

Concept Paper

# How to Effectively Promote Eco-Friendly Behaviors: Insights from Contextual Behavioral Science

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**Abstract:** The rapidly increasing rate of climate change is a major threat of our time. Human behaviors contribute to climate change. These behaviors are malleable. To change human behavior in significant and sustainable ways, we need a scientific understanding of motivation and behavior change. One area in psychological science that provides precision, scope, and depth to our understanding of human behavior and motivation is contextual behavioral science (CBS). The current article provides an account of how CBS can provide real-world solutions to promoting positive behavior change to reduce human-induced climate issues. Specifically, we will outline six evidence-based considerations for organizations aiming to promote pro-environmental behaviors through messaging, advertising, and social marketing. Practical examples are provided across all six considerations to promote behavior change to reduce the rapidly increasing rate of climate change.

**Keywords:** relational frame theory; climate change; contextual behavioral science; rule-following; pliance; sustainability; innovation; eco-friendly



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## 1. Introduction

Climate change is a major concern of the 21st Century. Peer-reviewed empirical research from a range of disciplines concurs that (i) climate change is happening *now*, (ii) the rate of climate change is rapidly increasing, and (iii) human activity following the Industrial Revolution including population and economic growth (e.g., use of fossil fuels) is a major driver of climate change [1]. The behaviors contributing to human-induced global warming are all changeable behaviors. Yet, despite the apparent scientific consensus around the imminent and permanent effects of climate change [2], organized actions to prevent further harmful change remain minimal.

The Intergovernmental Panel on Climate Change [2] suggest climate change can be effectively reduced and managed through adaptation and mitigation. Thompson (2010) [3] argues that there are three available responses to climate change; we can strive to mitigate climate change, adapt to new environments, or suffer. If humanity is to survive and thrive, responses involving mitigation (i.e., reducing behaviors resulting in climate change) and adaptation (i.e., adjusting to expected climate change) are necessary. Yet, consumers (both at the individual and organizational level) are slow to react to this pressing issue [4]. Simply put, climate change is an issue caused by human behavior that can also be fixed by human behavior. To change human behavior in significant and sustainable ways, we need a scientific understanding of behavior change motivation. One area in psychological science that provides precision, scope, and depth to our understanding of human behavior is contextual behavioral science (CBS) [5].

This article outlines how CBS can provide real-world solutions to promoting positive behavior change. More specifically, we will describe how government/not-for-profit organizations/companies may best ‘persuade’ consumers to alter their behaviors and consumption patterns to be more eco-friendly and less wasteful. It is important to emphasize that we use the term ‘consumer’ as a broad, all-encompassing referent for users of the

Earth's resources, ranging from the individual level to larger organizational level. At this point, we would like to emphasize that CBS (and other contextual accounts) strives to identify principles and strategies that scale hierarchically across complex, multi-level systems. Contextual perspectives further recognize that changes at one level can proudly impact context, function, and behavior across levels. This article presents a number of strategies likely to increase eco-friendly behaviors. In theory, these strategies (in some form) may be employed by/targeted toward any system level (i.e., individuals, governments, not-for-profit organizations, etc. could use/experience these strategies), however, for pragmatic purposes, we will predominantly discuss applications of these strategies in terms of larger organizations impacting nested consumers. Simply put, we will generally discuss larger organizations as shapers of the context that can either promote or discourage eco-friendly behaviors among their members. We invite readers to remember that behavior change within complex systems is not unidirectional (i.e., individuals can equally/asymmetrically impact organizations, subgroups within organizations, etc.), rather such behavior change is dynamic (i.e., shifts at one level can contribute to shifts at another, which may evoke further shifts at the initiating level, etc.) and contextual (i.e., impacted culture, power structures, economics, etc.). Whether the outlined strategies are most effective in a given context at one level or another, in one direction or another, is an empirical question worthy of future research. Our intention with this paper is to explicitly link related streams of literature through non-comprehensive synthesis and integration in service of inspiring future work and advancing the field.

This article will begin with a brief introduction to a CBS approach to human language and cognition, namely relational frame theory (RFT). Next, drawing on Stapleton's (2020) [6] paper on promoting rule-following through RFT, cognitive neuroscientific, behavior analytic, and social psychological lenses, we will then describe six key 'ingredients' or considerations for organizations aiming to promote pro-environmental behaviors through messaging, advertising, and social marketing.

