Agreeableness* is a personality trait characterized by a tendency to be compassionate, cooperative, and considerate, often associated with prosocial behaviors, trust, and a preference for social harmony (Costa & McCrae, 1990). Prosocial behavior refers to voluntary actions aimed at benefiting others or society (Caprara et al., 2011; Costa & McCrae, 1990). Scoring high on agreeableness may suggest that individuals demonstrate strong prosocial tendencies

toward others and the environment (Caprara et al., 2011; Costa & McCrae, 1990; Schwartz, 1972, 1974; Steg and Vlek 2009). Wuertz (2015) replicated Hirsh's (2010) study, that found a correlation between personality traits and sustainable attitudes and behavior. In line with these findings, Wuertz (2015) identified a significant correlation between agreeableness and sustainable behavior. For that reason, it would be interesting to distinguish individual sustainable behavior from circular citizenship behavior by taking it a step further and look into the effect of agreeableness on individuals advocating for more circularity (Costa & McCrae, 1990; Pacheco et al., n.d.). This point of interest leads to the formulation of the following hypothesis:

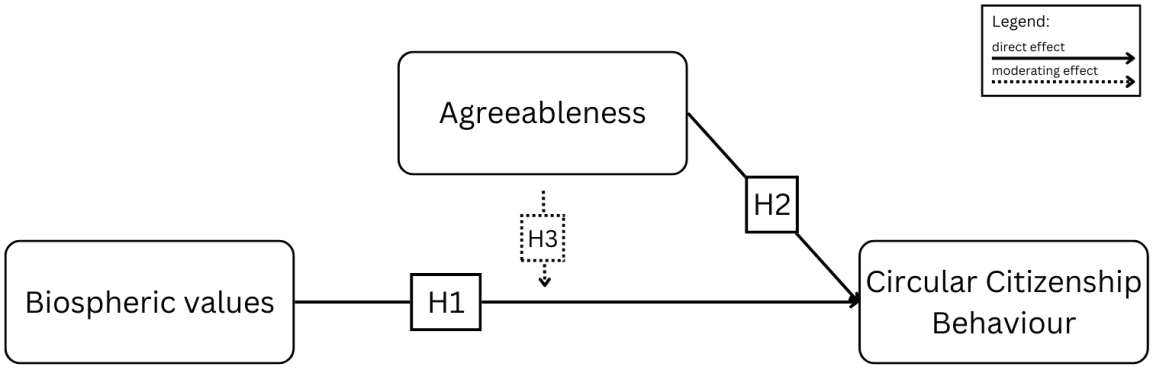
H2***:*** *Individuals with higher levels of agreeableness are more likely to engage in circular citizenship behavior.*

**Agreeableness as a moderator variable**

With values and personality traits both being influential in shaping behavior, it is important to explore the interplay between both constructs (Costa & McCrae, 1990; Schwartz, 1972,1974). Parks-Leduc et al. (2014) emphasize that values and personality traits should be regarded as distinct constructs. Research by Roccas et al., (2002) adds that the value' influence is stronger when behavior is under cognitive control, where a traits' influence is stronger for behaviors under weaker cognitive control. This distinction aligns with the idea that values act as substance, offering a stable motivational basis for behavior, whereas personality traits function as processes that shape how behavior is affected by relative contexts (Costa & McCrae, 1990; Kuhn, 1962; Schwartz, 1972,1974). Since circular citizenship behavior relies heavily on social influence, advocacy, and collective action, it is relevant to examine agreeableness as a moderator variable (Costa & McCrae, 1990; Pacheco et al., n.d.). Agreeable individuals may be more likely to act upon their biospheric values by engaging with others, advocating for systemic change, and influencing others to support

circularity (Costa & McCrae, 1990; Pacheco et al., n.d.; Schwartz 1972, 1974). By investigating this interaction, a better understanding of the conditions under which individuals with biospheric values actively engage in circular citizenship behavior could be achieved (Costa & McCrae, 1990; Pacheco et al., n.d.; Schwartz, 1972, 1974). Based on the combination of elements of Schwartz's value theory the Big Five personality trait framework and the possible influence of agreeableness on the relationship between biospheric values and circular citizenship behavior the following hypothesis is:

H3*: The positive relationship between biospheric values and circular citizenship behaviours will be stronger for individuals with higher levels of agreeableness compared to those with lower levels of agreeableness.*




## Method

### Design and Procedure

The research followed a cross-sectional design, employing an online questionnaire via the platform Qualtrics (2023). Prior to answering the questions, participants gave their informed consent to participate in this research after receiving information about the study, including its purpose, the types of questions they would be asked regarding their beliefs, behaviors, and influences, as well as demographic information such as age, gender, educational level, and income. The survey started off with questions assessing participants' values, traits, and other factors to determine key variables—biospheric values, agreeableness,

and circular citizenship behavior—followed by demographic questions and concluding with feedback-related questions. The survey was expected to take approximately 15 minutes to complete. The median of the duration of the survey was 16.4 minutes. Based on a set of questions developed by the Ethics Committee for the faculty of Behavioral and Social Sciences at the University of Groningen, the study was submitted to the fast-track procedure and therefore exempt from review.

**Sample**

To guarantee sufficient statistical power for the study, a power analysis was done before data collection. To ensure a minimal power of 0.80 with a confidence level of a = 0.05 and a Cohen's f-squared of 0.15 to detect a medium effect size, a sample group of at least 77 participants was required (Cohen, 1988).

Participants were primarily recruited through flyers (See Appendix A, Figure 1) distributed across the Faculty of Behavioural and Social Sciences of the University of Groningen (Netherlands) and in local hospitality establishments. In addition, participants were invited to complete the questionnaire through face-to-face invitations. The link to the questionnaire was also shared on multiple social media platforms, including Instagram, X (formerly Twitter), and LinkedIn.

After recruitment, the initial sample consisted of 213 participants. However, some participants were excluded due to incomplete questionnaires or clear indications of insufficient engagement with the questions. Insufficient engagement was assessed based on notable response times and monotonous response patterns. Additionally, participants under the age of 18 and those that did not indicate their age were excluded, resulting in a final sample of 125 participants. Of these, 34 were men and 88 were women, two participants were non-binary, and one participant preferred not to state their gender. The final sample had an average age of 31, with a minimum age of 19 years old and a maximum age of 68 years old.

From the sample, 1 participant's highest level of education was primary school, 2 participants had finished secondary school (MAVO/VMBO), 39 participants had finished secondary school (HAVO/VWO), 6 participants had completed secondary vocational education (MBO), 24 participants had completed higher professional education (HBO), 34 participants had completed university education (WO), 1 participant had obtained a doctorate (PhD), and 18 participants chose the open option. 94 participants filled out the questionnaire in English and 31 participants filled out the questionnaire in Dutch.

## Measures

Although the study also contained other variables, for the purpose of this thesis only biospheric values, agreeableness, and circular citizenship behavior will be considered.

### *Biospheric values*

Biospheric values were measured using a 9-point Likert scale ranging from (-1) to (7) (Steg et al., 2014). Participants stated their level of importance on different statements regarding biospheric values. Examples of the statements were: “Respecting the earth: harmony with other species” or “Protecting the environment: preserving nature”. A score of (-1) indicated that the participant was *opposed* towards the statement, a score of (0) indicated that the participant found the statement *not important at all*, and a score of (7) indicated that the participant found that the statement *very important*. A mean score was computed of the items since they formed a reliable scale ($a$ = 0.88, $m$ = 4.48, $sd$ = 1.54). On average, participants scored moderately on biospheric values, and the scale had an excellent consistency. An overview of the items, Cronbach's alpha and other descriptives can be found in appendix B (See Figure 2,3,4, Table 1,2).

### *Agreeableness*

Agreeableness was assessed using participants' responses to statements measured on a 7-point Likert scale (Donnellan et al., 2006). A score of (1) indicated that the participant *fully*

*disagreed* with the statement, while a score of (7) indicated that the participant *fully agreed* with the statement. The four statements that were used to measure the score on agreeableness were: “I sympathize with others’ emotions”, “I feel others’ emotions”, “I’m generally not really interested in others”, and “I’m not interested in other people’s problems”. For the sake of coherent interpretation, the outcome of the last two statements had to be reversed to be interpreted and measured. A mean score of the items was computed as they form a reliable scale ($a$ = 0.64, $m$ = 5.44, $sd$ = 0.83). On average, participants scored high on agreeableness and the scale had a moderate consistency. An overview of the items, Cronbach's alpha and other descriptives can be found in appendix B (See Figure 4, Table 1, 2).

