Exploring the Cognitive Diversity of Political Concepts

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Abstract

Prior research has shown that people vary considerably in how they interpret political concepts, a variability often attributed to liberal–conservative differences underlying political polarization. In this study, rather than focusing on the liberal–conservative dichotomy, we considered personality and morality variables as possible predictors of cognitive diversity in subjects' interpretation of political concepts. Participants completed brief personality (HEXACO) and morality (MAC) assessments, followed by a series of association ratings for the concepts of freedom, justice, and authority. We found that certain personality traits and moral dimensions correlate with higher associations between probe concepts. Furthermore, clustering of political inclination on morality dimensions and concept ratings suggested that the latter made a limited contribution to political diversity, only raising the number of clusters from 2 to 3.

Keywords: personality; morality; conceptual diversity; freedom; justice; authority

Introduction

Conceptual representations are flexible structures that are shaped by linguistic experience and environmental factors (Glenberg & Robertson, 2000; Louwerse & Jeuniaux, 2008; Lupyan & Thompson-Schill, 2012; Vigliocco et al., 2009; Yee & Thompson-Schill, 2016). Proponents of the Ad Hoc Cognition (AHC) theory argue that, although certain concepts activate some information more automatically and frequently, they still depend on context—which is always specified, albeit sometimes implicitly—and therefore the same concept cannot be evoked twice (Casasanto & Lupyan, 2015; Connell & Lynott, 2014). The AHC perspective has important implications for political concepts, as these are relatively abstract and are shaped by linguistic, cultural, and social interactions, rather than direct sensory-motor experience. One example is provided by Marti et al. (2023), who examined participants' similarity and feature judgments of animals versus political figures. While participants demonstrated variability in their judgments of animal concepts, those of political figures showed even greater variability in interpretation—an outcome the authors relate to the polarization observed in contemporary discourse.

It is common in political rhetoric to use one political concept to support another. Notable examples include Plato stating that "equality leads to friendship," George W. Bush claiming that "freedom leads to equality," and Marx and Engels writing that "equality supports freedom" (Maio et al., 2014). A potential explanation of such linking is that some political concepts serve to express, in addition to their cognitive content, also political values. In other words, freedom may reflect a person's value, underwritten by their conception of freedom. Maio et al. (2014) investigated how defining one value in terms of another affects persuasiveness. They found that the more closely related the defining value and target value were, the more persuasive the argument became. However, the authors focused on opposing defining values for a single target one, which inherently presupposes a contrast. For example, for the target value "social justice," one paragraph ended with "Increasing broadmindedness will increase the fairness of our society," while the opposing paragraph ended with "Increasing the pursuit of wealth will increase the fairness of our society." As hypothesized, values stemming from the same or similar motive (e.g., broadmindedness and social justice) proved more persuasive than those based on conflicting motives (e.g., wealth and social justice). The case with opposing motives is intuitive, but when there is ambivalence and competing intuitions in value definitions, the persuasiveness of an argument may depend on how individuals prioritize and reconcile those conflicting values.

In another experiment, Maio et al. (2001) found that when participants were prompted to generate reasons for supporting equality, they exhibited more egalitarian behavior in situations that hinted at discrimination (this result was later replicated with the value "helpfulness"). The authors explained that a lack of concrete cognitive support for values such as equality or helpfulness can make it difficult for participants to retrieve relevant reasons when challenged, thereby reducing the influence of such values on behavior. In contrast, participants who formulated more specific reasons for supporting the target value were more inclined to demonstrate corresponding ("provalue") behavior. Consequently, the more rational and concrete the conceptual representation of a value, the more consistently it guides behavior. These findings help explain how, by using context-dependent terms in a speech, a politician can convey different messages to different people in a single statement (Dacey, 1979). Such nuances may have significant implications for voting outcomes, where decisions are sometimes based more on perceived values and ethical principles than on concrete policy platforms. Building on this foundation, we aimed to explore the conceptual diversity behind liberal–conservative debates, possibly revealing

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how distinct interpretations of core concepts can shape political rhetoric and drive ideological conflict.