### *1.1. The Importance of CBS in Relation to Climate Change*

CBS is a modern, evidence-based approach to understanding human behavior. Any attempt to understand human behavior change necessitates an understanding of language and cognition. Humans understand the world through their thoughts, experiences, and senses. CBS is not the only theoretical framework in which human behavior is interpreted; however, it is one that is of particular relevance to climate change because: (i) it has a fundamental emphasis on behavioral actions in context, and (ii) it focuses on interventions for managing and changing dysfunctional behavior. From a CBS perspective, practical interventions to help influence behavior are not simply an afterthought, rather they are a theoretical requirement.

In accordance with CBS, in order to promote recommended climate change practices, government/not-for-profit organizations/companies must examine the contingencies in which poor practices and best practices occur. Simply put, consumers' behavior does not occur in a vacuum; like all behavior, it occurs in a particular context and is often guided by social reinforcement. One way in which we have ended up in the climate crisis is because social reinforcement is delivered for outcomes that do not encourage beneficial climate change practices (e.g., materialism, convenience, travel, etc.). Recently, we have seen a small shift with some social reinforcement happening for more eco-friendly practices (e.g., vegan lifestyles, reduction in travel, reusable bags, sustainable fashion, renewable energy source utilization, etc.), however, these are neither widespread nor at the scale/speed needed for the changes required to mitigate the damage caused to our planet.

Over the past fifty years or so, psychologists interested in understanding consumers' environmentally friendly behavior and choices have primarily examined consumers' 'attitudes' towards environmental issues and consumers' beliefs involved in decision-making processes [7,8]). This body of literature typically employs terms that make intuitive sense and are accessible/easy to understand and is therefore attractive to the general public and

policy-makers. However, while the face validity of these terms is undoubtedly a strength, they ultimately lack reliable predictive validity, do not account for contextual factors, and often fail to inform appropriate, tangible interventions [9,10]). As such, relying on attitudinal research in isolation is insufficient. This is largely due to the fact that examining relationships between what people *say* and what they *do* does not inform the development of interventions for meaningful behavior change.

In line with extant approaches (see Milfont and Markowitz (2016) [11] for a review and multi-level perspective), rather than focusing on correlations between attitudes and behaviors alone, we recognize the need for a science of behavior that allows us to understand the contexts (situations) in which people are likely to engage in any behavior we want to change (i.e., increase or decrease). When we identify the contexts in which behavior occurs we can then start to determine what contingencies (i.e., antecedents and consequences) maintain that behavior. We can then change the context in order to change the behavior. For example, if we determine that organizations are more likely to engage in appropriate disposal of industrial waste when there are financial incentives to do so, we can ensure financial incentives are in place to increase the likelihood that industrial waste is disposed of correctly.

To summarize, CBS offers advantages over traditional, attitudinal approaches to eco-friendly behavior. CBS is underpinned by RFT, a model of language and cognition that proposes ways of intervening to bring about desired and functional changes. Next, we will briefly describe RFT, emphasizing the relevance of the RFT account of rule-following.

### 1.2. The Relevance of Relational Frame Theory and Rule-Following

According to RFT [12], we learn to relate (relationally frame) things in our environment and this relational activity can change the psychological functions of those things. This is referred to as the ‘transformation of function’ (TOF) effect and can be highly useful in many contexts. For example, if I learn that A is the same as B and C is the same as B, I can derive that A and C are the same as each other. Now if I learn that A means ‘burning hot’, I may not touch a surface with a C sign on it. However, TOF can also be problematic in some contexts. For example, I may frame myself as someone who does not care about future generations, and, based on that framing, I may derive further relations such that I do not need to engage in ‘green’ behaviors. In the latter example, the functions of other ‘green’ behaviors are transformed for me so that I tend to avoid them, even though saving the planet may be beneficial even to my own generation given the speed at which change is happening.

One important phenomenon facilitated by language is rule-following. While non-humans learn primarily through association (e.g., ‘when the bell rings I get food’) and the consequences of their behavior (e.g., ‘a treat is given following sitting’), humans are able to act in accordance with language-specified, rather than directly experienced, contingencies. These rules are provided sometimes by other people (e.g., ‘bring reusable bags to the store’) and sometimes by a person themselves (e.g., ‘I need to use less gas’). RFT provides a technical account of rules and rule-following in terms of relational framing. It is important to note that the concept of ‘rules’ as used within CBS and RFT is a broader one than the concept as used more conventionally. The conventional sense of ‘rule’ is as a verbal statement that explicitly prescribes behavior (e.g., ‘we must reduce flying to save the planet’), whereas the concept of ‘rule’ as used by CBS and RFT refers to verbal statements about events in the world that can influence someone’s behavior more generally (e.g., ‘I feel bad for using plane travel given what I know about climate change’).

