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Comment

Time Matters: Temporal Dimensions of Change in Animal-Product Consumption and Animal Attitudes

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Psychological research on human-animal intergroup relations is increasingly concerned with how people change their dietary behavior and attitudes towards animals, for example to reduce animal product consumption, encourage shifts towards veganism, and promote attitudinal changes regarding animals. Although researchers have begun to use designs that try to detect these changes, either naturalistically or via interventions, longitudinal studies remain scarce (Green et al., 2025). Practical, conceptual, and empirical issues make longitudinal research challenging. In this commentary, we outline key considerations in this area, and discuss methods for addressing them.

Measurement Timing

The timing of measurement can significantly shape conclusions about the nature and extent of change. At least two interrelated factors make it difficult to capture change in attitudes and behavior. First, the processes involved in change can occur at multiple timescales. For example, a conversation might prompt someone to question their food

choices immediately, while shifting attitudes and beliefs, such as speciesism, might require repeated exposure to new ideas over several months, and achieving lasting changes in dietary behavior may take even longer. Although it is difficult to pinpoint exactly when such changes will occur, this uncertainty makes it necessary to sample attitudes and behaviors at differently spaced time intervals, informed by theory and prior evidence. Second, change processes are often measured at fixed time intervals (i.e., based on clock time), but meaningful change often occurs at times that do not align with fixed measurement schedules (i.e., psychological time; Hopwood et al., 2022). For instance, someone might move out at age 25 instead of 18. It may be the timing of the move, not the age, that influences dietary change, suggesting that psychological time can matter more than clock time. One measurement approach to address these challenges is using ecological momentary assessment (EMA). This involves repeated, real-time assessments in participants' everyday environments and can be scheduled at fixed intervals or in response to specific events (e.g., when entering a restaurant). EMA does not address timing issues by default, but it allows researchers to move beyond fixed follow-up points and to better align measurement with repeated exposures or psychologically meaningful events when these can be identified. When used over extended periods, EMA enables tracking of attitude and behavior change in relation to concrete experiences and repeated inputs, relying less on assumptions about when change occurs. Because change unfolds on different timescales, even relatively short EMA periods can capture immediate or short-term change.

Unobserved Spillovers

Another relevant consideration applies specifically to the evaluation of interventions. Ideally, experimental designs would aim to capture the full scope of change induced by an intervention. However, two common limitations are, first, that many studies focus only on the immediate effects of an intervention rather than longer-term impacts, and second, that they assess only the targeted outcome, ignoring any unintended or spillover effects (Green et al., 2025). Even when studies adopt longitudinal designs, they often rely on relatively simple pre-post designs. As a result, potential behavioral spillovers (whether positive or negative) that occur after intervention exposure might be missed (Bonev, 2025). For example, an intervention that encourages someone to choose a plant-based lunch might have the unintended positive consequence of encouraging a plant-based lunch choice the next day. However, it may also lead to compensatory behavior, such as increasing the likelihood of choosing an animal-based dinner later that same day. An assessment of only the target's lunch choice at the moment of intervention exposure would miss the effects on their later behavior. This would provide a distorted picture of the overall effectiveness of the intervention. Therefore, to fully capture broader patterns of change, it is important to measure beyond the targeted behavior. Decisions on

subsequent measurements should ideally be guided by considering which spillover mechanisms the intervention might trigger, such as sensory-specific satiety, goal balancing, reactance, or identity strengthening, and their operative timescales.

Nonlinearity of Change

Further, current literature in this area often focuses on average linear trends in dietary change. Yet, the number of interconnected factors involved in behavioral change suggests the possibility of more complex processes. In related fields, this complexity has been accounted for by Complex Dynamic Systems models (Resnicow & Vaughan, 2006). These describe how behavior may shift through gradual changes or occasional abrupt leaps toward and away from desired behaviors as various factors such as knowledge, attitudes, and self-efficacy interact nonlinearly over time. Complex systems are also sensitive to initial conditions (e.g., habits and attitudes) and are characterized by tipping points, meaning that change trajectories can be difficult to predict at the individual level. For example, a meat-reduction intervention participant may show little change for weeks but then reduce their consumption abruptly after a later exposure (e.g., a video depicting farm animals seen online by chance). Therefore, hypothesizing change as a nonlinear process has implications both for data collection (e.g., sample size and the number and timing/spacing of assessments) and data analysis (e.g., adoption of latent transition or point-process models) (Collins, 2006).

Lack of Formal Theory

Finally, while many theories describe change over time, they often do not explain their assumptions or articulate when and how specific processes of change are expected to happen. This makes it hard to design high-quality longitudinal studies or to identify the appropriate measures to capture the full impact of interventions. A promising way forward to address this and many of the issues described above is through formal modeling, such as agent-based models (Guest & Martin, 2021). These models can simulate behavioral development of multiple actors in a system over time based on specified mechanisms and parameters. For instance, they can model changes in dietary identities and food choices within a population following a workplace cafeteria intervention (Zhu et al., forthcoming).

Conclusion

In this commentary, we highlighted some relevant considerations for the design and analysis of longitudinal studies. Despite the multitude of relevant considerations, we

acknowledge that ideal methods of assessing dietary and attitude change often collide with real-world limits like time and funding. These constraints often shape how studies are designed, but it is important to make explicit which choices were made for practical reasons and which were based on theory.

All in all, time should be considered in the study of dietary change and attitudes towards animals, and longitudinal research is an important instrument for investigating these changes. An increased focus on time and greater precision in longitudinal designs can provide better-quality data on change processes, therefore improving our understanding of whether, under what conditions, and how, change in dietary behavior and attitudes towards animals happens.

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