Conceptual diversity in liberal-conservative debate

The sense of identifying with a particular ideology or belonging to a party can lead individuals to interpret the underlying concepts in different ways. Araque et al. (2021) used a machine learning approach to generate a lexicon of "libertarian" and "conservative" words. Their initial seed nodes for the libertarian lexicon included "liberty," "society," "free," "freedom," "choice," and "equality," while the conservative lexicon began with "private," "property," "norm," and "tradition." The results showed that the liberal lexicon was related to economic issues, emotional and cognitive states, and moral reasoning, whereas the conservative lexicon was more closely tied to authority, religion, and property. However, as the authors noted, these findings largely reflect the influence of the seed words themselves. Including words such as "tradition" and "orthodox" in the seed list, for example, naturally generates more religion-related terms in the resulting lexicon.

Examining how liberal and conservative politicians use moral language over time also offers interesting insights. Brady et al. (2019) investigated liberal–conservative debates and found that conservative leaders often moralize their messages strongly around themes of loyalty, authority, and sanctity, while liberal leaders more frequently focused on harm and fairness. Their results additionally showed that such strongly moralized messages tended to spread more quickly on social media. In contrast, Wang and Inbar (2021) observed that from 2016 to 2018, US Democrats employed more intense moral rhetoric, emphasizing harm, fairness, and loyalty. They attributed this shift to power dynamics, suggesting that groups in opposition are more likely to use heightened moral language against those in power. These findings imply that moral language is not a static feature of political discourse; rather, it is a flexible tool that shapes, and is shaped by, situational factors. This underscores the importance of going beyond the simplistic fixed liberal–conservative contrast when analyzing political interpretations, as we attempted to do in the present study.

Our study also questions the direction of causal inference posited by Araque et al. (2021). While that work hypothesized political ideology to be a driver of conceptual diversity, here we explore the idea that conceptual diversity itself might contribute to political polarization. A similar study by Karjus and Cuskley (2024) analyzed Twitter posts and discovered a marked divergence in language use—ranging from word frequency to emoji choice—across politically aligned groups. They argue that such linguistic shifts further indicate polarization and communication gaps. Given the flexible nature of conceptual representations, it is likely that the relationship between ideology and conceptual interpretation is bidirectional: just as ideology shapes how concepts are understood, those evolving conceptual frameworks, in turn, update political attitudes.

Accordingly, rather than focusing solely on conceptual differences between conservatives and liberals, we propose investigating the underlying effects of personality and morality. Moral questionnaires have long been employed to reveal political leanings (Elmer, 2002; Graham et al., 2009; Haidt & Graham, 2007), while the integration of psychological taxonomies into political inclination studies is a more recent approach (Costello et al., 2023). We aim to combine this established moral framework with contemporary personality models to shed light on conceptual diversity within political discourse.

Word Association Study

Our study examined how participants' morality and personality traits, as revealed by standard tools, influence their ratings of both the importance and the directional relationships of political concepts and their associated ideas.

Methods

Participants Five hundred US participants (aged 18 or older) were recruited for an online experiment. The study was reviewed and approved by the Institutional Review Board, and informed consent was obtained from all participants. Participants were minimally compensated ($1) for their participation. After cleaning the data to exclude responses that failed bot checks or had completion times more than two standard deviations below the mean, the final sample size was $N = 476$.

Materials The online survey was divided into three parts. First, participants completed a brief personality questionnaire, followed by a section on moral judgments, and finally, they rated the degree and importance of word associations. For measuring personality, the Big Five model (Openness to Experience, Conscientiousness, Extroversion, Agreeableness, Neuroticism) has been the dominant framework for decades. However, recent studies suggest that alternative personality models may also be appropriate, depending on the purpose of the study (Feher & Vernon, 2021). Specifically, for political studies, the HEXACO[1] model is often preferable due to the addition of a sixth dimension, Honesty-Humility, to the original Big Five (Howard & van Zandt, 2020). HEXACO has demonstrated efficacy in predicting psychological factors such as prosocial lying and leadership preferences (Diníc et al., 2023; Paul et al., 2022). A brief version of the questionnaire was used to accommodate time and resource constraints (de Vries, 2013).

The Moral Foundations Questionnaire has traditionally been effective in identifying the distinct sets of moral dimensions relied upon by liberals and conservatives (Graham et al., 2013). However, more recent studies advocate for the use of the Morality as Cooperation (MAC) Compass, which

[1]Note that what is labeled as Neuroticism in the Big Five model is referred to as Emotionality in the HEXACO model.

provides a robust framework for exploring the moral landscape (Curry et al., 2019). The MAC Compass includes two sets of questions—Relevance and Judgment—that assess the same seven dimensions: Family, Group, Heroism, Deference, Reciprocity, Fairness, and Property. To focus explicitly on participants' values, only the Relevance set of questions was used in this study.