Ultimately, the RFT account of rule-following has important implications for how relevant organizations develop and design messages to change behavior. Encouraging rule-following comes down to effective messaging strategies [13]. Skillful marketing is needed to meaningfully impact consumer behavior [4]. Incorporating the RFT account of rule-following into messaging strategies will enable organizations to consider both what they choose to say explicitly and the relations consumers are likely to derive [4].

### 1.3. A Note on Other, Similar Approaches

Although CBS is not standard in this area, there are other, similar approaches evidenced to beneficially impact eco-friendly behaviors. A comprehensive summary and integration of these approaches is beyond the scope of the present synthesis; however, it is important to acknowledge extant knowledge and highlight what CBS adds. To this end, as an example, we will briefly discuss behavioral economics, a field sprung from microeconomics that synergizes economics and psychology to understand decision-making [14].

Within behavioral economics, there exists a continuum in terms of the ways theorists conceptualize the nature of decision-making [15]. At one end of the continuum, theorists focus exclusively on mentalistic causes of behavior, meaning thoughts and feelings are viewed as initiating causes of behavior (i.e., these theorists approach decision-making from a traditional cognitive psychological perspective, which differs from CBS in terms of epistemology) [15]. At the other end of the continuum, theorists emphasize the principles of operant learning through the reinforcer pathology model [15]. In simple terms, the reinforcer pathology model describes how unfavorable consequences may acquire greater reinforcing value than more favorable consequences. In this way, behavioral economics provides insight into apparent “irrational” behaviors (e.g., why a student may choose to delay preparing a manuscript and instead stream a tv series, short-term gain, long-term pain behaviors, etc.).

Despite the behaviorist version of behavioral economics being summarized by Hursh in 1980 [16] in terms of demand functions, reinforcer competition, and economy type (with discounting later integrated into the approach [17]), it has arguably yet to fulfill its potential [18]. More specifically, according to Furrebøe and Sandaker (2017) [17], although the behaviorist perspective has been successfully integrated into some behavioral economic issues, its influence beyond the behavior analytic field is limited. As such, theorists working from a behavioral economics perspective may place disproportionate emphasis on the topography of eco-friendly behaviors (i.e., how the behaviors look, what the behaviors are, etc.) versus the function of engaging/not engaging in those behaviors for the individual consumer (i.e., how does the behavior serve the individual, what is maintaining/inhibiting this behavior, etc.) [19]. The latter of these, behavioral function, is of particular interest from a CBS perspective; understanding ongoing acts in context allows behaviors to be predicted and influenced with precision, scope, and depth. A complete overview of behavioral economics is beyond the scope of the present synthesis; readers are directed to Edwards (2021) [20], Reed et al. (2013) [15], and Venkatachalam (2008) [19] for more comprehensive discussions and integrations of behavioral economics.

### 1.4. Summary

To summarize, while there are similar, evidence-based approaches to eco-friendly behavior change (including and not limited to behavioral economics), CBS is a valuable addition to this area. CBS is functional contextual in nature, rejects mentalism (i.e., viewing thoughts and feelings as initiating causes of behavior), examines behavioral function, and explicitly aims to predict and influence behavior with precision, scope, and depth. A complementary advantage of CBS to other, similar approaches that look at demand functions, reinforcer competition, and economy type, is its evidence based account of cognition. When trying to understand the impact of demand functions, reinforcer competition, and economy type on human behavior change we must understand key cognitive processes such as decision making, reasoning, rule following and problem solving. CBS provides an evidence based behavioral account of cognition as learned behavior. We propose that the CBS account of human cognition may add to the description accounts of phenomena in existing approaches. For example, this account can provide an understanding of how phrasing the same content in two different ways can change its meaning; CBS provides an analytic account of when and why phenomena described in accounts such as behavioral economics occur. Adding a relational frame theory perspective provides insight into forms of behavioral regulation because the apparent capacity to relate events based on context

creates reinforcers and augments their impact, establishing forms of stimulus control. Understanding the impact of this human capacity is critical to understanding how to promote eco-friendly behaviors as an understanding of phenomena such as demand functions, reinforcer competition without considering the impact of such relational framing is limited.

We will now describe six RFT-informed ways to increase the likelihood that messages promoting pro-environmental behavior will enact change. Each section will begin with a brief description of the consideration, followed by a summary of related evidence, and application to promoting eco-friendly behavior. It is important to note that these principles are scalable across the levels of influence on population behavior (i.e., individual-, social network-, community-, and place-based drivers of population behavior), facilitating multi-level interventions [21].