***Circular Citizenship Behaviours***

Circular citizenship behavior was assessed by measuring advocacy for circularity among other individuals, businesses, and governments. Participants rated their engagement in circular citizenship behaviors using a 6-point Likert scale, ranging from (0), that indicated that participants *never engage* to (5) which indicated that participants *frequently engage* (Pacheco et al., n.d.). At the individual level, participants rated statements about how often, and in what way, they engage in urging other individuals to advocate for circularity. An example of a statement would be: “Trying to set a good example with my own behaviour on how to use less resources, reuse the ones I already have, or recycle things I no longer need”. At the business level, participants rated behaviours such as urging their employer or other businesses to reduce, reuse, or recycle. An example of a business-related statement would be: “Taking action to urge the company you work for to reduce, reuse, or recycle”. At the governmental level, examples included signing petitions on local, national, or international levels or voting for candidates or political parties that support reducing, reusing, and recycling. An example of a statement would be: “Protesting, joining public demonstrations, or participating in sit-ins, strikes or rallies”. Additionally, participants were asked about their engagement in behaviours

promoting circularity through behaviours that target multiple groups mixed, (other individuals, businesses, or governments, simultaneously), such as “volunteering at environmental organizations that influence decision-makers or the public to reduce, reuse, or recycle.”. A mean score of all the items together was computed to form an overall reliable scale of circular citizenship behaviors ($a$ = 0.91, $m$ = 1.76, $sd$ = 0.90). On average, participants' level of circular citizenship behaviors was low. An overview of the items, Cronbach's alpha and other descriptives can be found in appendix B (See Figure 5,6,7,8, Tabel 1,2).

## Results

### Assumption checks

The assumptions for the regression analysis were tested to ensure the validity of the model. Scatterplots indicated that the linearity assumption was met for the relationship between biospheric values and circular citizenship behavior. The assumption of homoscedasticity was not easily confirmed from the charts, so a regression analysis with 1,000 bootstrap samples was conducted. To test the normality assumption, a regression analysis was conducted, and a histogram of the z-residuals was created. The histogram closely resembled a normal distribution, indicating that the normality assumption was met despite minor deviations that were not severe enough to cause problems. Multicollinearity was assessed through regression analysis by examining tolerance and VIF values. For biospheric values, the tolerance value was 0.09 and the VIF was 10.78, indicating a violation of the multicollinearity assumption. Similarly, the interaction term biospheric values x agreeableness showed a tolerance value of 0.07 and a VIF of 14.97, further suggesting multicollinearity. In contrast, agreeableness exhibited a tolerance value of 0.28 and a VIF of 3.59, indicating no violation of this assumption. Tables and figures regarding the assumptions can be found within appendix C (See Figure 9,10).

**Correlation**

The analysis provided the statistics regarding the relationship between the measured variables: biospheric values, agreeableness, circular citizenship behavior and the interaction variable biospheric values * agreeableness. Biospheric values has a moderate positive correlation with circular citizenship behavior ($r = .44$, $p < .01$). Agreeableness is weakly correlated with both circular citizenship behavior ($r = .15$, $p < .05$) and biospheric values ($r = .18$, $p < .05$). The interaction term biospheric values * agreeableness had an expected high correlation with biospheric values ($r = .90$, $p < .01$) and agreeableness ($r = .57$, $p < .01$). Additionally, the interaction term is moderately correlated with circular citizenship behaviors ($r = .43$, $p < .01$). An overview of the whole correlation table is added in appendix D (See Table 3).

**Regression analysis**

To test the hypotheses a multiple linear regression was done including the following variables: circular citizenship behavior as dependent variable, biospheric values and agreeableness as independent variables, and the interaction term of biospheric values and agreeableness. The overall model was statistically significant, ($f(3,121) = 10.11$, $p < .001$), which indicates that the coefficients explain a significant effect of the variance in circular citizenship behavior. The model accounted for 20% of the variance ($R^2 = .20$), with an adjusted R-squared of 18% ($R^2\text{-}adjusted = .18$), which indicates a moderate power.