Finally, regarding word associations, the existing literature lacks a data-driven approach to understanding the associations people perceive among political concepts. To address this gap, we used ChatGPT (OpenAI, 2024) to generate word associations for key political concepts. The prompt provided was: *"Generate word associations for freedom, authority, and justice."* From the resulting list, three concept associations were randomly selected from the top five for each concept. The full list of target concepts (TA) and their concepts associations (CA) is shown in Table 1. All concept associations are self-explanatory and commonly found in political literature. Climate-related concepts (e.g., climate change and environmental justice) were also included due to their current political relevance and frequent manipulation within polarized discourse.

Table 1: Target concepts and their concept associations.

TC	CA 1	CA 2	CA 3
Freedom	Free speech	Self-gov.[2]	Climate change
Authority	Legitimacy	Hierarchy	Regime
Justice	Equality	ROL[3]	Env. justice[4]

Procedure The experiment was conducted on Amazon Mechanical Turk (Amazon Mechanical Turk, n.d.). The participants were introduced to the topic of the study and provided informed consent prior to beginning. The order of questions was randomized to minimize potential order effects. For the HEXACO personality assessment, participants rated statements such as "I find it difficult to lie," on a 5-point scale, with 1 representing strong disagreement and 5 representing strong agreement. For the MAC questions, participants evaluated items such as "When you decide whether something is right or wrong, to what extent is the following consideration relevant to your thinking—whether or not someone acted to protect their family," using a 6-point scale, with 1 indicating not at all relevant and 6 indicating extremely relevant.

In the concept-association part of the study, participants rated questions such as "How important is free speech to freedom?" on a 5-point scale ranging from 1 (not important) to 5 (critically important). They also answered directionality-related questions—for instance, "How does free speech affect freedom?" using a 3-point scale, where 1 indicated opposing, 2 indicated neutral, and 3 indicated promoting. In these items, freedom served as the target concept (TC), and free speech was its associated concept (AC). Hereafter, we refer to the first type of concept associations (1–5) as importance ratings and the second type (1–3) as directionality ratings.

Data analysis Using R (R Core Team, 2023), we first examined the correlations between personality and morality items and concept-association ratings. Ordinal variables, such as those measured on a Likert scale, are common in psychology but are often analyzed with statistical models that incorrectly assume them to be metric (Bürkner & Vuorre, 2019). To address this, we used an ordinal logistic model, treating concept-importance ratings as an ordinal variable with five levels and personality /morality items as continuous variables.

Two types of clustering analyses were applied: hierarchical agglomerative and k-means clustering. K-means clustering, a simple yet effective non-hierarchical method, is widely used across various research fields, including psychology (Morissette & Chartier, 2013). It is a partitioning algorithm that divides data into k clusters by minimizing the sum of squared distances between data points and their respective cluster centroids (Kodinariya & Makwana, 2013). However, the full k-means clustering procedure was not performed in this study, as we focused only on determining the optimal number of clusters using the elbow method. The hierarchical agglomerative method, on the other hand, begins by assigning each case to its own cluster, with the initial number of clusters equal to the total number of items. In subsequent steps, the most similar items or clusters are progressively merged until all are combined into a single cluster (Yim & Ramdeen, 2015). This approach uses a correlation matrix, based on the assumption that correlations may exist between variables (Liu et al., 2012). To ensure compatibility with the clustering algorithm, the correlation matrix was transformed into a distance matrix with non-negative values. We applied the hierarchical agglomerative method to cluster participants for ideological diversity assessment and used both k-means (elbow method) and hierarchical agglomerative analyses to cluster the questions for tool assessment.

Results

Three personality traits—Openness to Experience, Conscientiousness, and Honesty-Humility—yielded significant effects for the question "How important is free speech to freedom?" as shown in Table 2. The results indicate that for each unit increase in the personality trait Openness to Experience, the log odds of being in a higher versus lower rating category increase by 1.7607, which is statistically significant ($p < .05$). Conversely, for Honesty-Humility, each unit increase in this trait decreases the log odds of being in a higher versus lower rating category by 0.5652, which is also statistically significant ($p < .05$). The summary of all statistically significant results is provided in Table 3 and Table 4.

Participants. The clustering analysis of participants indicated that the optimal number of clusters is between 2 and 4,

[2]Self-governance
[3]The Rule of Law
[4]Environmental justice

as shown in Figure 1. The silhouette method for determining the number of clusters reveals a significant drop in silhouette width after $k = 2$. Beyond $k = 4$, the silhouette width levels off and gradually decreases. The dendrogram of response variables indicates that the most well-defined clusters occur at two clusters, while the least cohesive clustering is observed at four clusters (Figure 4).