## 2. How to Effectively Promote Eco-Friendly Behaviors

### 2.1. Establish Credibility

Messages promoting environmentally friendly behaviors are most likely to be effective when they are presented by a credible speaker [22,23]). Credible speakers are those that consumers perceive to be knowledgeable, logical, truthful, etc. These traits are generally treated as apparent predictors of rule accuracy, and, as such, credibility increases the likelihood that messages will be effective. Organizations and companies may establish credibility directly (e.g., by consistently behaving in ways that are perceived to be wise, honest, etc.) or verbally (e.g., by being related to other organizations that are deemed credible by consumers, such as the Environmental Protection Agency [22]).

In addition to empirical support from the obedience and compliance literature (e.g., [24]), the importance of speaker credibility has been observed in recent health communication research, with greater perceived credibility associated with greater intention to act on given advice [25,26]). In the context of climate change, Dietz et al. (2007) [27] found that trust was one of the most significant predictors of policy support. More specifically, greater trust in environmental groups/scientists and lesser trust in industry (e.g., coal companies) was associated with stronger support for climate change mitigation policies. Similar findings were observed by Arbuckle et al. (2015) [28], with greater trust in environmental interest groups associated with greater perceived risk from climate change and a greater belief that action should be taken.

Similarly, in organizational contexts, research on quality management systems has highlighted symbiotic relationships between quality management systems and environmental innovation. Simply put, organizations with high quality (i) leadership and (ii) measurement, analysis, and knowledge management were more likely to endorse corporate sustainable development practices (e.g., implement strategies directed toward sustainable development goals). For example, Zhao et al. (2022) [29] found that having a quality management system (as per Malcolm Baldrige National Quality Award ratings across six dimensions) facilitated organizations in achieving their sustainability goals. These findings suggest that (i) modelling desirable behavior and (ii) using data to support key processes may be beneficial; both of these behaviors relate to speaker credibility. Related to this, organizations and companies seeking to change consumers' behavior must also attend to the impact of consumers' social or political identities on both (i) where they source information, and (ii) which sources they deem credible [30,31]. Consumers' political ideologies and worldviews in particular are evidenced to impact the extent to which they believe climate science [31–34], likely due to how their group endorses or undermines the credibility of those conducting research and developing climate change policies [30]. Therefore, environmental organizations should utilize a range of outlets and speakers to reach as many consumers as possible through sources they trust [35]. Environmental organizations may also try to undermine the credibility of interest groups that contest the existence or seriousness of climate change, while simultaneously trying not to incite counterpliance (see Section 2.5 below). For example, environmental organizations may



highlight how interest groups directly benefit from preventing climate change policies being implemented (i.e., questioning their motivations, honesty, etc.).

## 2.2. Deliver Appropriate Consequences

A message is less likely to impact climate-relevant behaviors if consumers believe that the speaker has limited authority and thus capacity to mediate consequences [22]. Simply put, consumers are more likely to change their behavior in line with messages if they believe that consequences will be delivered for compliance/non-compliance [23]. Therefore, organizations should be explicit in the ways they intend to consequence behaviors, either by increasing the cost of wasteful consumption and/or decreasing the cost/increasing the incentives for pro-environmental behaviors.

Returning to the obedience literature, a speaker's perceived ability to mediate consequences is evidenced to impact behavior (e.g., [24,36]). Within the RFT literature, in the context of rule-following, authority does seem to impact message uptake. Specifically, Donadeli and Strapasson (2015) [37] found that participants were more likely to follow rules when they knew they were being monitored. Moreover, when participants received a social reprimand for rule-breaking, they persisted in following a given rule, even when doing so was no longer advantageous [37]. Feedback is another form of consequence that is of particular relevance to environmentally friendly behaviors [21]. For example, a review of intervention studies targeting household energy conservation found that feedback messages reduced energy consumption by up to 13% [38]. Tailored recommendations were found to reduce wasteful consumption even further, with decreases of 21% in electricity usage observed among participants who received energy audits (i.e., personalized feedback) relative to a control group [38].