The regression showed a small positive, however no significant effect for biospheric values on circular citizenship behavior ($\beta = 0.15$, $p = .814$). This indicates that there is no evidence to support the hypothesis that individuals with stronger biospheric values are more likely to engage in circular citizenship behavior.

A small negative effect for agreeableness on circular citizenship behavior was found, however this was not significant ($\beta = -.009$, $p = .729$). This suggests that there is no support

for the hypothesis that individuals with higher agreeableness scores are more likely to engage in circular citizenship behavior.

For the interaction effect a non-significant result was found, indicating that agreeableness does not significantly moderate the relation between biospheric values and circular citizenship behavior ($\beta = 0.38$, $p = .517$). This result indicates insufficient evidence to support the hypothesis that the positive relationship between biospheric values and circular citizenship behavior is stronger for individuals with higher levels of agreeableness. Tables and the interaction figure regarding the regression analysis are added in appendix D (See Table 4,5, Figure 11).

## Discussion

### Interpretation

The present study examined the influence of biospheric values and agreeableness on circular citizenship behavior. Additionally, it investigated the moderating effect of agreeableness on the relationship between biospheric values and circular citizenship behavior.

The first hypothesis, which proposed a positive relationship between biospheric values and circular citizenship behavior, was not supported by the data. Individuals with stronger biospheric values engaged more in circular citizenship behavior, however, the effect was minor and not significant. Although circular citizenship behavior is a newly introduced concept that has not been researched much so far, the result that was found seems contradictory. Given previous research outcomes that stated that individuals with higher biospheric values usually act in a more sustainable way, stronger biospheric values were expected to lead to more individual engagement in circular citizenship behavior (Chaudhary, 2019; Schultz et al., 2005; Stern et al., 1999).

The findings regarding the second hypothesis, which examined the influence of agreeableness on circular citizenship behavior, were contrary to expectations. Based on prior

research on personality traits and sustainable behavior, it was hypothesized that higher levels of agreeableness lead to more engagement in circular citizenship behavior (Barrick & Mount, 1991; McCrae & Costa, 1999). However, the results indicated that the effect of agreeableness was minor, negative, and not statistically significant, leading to a rejection of the hypothesis. This contradicts initial expectations, as agreeableness is typically linked to prosocial and cooperative behaviors that align with sustainability (Barrick & Mount, 1991; McCrae & Costa, 1999). A possible explanation for this finding is that agreeableness is closely related to conformity and a tendency to align with majority group behaviors (Barrick & Mount, 1991; McCrae & Costa, 1999). On top of that, individuals that score high on agreeableness embrace social harmony and prefer to avoid conflict (McCrae & Costa, 1999). Since circular citizenship behavior involves actively encouraging others to adopt support circularity, it may be that individuals high in agreeableness are less likely to engage in such behaviors when sustainability efforts are not yet widely accepted, as those who advocate for sustainability may still be a minority group and be seen as counter to social harmony (Bolderdijk & Jans, 2021).

The results of the interaction effect did not align with initial expectations. There was no statistical evidence to support the hypothesis that agreeableness moderates the relationship between biospheric values and circular citizenship behavior. Although previous research suggests that stronger biospheric values are associated with increased sustainable behavior and that higher levels of agreeableness often promote prosocial and cooperative tendencies (Barrick & Mount, 1991; McCrae & Costa, 1999; Schultz et al., 2006; Steg & de Groot, 2012; Stern, 2000), the expected interaction was not significant in the present research. This finding suggests that biospheric values independently predict circular citizenship behavior, without requiring reinforcement from agreeableness.

One possible explanation is that values are deeply embedded and internalized, making

them a stable predictor of behavior, regardless of personality traits (Schwartz 1972, 1974). Alternatively, it may be that other personality traits, such as conscientiousness or extraversion, play a more influential role in shaping circular citizenship behavior (Milfont and Sibley, 2012). Research by Milfont and Sibley (2012) found that agreeableness, openness to experience, and conscientiousness were consistently positively associated with sustainable behaviors. However, circular citizenship behavior goes beyond individual sustainability efforts by actively encouraging others to support circularity (Pacheco et al., n.d.). This distinction may explain why the results did not align with the original hypothesis.