Questions. The clustering analysis of questions, as shown in Figure 2, indicates that the 'elbow' point lies between 2 and 3 clusters, although it is not particularly pronounced. This result aligns with the logistic regression analysis, which revealed correlations between morality items and concept associations. These correlations contribute to overlapping clusters, reducing intra-cluster variance and making the elbow point less distinct. The clustering results of the questions, presented in the hierarchical dendrogram (Figure 3), indicate that the largest jumps occur between heights of 0.6 and 0.8, suggesting that cutting the dendrogram at this level would produce 3–4 clusters. A closer examination reveals that the morality questions (Q25–Q45) form a large cluster near the left-center, while the conceptual association questions (Q46–Q63) split into smaller clusters on the left and right extremes. Some conceptual questions (e.g., Q48, Q54, Q53) are distinctly grouped together. The morality questions appear relatively cohesive but can be subdivided into smaller clusters that reflect specific aspects of morality (e.g., family vs. reciprocity). In contrast, the conceptual association questions show weaker cohesion, with some clusters possibly capturing related themes, such as "freedom" and "authority".

Table 2: Summary of the regression coefficients for the ordinal logistic model of the importance rating "free speech to freedom".

Personality trait	Value	Std. Error	t value
Openness to Exp.	1.7607	0.2426	7.2574*
Conscientiousness	0.9167	0.2376	3.8574*
Agreeableness	-0.4855	0.2805	-1.7308
Extroversion	0.1590	0.2403	0.6616
Emotionality	-0.2661	0.2624	-1.0143
Honesty-Humility	-0.5652	0.2163	-2.6132*

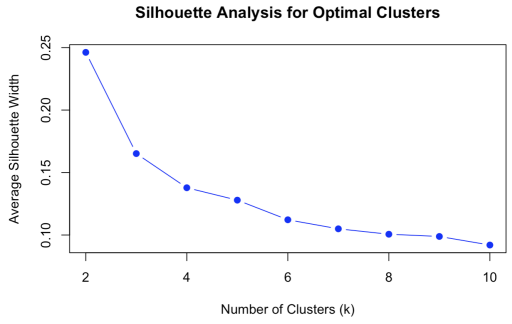

Figure 1: Scree plot for clustering participants.

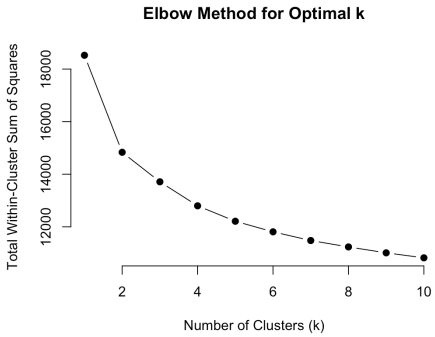

Figure 2: Scree plot for clustering morality and concept association ratings.

Discussion

This study investigated how people's political concept associations vary according to their morality and personality traits. By incorporating personality into the analysis, our research seeks to move beyond the traditional one-dimensional liberal–conservative framework to better understand the cognitive diversity of political concepts. Identifying correlations between personality and morality traits on the one hand and political concepts on the other hand allowed us to view the liberal–conservative distinction through a broader lens.

By comparing Table 3 and Table 4, we observe that Openness to Experience, Conscientiousness, and Honesty-Humility are the personality traits that appear most frequently in association with political concepts, while Reciprocity is the most prominent morality item. These results are expected, given the strong relationship between these traits and political inclinations. Another notable finding is that directionality questions significantly reduced the number of morality and personality items correlated with concept associations. This implies that although participants with certain traits believed that concept associations are important for the target concept, they were more cautious in their judgments when the question was rephrased to ask whether the association promotes or opposes the target concept.

A closer examination of the less frequently appearing items reveals that individuals high in Emotionality view climate change as important to freedom. This finding aligns with existing literature, which shows that the anxiety subfacet of Emotionality predicts pro-environmental values (Hopwood et al., 2021; Pickering & Dale, 2023). Additionally, people high in Emotionality perceive legitimacy as important to authority, self-governance as likely to promote freedom, and hierarchy as likely to promote authority. Beyond anxiety, the Emotionality factor in the HEXACO model encompasses traits such as sentimentality, sensitivity, and fearfulness, contrasting with traits such as toughness, bravery, and self-confidence (Shepherd & Belicki, 2008). This distinction also explains why Heroism is negatively correlated with the association between Freedom and Self-governance, while Emotionality is posi-

Table 3: Summary of the statistically significant correlations between importance ratings. The first line of the table indicates that people high in Openness to Experience, Conscientiousness, and Reciprocity believe that free speech is important to freedom, whereas those high in Honesty-Humility do not.