In line with this, in the context of climate change, organizations may introduce financial incentives to encourage consumers to engage in environmentally friendly behaviors (e.g., subsidies to purchase eco-friendly cars, imposing increased gasoline taxation, etc.). Alternatively, organizations may attempt to increase the salience of existing financial incentives. For example, Zhang et al. (2022) [39] report that companies that invest in environmentally friendly projects attract other investors/funders which then put money back into the original company (i.e., green investments can beneficially impact companies' performance on the stock market). However, there are some issues associated with relying solely on monetary incentives. First, these incentives often fail to gain traction due to a lack of support from the general public [21]. Second, some researchers suggest that financial incentives may be counterproductive given their potential to 'crowd out' intrinsic motivations for protecting the environment [40,41]. Although Steinhorst and Klöckner (2018) [42] found that financial incentives did not reduce pro-environmental intrinsic motivation, pro-environmental intrinsic motivation itself was identified as a mediator of the given pro-environmental message on consumers' intention. Therefore, environmental framing of behavioral interventions may be better suited to promoting eco-friendly behaviors across time. A final issue stems from how emphasizing materialistic ideologies and material wealth may ultimately increase wasteful consumption [13]. In an ideal world, organizations would work to establish and increase the effectiveness of non-material reinforcers, pivoting from a 'work-to-consume' culture toward one that values aesthetics and time wealth [13].

Organizations must also be cautious when using arbitrary social incentives (e.g., praise) to increase consumers' engagement in eco-friendly behaviors. Messages that focus solely on describing (i) standard levels of consumption or (ii) behaviors that are endorsed or condemned within the given context may not be effective long-term [43,44]. From an RFT perspective, an overreliance on arbitrary socially mediated consequences is called 'generalized pliance' [44]. Although generalized pliance generally differs across lifespans [45] and cultural contexts [46], promoting excessive 'people-pleasing' or an overreliance on arbitrary praise and disapproval can create ossified behaviors that are less sensitive to shifting environmental contingencies (i.e., patterns of problematic behaviors that are resistant to change). Moreover, behaviors controlled solely by pliance may not persist when consumers

believe they are not being observed (i.e., when there is a perceived absence of these consequences [44]). For example, consider an industrial organization based near a large body of water that wants to dispose of a significant amount of waste. If the organization leaders had previously adhered to eco-friendly practices based on solely pliance, and, if they now believe that no one will ever find out (i.e., there is a perceived absence of arbitrary socially mediated consequences), they may choose to dispose of the waste by polluting the water. Therefore, while approval/disapproval may be useful at the beginning of a messaging campaign, organizations should strive to shift toward more natural, values-oriented motivators to enact sustainable change.

In addition to considering the type of consequences, organizations must also consider the type of schedule of reinforcement that may work best for their target population. In the context of climate-relevant behaviors, variable schedules of reinforcement have been associated with long-term improvement following sustainability interventions [47]. For example, Ro et al. (2017) [48] observed a significant decrease in household electricity consumption following an intervention that included cash prizes being awarded randomly each week to participants who reported engaging in at least one eco-friendly behavior. This effect was maintained 6-months after the game had ended [48], highlighting the behavior change power of a variable schedule. Schedules of reinforcement may be thinned once the target behavior has become habitual, with extrinsic rewards completely phased out over time in some cases [47]. To summarize, organizations are most likely to enact behavior change if consumers believe that they can consequence behavior and that the delivered consequences are both (i) appropriate for reducing long-term consumption, and (ii) delivered per an appropriate schedule of reinforcement.

### *2.3. Make Sense and Increase Consumers' Perceived Self-Efficacy*

A message is most likely to enact behavior change if it seems plausible to the consumer [22]. From an RFT perspective, this means ensuring the elements of the message and related relational networks are not contradictory or incoherent with the consumer's existing understanding of the world [23]. To illustrate this, consider Alavosius et al.'s (2015) [4] simple example of 'Joe', a fictional character who is shopping for a new vehicle and thinks electric vehicles are not 'masculine', further viewing them as lesser symbols of status relative to sport utility vehicles. For Joe, messages that focus solely on the 'masculinity' or 'status' of electric vehicles are unlikely to be effective because these are incoherent with his existing relational networks. As such, an alternative approach that seeks to add something new to the existing network is more likely to be effective.