**Strengths and Limitations**

One of the key strengths of this research is the use of a cross-sectional online questionnaire, which made participant recruitment efficient and accessible. This method enabled the recruitment of a broad and diverse sample, with enough participants, according to the power analysis conducted prior to the sampling procedure.

A corresponding strength is the high internal reliability of the questionnaire, particularly in the measures of biospheric values and circular citizenship behavior, which showed excellent Cronbach's alpha levels. The measure for agreeableness also demonstrated moderate reliability, supporting the robustness of the findings.

Another notable strength of this research is its examination of both personality traits and values in relation to sustainable behavior. By exploring how personality traits moderate the influence of values, this study provides valuable insights into the underlying psychological mechanisms that drive sustainable actions and advocacy. This allows for a more nuanced understanding of the factors that contribute to circular citizenship behavior, highlighting the interplay between individual differences and deeply held values.

However, simultaneously this also presents a limitation. Research on values, personality traits, and their influence on sustainable behavior, let alone circular citizenship

behavior is complex, making it difficult to draw definitive conclusions and control for external factors. The relationships between these variables may be influenced by unmeasured factors such as social norms, situational contexts, or external pressures.

Another notable limitation is the length of the questionnaire. Since it included not only items relevant to this study but also questions for other research purposes, participants indicated to have experienced survey fatigue, potentially reducing their attention and engagement. This could have affected response accuracy. Future research could benefit from a more concise survey design to enhance participant focus and data quality.

**Future research**

While this study provides a broad overview, future research could examine the impact of biospheric values and agreeableness on circular citizenship behavior at the individual, organisational, and governmental level, separately, to see if this leads to different outcomes. On the individual level, for example, more specific research could explore how values and personality traits influence circular citizenship behavior by focussing specifically on the difference between individual sustainable actions and actively encouraging others to adopt sustainable behaviors (i.e., circular citizenship behavior). Understanding the mechanisms that drive this distinction would provide deeper insights into the role of biospheric values and personality traits in advocating sustainability.

Additionally, an important avenue for future research is examining whether being part of a majority versus a minority group in society influences the effect of agreeableness on sustainable behavior. Since agreeableness is associated with cooperation and social harmony, it is possible that individuals high in agreeableness are more likely to adopt sustainable behaviors and advocate circularity when their group aligns with the majority rather than a minority (Bolderwijk & Jans, 2021; Costa & McCrae, 1999).

On the organisational level, previous research has examined the role of dark triad

personality traits (machiavellianism, psychopathy, and narcissism) in leadership and sustainability outcomes (Milfont & Sibley, 2012; Pelster & Schaltegger, 2021). However, less is known about how the Big Five personality traits (agreeableness, openness to experience, extraversion, neuroticism and conscientiousness) influence sustainable behavior and and advocacy of circularity at the three levels (individual, organisational and governmental). Separately investigating these different sets of personality traits on the different levels, could provide a more comprehensive understanding of how personality traits drive advocating for sustainability like circularity, both in personal setting and in broader societal influence.

**Practical Implications**

Although the findings of this study were not statistically significant, they still offer valuable insights for practical applications.

One key implication is that values alone may not be sufficient to drive advocacy for sustainable behavior. Since biospheric values did not significantly predict behaviors aimed at encouraging others to support circularity, policymakers and environmental organizations may need to focus on peer influence strategies rather than relying solely on value-based campains.

Additionally, the finding that agreeableness does not significantly predict advocacy for circularity has implications for organizations and governments. Since individuals with high levels of agreeableness do not automatically advocate for circularity, organizations and governments should explore how leadership styles, policies, and top-down strategies impact engagement towards circularity. For example, incentive-driven initiatives may be an effective approach to encourage advocacy for circularity.

## Conclusion

To conclude, this research examined the influence of biospheric values and agreeableness on circular citizenship behavior, adding the role of agreeableness as a moderator of the relationship between biospheric values and circular citizenship behavior.

The study revealed the following findings: although the effect of biospheric values was present, it was not significant, suggesting a need for further research to establish a robust relationship between values and circular citizenship behavior. Secondly, unexpectedly, agreeableness had a negative impact on circular citizenship behavior. However, this effect was also not significant, indicating that further research should explore the role of agreeableness in circular citizenship behavior. No significant result was found regarding the role of agreeableness as moderator on the influence of biospheric values and individual engagement in circular citizenship behavior. Although none of the findings were significant, the results have provided a foundation for future research to further understand the complex interrelated role that both values and personality traits have in the underlying processes of circular citizenship behavior. The findings also offer practical implications for policymakers focusing on interventions that support systemic change towards more circularity.