TC & CA	Personality items	Morality items
Freedom & Free speech	O, C, H-H (negative)	Reciprocity
Freedom & Self-gov.	O, C, H-H (negative)	Reciprocity, Fairness (marginally)
Freedom & Climate change	O, Em., H-H (negative)	Fairness
Authority & Legitimacy	O, C, Em., H-H (negative)	Reciprocity
Authority & Hierarchy	O, H-H (negative)	Family, Reciprocity, Deference
Authority & Regime	O, H-H (negative)	Deference
Justice & Equality	O, C	Reciprocity, Fairness
Justice & ROL	O, C	Reciprocity
Justice & Env. justice	O, A (negative), H-H (negative)	Group, Reciprocity

Table 4: Summary of the statistically significant correlations between directionality ratings. The first line of the table indicates that people high in Openness to Experience and Conscientiousness believe that free speech promotes freedom, whereas those high in Heroism do not.

TC & CA	Personality items	Morality items
Freedom & Free speech	O, C	Heroism (negative)
Freedom & Self-gov.	Em.	Heroism (negative)
Freedom & Climate change	H-H (negative)	None
Authority & Legitimacy	O, C	None
Authority & Hierarchy	Ex., Em.	None
Authority & Regime	O, Ex.	None
Justice & Equality	O, C	Reciprocity, Deference (negative)
Justice & ROL	C	Reciprocity (marginally)
Justice & Env. justice	O, C	None

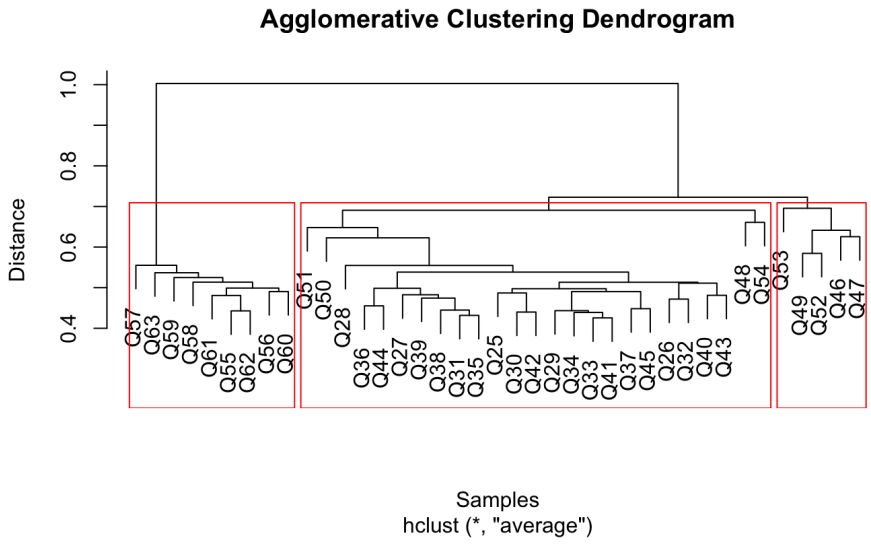

Figure 3: Dendrogram illustrating the clustering results of morality and concept association ratings. The leaves of the dendrogram represent the question variables. Q25–Q45, which include morality questions, form a large cluster in the middle with divisions into smaller clusters that reflect specific items (e.g., family, reciprocity, etc.). Q46–Q63 are concept association questions, which appear less cohesive and are positioned on the left and right extremes of the dendrogram.