The importance of message plausibility has been addressed in health communication literature in relation to treatment adherence. Specifically, if a physician wants to impact an individual's adherence to a treatment plan, then research suggests they ascertain the individual's understanding of the proposed treatment, further recommending participatory decision-making to address potential incoherencies and issues around perceived self-efficacy [49]. Turning to the RFT literature, Watt et al. (1991) [50] found evidence to suggest that prior learning histories suppress equivalence responding. In simple terms, if particular patterns of relating dominate a consumer's existing set of learned relations, then these are unlikely to be undermined by mere reversals alone (i.e., trying to override 'electric vehicles  $\neq$  masculine' by presenting 'electric vehicles = masculine' is unlikely to work) since these relations are additive, not subtractive, in nature. Essentially, this 'reversal' approach may actually increase the salience of the original 'electric vehicles  $\neq$  masculine' relation. Applying this to the 'Joe' example, it may be more effective to work toward deemphasizing the 'psychological importance' of the relevant categorization (i.e., 'masculinity' as a means of grouping stimuli), or to facilitate the creation of numerous overlapping categorizations [22]. Functionally, the aim would be, not to 'remove' the problematic relation, but rather to decrease its saliency, loosening the network and providing space for flexible responding. Extending this to climate change, when targeting climate change skeptics, inviting them to focus on how well conspiracy theories explain climate-relevant outcomes, rather than

trying to ‘reverse’ their existing understanding, can better mitigate biased evaluations of climate science, climate policies, and messages promoting eco-friendly behaviors [51].

Related to rule plausibility is perceived self-efficacy [22]. In the context of climate-relevant behavior, perceived self-efficacy refers to the extent to which a consumer believes they can adopt eco-friendly behaviors. If a consumer believes that they are incapable of successfully engaging in the relevant behaviors, then the message is less likely to be effective. In the context of climate change research, both informational self-efficacy (i.e., consumers’ perception of their ability to inform themselves about climate change) and general environmental knowledge are positively correlated with engagement in eco-friendly behaviors [52,53]. Similarly, the extent to which a message states the benefits of eco-friendly behaviors that align with consumers’ existing intrinsic and/or extrinsic motivators impacts its behavior change power [54]. Finally, research demonstrates that messages are most likely to increase climate-relevant behaviors when they are well-presented and easily accessible to consumers [35,55], with knowledge-based interventions evidenced to increase perceived self-efficacy and enhance openness and engagement in climate change discussion [56]. Taken together, one possible interpretation of these findings is that, when information on climate-relevant behaviors is presented in a way that makes sense to consumers (i.e., appears plausible and achievable), then consumers are more likely to be receptive to shifting toward eco-friendly behaviors.

#### *2.4. Facilitate Eco-Friendly Behaviors Transiting into Habitual Behaviors*

Establishing pro-environmental habits is the ultimate goal when promoting long-term eco-friendly behavior change [47,57]. Messages promoting environmentally friendly behaviors are most likely to be effective when the recommended behaviors align with consumers’ existing habits. In line with cognitive neuroscience, a habitual behavior is one that is emitted regardless of shifts in the contingencies that originally influenced it (i.e., regardless of changes in the original establishing schedule of reinforcement [58,59]). Habits themselves arise from continued reinforcement (typically on a variable schedule) for emitting the particular response and are considered to be automatic, inflexible, and cognitively efficient [47,59–61]. This means that consumers are particularly likely to fail to maintain eco-friendly behaviors that have not been effectively established as habitual behaviors, especially when performing secondary tasks [60]. Therefore, organizations seeking to promote pro-environmental behaviors must also endeavor to transition these behaviors into habits in order to maintain long-term change.

Drawing from cognitive neuroscience data, Vahey et al. (2017) [59] describe features of instrumental behaviors that make them particularly likely to become habitual that should be considered when designing messages to increase consumers’ eco-friendly behaviors. Specifically, Vahey et al. (2017) [59] highlight the importance of variable-interval schedules of reinforcement and the extent to which consumers are disinclined to deliberate about the target behavior, with each shown to facilitate the development of habitual patterns of responding. Related to previous discussions of reinforcer availability and plausibility, Vahey et al. (2017) [59] also note that when behaviors are uncomplicated and reinforced both consistently and intensively in a stable environment across time, they are likely to become habitual.

In addition to facilitating the development of ‘green’ habits, organizations must also manage consumers’ existing wasteful consumption habits. One evidence-based strategy for reducing habit interference involves actively attending to potential slip-ups [62]. This strategy works, not by decreasing the strength of the habitual pattern itself, but rather by increasing consumers’ cognitive control (i.e., their ability to inhibit non-task-relevant information in favor of task-relevant information [62]). In line with this, reminders can be particularly useful in decreasing interference from habits, as evidenced by research on energy consumption (e.g., [31,63]). Another evidence-based strategy requires establishing inhibitory plans and relating these plans to cues that previously activated habits [64]. In simple terms, organizations should encourage consumers to consciously monitor their



own behavior, noticing cues for their own wasteful consumption, and developing plans to take alternative actions when presented with these cues. To summarize, consumers always have choices and organizations should ensure eco-friendly behaviors are available, uncomplicated, and richly reinforced, while simultaneously making wasteful consumption more challenging and less reinforcing [47]. Providing consumers with tips to manage problematic habits while also facilitating the development of ‘green’ habits will ensure any established sustainable behaviors are maintained long-term.