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# Appendix A

## Advertisement flyer

***Figure 1***

# Appendix B

## Survey Questions

### *Figure 2*

### *Biospheric values*

| **Biospheric Values** | Opposed | Not important | 1 | 2 | Important 3 | 4 | 5 | 6 | Supreme importance 7 |
|---|---|---|---|---|---|---|---|---|---|
| EQUALITY: equal opportunity for all | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| RESPECTING THE EARTH: harmony with other species. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| SOCIAL POWER: control over others, dominance. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| PLEASURE: joy, gratification of desires | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| UNITY WITH NATURE: fitting into nature | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| A WORLD AT PEACE: free of war and conflict | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

***Figure 3***

***Biospheric values***

| **Biospheric Values** | Opposed | Not important at all 0 | 1 | 2 | Important 3 | 4 | 5 | 6 | Supreme importance 7 |
|---|---|---|---|---|---|---|---|---|---|
| WEALTH: material possessions, money | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| AUTHORITY: the right to lead or command | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| SOCIAL JUSTICE: correcting injustice, care for the weak | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| ENJOYING LIFE: enjoying food, sex, leisure, etc. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| PROTECTING THE ENVIRONMENT: preserving nature | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

***Figure 4***

***Biospheric values***

| **Biospheric Values** | Opposed -1 | Not important at all 0 | 1 | 2 | Important 3 | 4 | 5 | 6 | Supreme importance 7 |
|---|---|---|---|---|---|---|---|---|---|
| INFLUENTIAL: having an impact on people and events | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| HELPFUL: working for the welfare of others | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| PREVENTING POLLUTION: protecting natural resources | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| SELF-INDULGENT: doing pleasant things | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| AMBITIOUS: hard working, aspiring | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

***Figure 5***

***Agreeableness***

| **Agreeableness** | Fully disagree 1 | Disagree 2 | Somewhat disagree 3 | Neighter agree nor disagree 4 | Somewhat agree 5 | Agree 6 | Fully agree 7 |
|---|---|---|---|---|---|---|---|
| I sympathize with others' feelings | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| I feel others' emotions | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| I am generally not really interested in others | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| I am not interested in other people's problems | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

***Figure 6***

***Circular Citizenship Behavior***

***CCB individual***

| **CCB individual** | Never | Very rarely | Rarely | Occasionally | Regularly | Frequently |
|---|---|---|---|---|---|---|
| Trying to set a good example with my own behaviour on how to use less resources, reuse the ones I already have, or recycle things I no longer need | ○ | ○ | ○ | ○ | ○ | ○ |
| Sharing information with other people about the importance of reducing, reusing, and recycling resources and on how they can do so | ○ | ○ | ○ | ○ | ○ | ○ |
| Asking other people to use less resources, reuse the ones they already own, or recycle products they no longer need | ○ | ○ | ○ | ○ | ○ | ○ |
| Complimenting other people when they use less resources, reuse the ones they already own, or recycle the ones they no longer need | ○ | ○ | ○ | ○ | ○ | ○ |
| Criticising people when they use resources wastefully or no not reuse and recycle products they own | ○ | ○ | ○ | ○ | ○ | ○ |

| | | | | | | |
|---|---|---|---|---|---|---|
| Informing and motivating people online (e.g. through posting messages or links on social media) about reducing, reusing, and recycling | ○ | ○ | ○ | ○ | ○ | ○ |

***Figure 7***

***CCB Business***

| **CCB Business B-3b** | Never | Very rarely | Rarely | Occasionally | Regularly | Frequently |
|---|---|---|---|---|---|---|
| Taking action to urge the company you work for to reduce, reuse, or recycle | ○ | ○ | ○ | ○ | ○ | ○ |
| Investing in businesses to stir decision-making in favour of reducing, reusing, and recycling or to strengthen businesses and projects that reduce, reuse, or recycle | ○ | ○ | ○ | ○ | ○ | ○ |
| Boycotting businesses that do not reduce their resource use, or do not reuse or recycle resources | ○ | ○ | ○ | ○ | ○ | ○ |