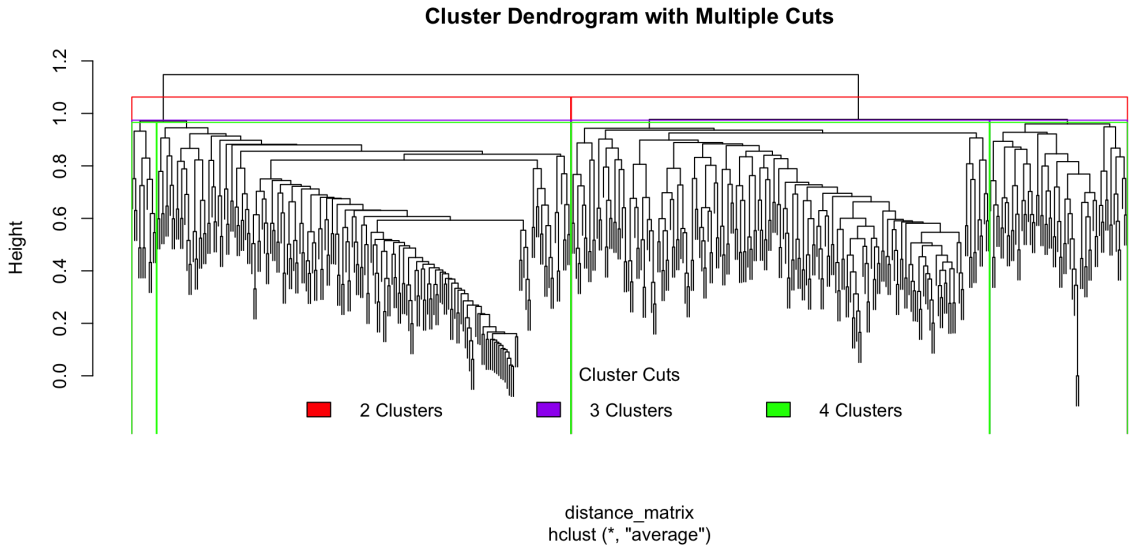

Figure 4: Dendrogram illustrating the clustering results of participants based on their responses. The leaves of the dendrogram represent participants as individual data points. The red line indicates two well-defined clusters. As the number of clusters increases to three (purple) and four (green), the clusters become less cohesive.

tively correlated.

The morality item Deference frequently appears in relation to authority-based questions. Individuals high in Deference perceive hierarchy and regime as important to authority but believe that equality is unlikely to promote justice. This finding warrants further exploration, as the concept of equality can be interpreted differently across ideologies. Given that the participants were from the USA, those high in Deference are more likely to lean toward right-wing ideologies, as suggested by the study conducted by Araque et al. (2021). In such worldviews, certain hierarchies and inequalities are seen as both inevitable and desirable within a just social order.

The morality item Family appears only once, among individuals who perceive hierarchy as important to authority. This result is also expected, given the inherently hierarchical nature of family structures (Nock, 1988; Shaw et al., 2004). Two additional findings are more challenging to interpret due to the lack of an obvious link between the correlations: individuals high in Agreeableness view environmental justice as unimportant to Justice, and those high in Extroversion believe that hierarchy and regime are likely to promote Authority.

Limitations and Future Recommendations

The clustering analysis of participants suggests that concept associations did not provide significant additional insight beyond the morality questionnaire. Hierarchical agglomerative clustering revealed two well-defined clusters and three to four less cohesive clusters, indicating limited ideological diversity. The clustering analysis of questions revealed a well-defined cluster for the morality questions, while the concept associations were placed in less cohesive clusters at the left and right extremes. It is worth noting that a well-established questionnaire was used for morality, whereas the concept-association questionnaire was a pilot instrument designed with the assistance of AI. Another consideration for future research on the cognitive diversity of political concepts is their latent nature. Specifically, in our questionnaire, the target concept was provided up front, potentially introducing bias into participants' responses.

One possible approach to remedying that could involve implementing implicit measures of attitudes. Ferguson and Bargh (2007) argue that automatic (implicit) attitudes reflect unintentionally activated evaluations of "object-centered contexts" rather than evaluations of the object itself. Furthermore, they suggest that automatic attitudes are more context-dependent than deliberately formed ones. For example, respondents who do not want to be perceived as racist may report positive attitudes toward certain races but behave differently in private settings (McConahay, 1983). Implicit measures were designed to reduce this strategic editing of attitudes toward stigmatized behaviors (Swanson et al., 2001). Integrating implicit measures could help minimize the bias introduced by political party affiliation.

Another possible solution is to utilize open-ended concept maps (de Ries et al., 2022). Questions such as "*What does self-governance mean to you?*" or prompts such as "*What are the implications of climate change in the context of freedom?*" can yield data for rich qualitative analysis. Despite the challenges associated with data analysis in this method (Buhmann & Kingsbury, 2015; Jirásek et al., 2016), it can uncover unexpected relationships and allow for deeper exploration of underlying concepts.

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