### 2.5. Avoid Inciting Counterpliance

Within the RFT account of rule-governed behavior, counterpliance refers to rule-following under the control of a history of socially mediated reinforcement for a lack of correspondence between the rule and relevant behavior [22,65]). In simple terms, counterpliance occurs when a consumer intentionally does not follow the rule they believe was intended in a message. Conceptually, counterpliance is similar to the concept of ‘reactance’ in general social psychology literature or the ‘boomerang effect’ observed in response to social-norm campaigns and may stem from a consumer’s desire to re-establish their sense of freedom [66]. To illustrate counterpliance, imagine a consumer who chooses to litter despite signage encouraging appropriate disposal of waste in order to receive praise from their peers.

Research suggests that counterpliance is less likely to occur when consumers believe they are being monitored and the consequences in favor of compliance outweigh those in favor of non-compliance [65,66]). Turning to research on effective messaging, in line with Reynolds-Tylus (2019) [67], organizations should also consider whether their messages employ freedom-threatening language, have an appropriate level of message sensation, and refer to others. Regarding freedom-threatening language, explicit, direct calls to action are more likely to incite counterpliance [67]. Therefore, organizations must balance the need to advocate for specific actions with perceived losses of freedom (e.g., ‘I invite you to ...’ versus ‘You must ...’). Regarding message sensation, messages that are dramatic, exciting, and novel (i.e., high sensation value), are evidenced to be more persuasive and less likely to evoke counterpliance [68]. However, organizations must attend to the overarching goal of long-term change/repetition of behavior change campaigns, as repeated presentations of the same message will decrease its sensation value. Finally, relative to self-referencing messages, other-referencing messages evoke lesser counterpliance and are generally perceived as more favorable by consumers [69]. Therefore, organizations should consider emphasizing the influence of individuals’ eco-friendly choices on others (e.g., humanity as a whole, future generations, etc.).

Another consideration arises from recent research on wasteful energy consumption and social-norm campaigns [70]. Descriptive social-norm campaigns aim to reduce wasteful consumption by telling consumers that deleterious behaviors occur less often than people think (i.e., providing a standard level of consumption that consumers are motivated to avoid exceeding). However, for individuals who already consume less than the presented norm, there can be a ‘boomerang effect’ whereby this point of comparison prompts an increase in consumption, becoming a ‘magnet’ for behavior. One viable, evidence-based alternative for organizations is to present messages with injunctive norms, rather than descriptive social-norms [70]. Injunctive social-norms describe which behaviors are endorsed or condemned within the given context. For example, in Schultz et al.’s (2007) [70] study, if participants consumed less energy than the average household in their neighborhood, the researcher would visibly draw a smiley face (i.e., a symbol of social approval for lesser consumption), and found this eliminated the ‘boomerang effect’. However, in line with RFT, encouraging consumers to rely on arbitrary socially mediated consequences may be detrimental long-term, creating rigid patterns of behavior that are less sensitive to shifting environmental contingencies [6,22,37]). Therefore, while organizations may provide arbitrary social approval at the beginning of a messaging campaign, the eventual goal should be to instill consumers with intrinsic motivation for engaging in pro-environmental

behaviors, encouraging them to contact the natural consequences of behaving in line with these motivators.

## 2.6. Establish Appropriate Motivative Augmentals

A message is most likely to impact climate-relevant behaviors if it is connected with consumers' values/what matters most to them [22]. From a CBS perspective, values are freely chosen aspects or qualities relating to what is important for the person and guiding their behavioral choices. Importantly, distinct from goals, 'values' cannot be completed. For this reason, targeting consumers' values in accordance with CBS may facilitate the shift from a 'work-to-consume' culture [13]. From an RFT perspective, values are central to motivative augmental control. Augmentals alter our interest in existing consequences by bringing distant consequences to the present via language (e.g., if organizations know consumers value 'justice', they could increase/augment message effectiveness by emphasizing how justice relates to environmentally friendly behaviors). In this regard, messages aiming to motivate behavior change should feature adequate motivative augmentals; they should be linked to consumers' values (e.g., values in the domains of health, family, relationships, recreation, spirituality, education, work, etc. [5]). The more tailored messages are to consumers' values, the more likely they are to enact change.