***Figure 8***

*CCB Government*

| **CCB Government** | Never | Very rarely | Rarely | Occasionally | Regularly | Frequently |
|---|---|---|---|---|---|---|
| Protesting, joining public demonstrations, or participating in sit-ins, strikes or rallies | ○ | ○ | ○ | ○ | ○ | ○ |
| Signing a petition on the local, national, or international level | ○ | ○ | ○ | ○ | ○ | ○ |
| Writing letters to/emailing/phoning government officials (local/national/EU) | ○ | ○ | ○ | ○ | ○ | ○ |
| Voting for a candidate or political party (in local, national, EU elections) at least partly because they support reducing, reusing, and recycling | ○ | ○ | ○ | ○ | ○ | ○ |
| Participating in the political system, e.g. participating in public assemblies/hearings to advocate for reducing, reusing, and recycling | ○ | ○ | ○ | ○ | ○ | ○ |

***Figure 9***

***CCB Mixed***

| **CCB Mixed** | Never | Very rarely | Rarely | Occasionally | Regularly | Frequently |
|---|---|---|---|---|---|---|
| Volunteering at environmental organisations that urge decision makers to support reducing, reusing, and recycling resources or influence the broader public to reduce, reuse, recycle | ○ | ○ | ○ | ○ | ○ | ○ |
| Donating to environmental organisations that urge decision makers to support reducing, reusing, and recycling resources or influence the broader public to reduce, reuse, recycle | ○ | ○ | ○ | ○ | ○ | ○ |
| Volunteering at environmental organisations that urge decision makers to support reducing, reusing, and recycling resources or influence the broader public to reduce, reuse, recycle | ○ | ○ | ○ | ○ | ○ | ○ |

***Table 1***

*Cronbach's alfa:*

| Scale | Chronbach's a | Reliability level |
|---|---|---|
| CCB | .91 | Excellent |
| Biospheric values | .88 | Excellent |
| Agreeableness | .64 | Moderate |

***Table 2***

*Descriptive Statistics*

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| Circular Citizenship Behavior | 125 | 0.00 | 4.00 | 1.76 | 0.90 |
| Biospheric Values | 125 | 0.25 | 7.00 | 4.84 | 1.54 |
| Agreeableness | 125 | 2.50 | 7.00 | 5.43 | 0.83 |

*Note. CCB was measured on a 6-point scale, Biospheric Values was measured on a 9-point scale and Agreeableness was measured on a 7-point scale.*