A lack of values clarity and valued action (i.e., failing to behave in ways that are consistent with our values) are recognized components that contribute to psychopathology and suffering [71,72]). From a CBS perspective, individuals who function inconsistently to what is truly meaningful and valuable to them engage in behaviors that favor immediate short-term gains over delayed long-term gains and are in direct opposition to who the person really wants to be. Unfortunately, it is common for individuals to lose their valued directions and become confused about what it is that is of meaning to them when living in societies that promote consumerism and overconsumption. Explorations of personal values (e.g., as carried out in the CBS psychotherapeutic approach of acceptance and commitment therapy [73] may help individuals clarify values and choose to engage in behaviors that align with these values, including more eco-friendly behaviors.

To summarize, messages should instigate personal intrinsic values and meaning, further striving to align environmental behavior change practices to these values. For example, returning to Alavosius et al.'s (2015) [4] character 'Joe', if Joe cares about his children, understands electric vehicles are less harmful to the environment and comes to relate 'climate change' to 'harmful for his children', Joe may be more likely to purchase an electric vehicle and engage in other environmentally friendly behaviors. If Joe was a chief executive officer of an oil or coal company, establishing this intrinsic motivation could significantly impact his company's practices and climate change as a whole. So long as the consequences for engaging in valued actions are stronger than those in favor of values-inconsistent actions, Joe will likely persist in values-consistent eco-friendly behaviors [74]. Research demonstrates that linking eco-friendly behaviors to individuals' intrinsic values (particularly those related to universalism and benevolence) in this way can increase both environmentally friendly policy recommendations and engagement in greater sustainable environmentally relevant behaviors [75]).

A further consideration arises from how the effects of climate change may not appear to be directly impactful upon us immediately or in the near future (i.e., may not seem as 'strong' as more immediate consequences). The science of behavior analysis demonstrates that immediate consequences are those that impact and either maintain behaviors if they are reinforcing or lead to decreases in behaviors if they are punishing [76]. Unfortunately, many eco-friendly practices do not have immediate reinforcing consequences and thus are not as likely to be brought about or maintained. As such, motivating augmentals or establishing operations are important so as to provide the context for eco-friendly behaviors and when the outcome is immediate satisfaction of doing what matters to a person (valued-living), this has the potential to act as the immediate reinforcer that can contribute to behavior changes.

Given the evolutionarily adaptive social nature of humans, it is important to encompass prosocial values as motivating augmentals in addition to more individualistic ones. A CBS prosocial approach [77] can aid in promoting shared purpose and identity, improving cooperation with others to achieve common aims for the benefit of society as a whole. Climate change is a global problem and collective actions are required for its management (IPCC, 2014 [2]). The CBS prosocial approach utilizes Elinor Ostroms' (1990) [78] principles that present fundamental features of successful groups, combining them with CBS psychotherapeutic skills with demonstrated empirical evidence to bring about behavioral changes including eco-friendly behaviors. One example was establishing wind power as the primary source of energy on Martha's Vineyard island [79], whereas other projects have been undertaken in Australia and Africa (prosocial world website). Overall, this approach holds great promise in providing tangible tools for groups and individuals to bring about values-consistent behavior change that can impact climate change practices.

### 3. Conclusions

The current article provides an overview of a scientific understanding of behavior change from a Contextual Behavioral Science (CBS) perspective. We argue that this approach offers the precision, scope, and depth needed to tackle critical behavior change that is required in the context of the climate change crisis. The paper went on to offer a solution-focused approach to promoting behavior change by outlining six key evidence-based considerations for organizations aiming to promote pro-environmental behaviors through messaging, advertising, and social marketing. Specifically, we discussed the importance of establishing credibility, incentivizing effectively, being credible and coherent, helping people realize they themselves can make these changes, forming habits from new behaviors, being careful not to incite reactance, and helping connect individuals to their unique motivations for changing their behaviors. Some of these behavior changes are relatively simple, while others will involve sacrificing conveniences we have become accustomed to. However, arguably, we face the most worthy issue that warrants behavior change, that is, the survival of our planet. We hope our manuscript is useful in facilitating the future development of systematic studies on this issue, such as testing the impact of delivering theoretically appropriate consequences (e.g., financial versus intrinsic incentives for recycling) or techniques theorized to reduce counterpliance (e.g., lesser utilization of freedom-threatening language). We hope researchers and professionals will continue to systematically test the relative effectiveness of the present suggestions in isolation and in combination with each other to find optimal ways to promote eco-friendly behavior.

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