# Appendix C

## Assumptions

***Figure 10***

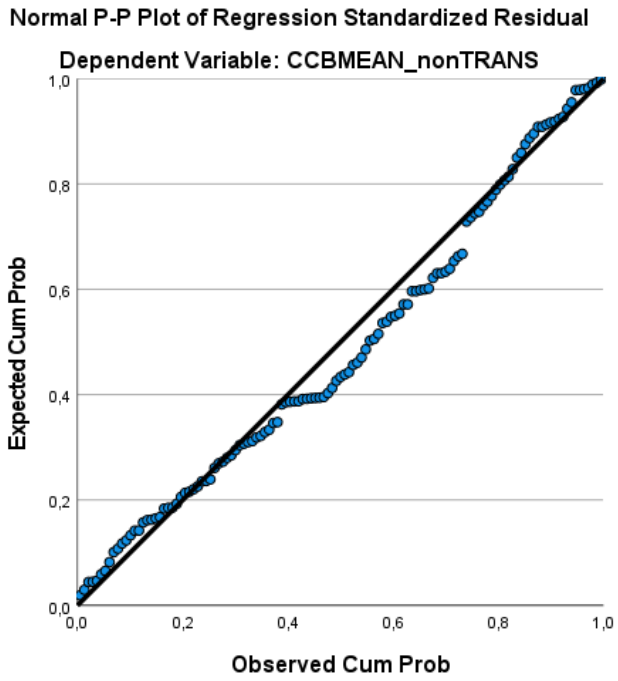
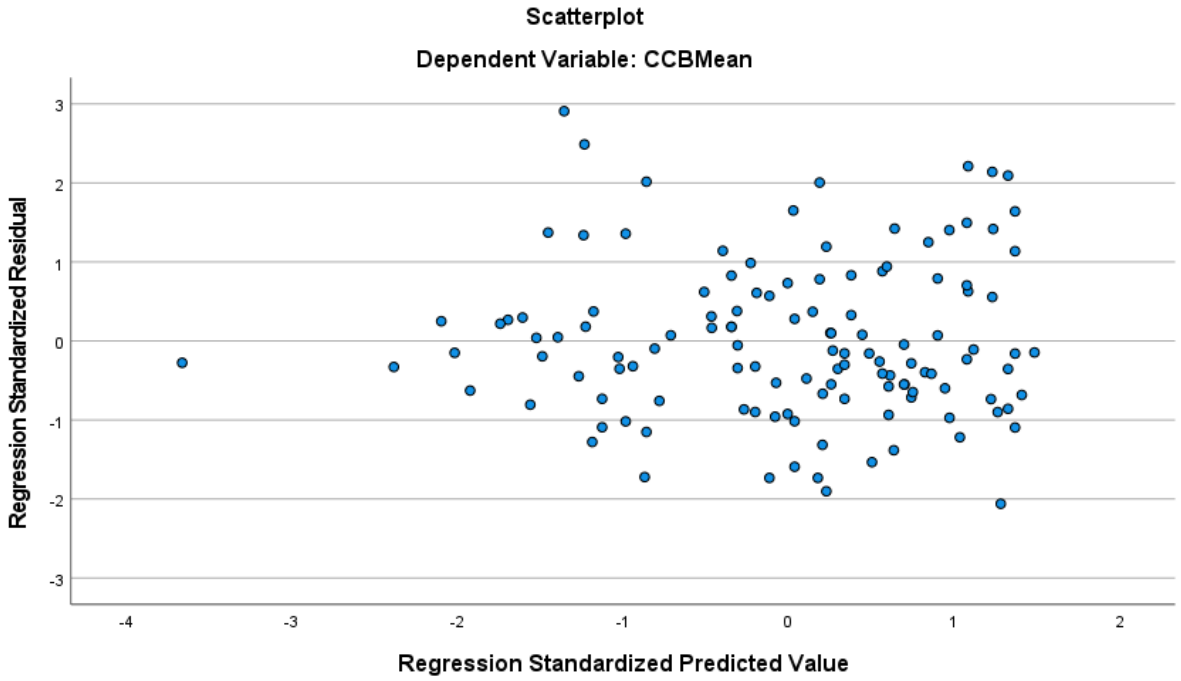



***Figure 11***



## Appendix D

### Regression Analysis

***Table 3***

*Correlation Table for Study Variables*

| *Variable* | *n* | *M* | *SD* | *1* | *2* | *3* | *4* |
|---|---|---|---|---|---|---|---|
| *1. Circular Citizenship Behavior* | *125* | *1.76* | *0.90* | – | – | – | – |
| *2. Biospheric Values* | *125* | *4.84* | *1.54* | *.44*** | – | – | – |
| *3. Agreeableness* | *125* | *5.44* | *0.83* | *.15** | *.18** | – | – |

***Table 4***

*Model summary*

| *R* | *R²* | *Adj. R²* | *MSE* | *F* | *df1* | *df2* | *p* |
|---|---|---|---|---|---|---|---|
| .45 | .20 | .18 | .67 | 10.11 | 3 | 121 | <.001 |

a. *Predictors: Biospheric Values, Agreeableness, Biospheric Values en Agreeableness interaction-effect.*
b. *Dependent variable: Circular Citizenship Behavior*

***Table 5***

*Regression table*

| Variable | b | se | $\beta$ | t | Sig. | %CI |
|---|---|---|---|---|---|---|
| Intercept | 1.03 | 1.47 | - | 0.70 | .486 | [-1.88, 3.93] |
| Biospheric Values | 0.67 | 0.29 | 0.15 | 0.24 | .814 | [-0.50, 0.63] |
| Agreeableness | -.10 | 0.28 | -0.09 | -0.35 | .729 | [-0.66, 0.46] |
| Interaction | 0.04 | 0.05 | 0.38 | 0.65 | .517 | [-0.70, 0,14] |

*Note.* See APA manual beginning on p. 219 for more regression table examples.

***Figure 12***

*Interaction figure*