

Changing Habits Using Contextualized Decision Making

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Abstract In this paper we aim to present a new model in which context influences a combination of both habitual and intentional environmental behavior using the concept of social practices. We will illustrate the model using meat-eating behavior while dining out.

Keywords Agent-based simulations • Context • Habits • Meat eating

1 Introduction

Despite both governmental and scientific interventions, greenhouse gas (GHG)-emissions continue to rise. Climate change is primarily driven by green house (GHG)-emitting human behavior and could therefore be largely mitigated by interventions in human behavior. For example, a global transition to a healthy low meat-diet would have a substantial impact on lowering GHG-emissions [9, 15]. However, human behavior, including meat eating, is the least understood aspect of the climate change system [8].

One possible major defect is the focus of interventions (and theory) on *intentional* (i.e., voluntary) behavioral change [1, 6]. The underlying idea is that to change behavior one must change ones intention. However, this does not adequately account for the extend to which behavior is influenced by *context* and, consequently, *routines*. Context is defined as the setting in which something happens, including location, people, and past behavior [2, 18]. Repeated behavior in the same context can lead to habits (i.e., routines) [18]. Habits are often contrasted with intentions, capturing the fast-thinking, and automatic side of behavior. Interventions predominantly focus on changing intentions, for example, by providing more information, not acknowledging that one behaves, at least partly, because one behaved similarly

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before in the same context [1]. A possible solution might lie in using a notion of sociology called *social practice*. Sociologist from the social practice tradition focuses more on the practice than the individual highlighting its relation with context [14].

In this paper we aim to present a new model in which context influences a combination of both habitual and intentional environmental behavior using the concept of social practices. We will illustrate the model using meat-eating behavior while dining out.

2 Background

One widely studied primary predictor of environmental behavior is the notion of values. Values represent what a person finds important in life. We see them both as reasons that trigger an action as well as post-action criteria for evaluation [16]. In line with Schwartz we model a person's characteristics in terms of four different value types: openness, conservation, self-transcendence, and self-enhancement [12].

One of the most influential theories that tries to capture the complex interaction of influences (e.g., values) on intentions is Azjen and Fishbein's reasoned action approach [5]. However, we believe their negligence of habits accounts for the reason that interventions based on this approach (e.g., [13]) have had little or no effect on largely habitual behavior such as meat eating.

Habits are learned dispositions to repeat past responses. Their automaticity emerges from patterns of covariance between context and behavior. They are often the residue of goal pursuit (i.e., intentions), but once formed, perception of contexts triggers the associated response without a mediating goal [18]. Note that everyday vernacular implies a dichotomous view of habits and intentions, but behavior is more realistically conceived as on a continuum between habitual and intentional each requiring different interventions [10].

Sociologist from the social practice tradition focuses less on the individual and more on the practice itself. They study how practices emerge, persist, or disappear in society by securing or losing "carriers." We adopt this idea of a practice as a distinct (epistemological) entity that is "a temporally and spatially dispersed nexus of doing and saying things" [11, p. 89]. In our model, each individual and each enactment thus relates to a shared notion of the practice of "dining out."

We will base our model on a notion of Shove et al. [14] called *social practice*, originally consisting of three *elements*: materials (covering physical aspects), competences (skills and knowledge needed for the practice), and meanings (referring to the mental and social associations of practices).

The social practice of eating, for example, can be divided into its materials—tableware, cutlery, and food—its required competences—etiquette and usage of cutlery—and the meaning of pleasure, health or the achievement of a necessary chore [7]. On enactment one combines these distinct elements into the single practice of eating. The practice of eating, however, includes more than simply the

intake of food. It is a social activity consisting of selecting food, preparing dishes, making social arrangement for meals, and judgments about taste [17]. In our model we compress this complex practice in the tangible form of *dining out*.

3 Model

3.1 Social Practices and Agents

Based on the work of Dignum et al. [2–4] we present a model that uses the macroscopic notion of social practices in microscopic deliberation. A social practice is constituted by the following aspects:

Physical context describes the physical environment that can be sensed (e.g., meat venue, vegetarian venue, or mixed venue) including affordances that describe the natural physical conditions to enact the practice (e.g., meat venue affords eating meat/vegetarian venue affords eating vegetarian) and Triggers that describe physical context that (often) co-varied with the practice (e.g., 5× eating meat in venue 1, 10× eating vegetarian in venue 2, etc.)

Social context describes the other agents that can be sensed (fellow customers in venue, e.g., agent 1, agent 2, etc.) including social triggers that describe the social context that (often) co-varied with the practice (e.g., 5× eating vegetarian with agent 1, 10× eating vegetarian with agent 2, etc.)

Values refers to the meaning of the practice, i.e., the values it furthers

Embodiment refers to the set of possible actions, plans, roles, and norms that the agent will use to guide its behavior within this practice (e.g., eating meat, eating vegetarian)

Evaluation captures agents own judgment about past enactments of practice.

The agents all have their own image of the social practice of dining out. Some of the aspects will be equal for all agents (e.g., affordances, values), but each agent also records its own experience with that practice (e.g., by updating triggers and evaluation). In addition the agents heterogeneity is ensured in their difference in values. Each agent attributes a different *level of importance* to openness, conservation, self-transcendence, and self-enhancement.

The social practice as described above is used in the deliberation of the agents as depicted in Fig. 1.

In the first stage of the deliberation an agent filters the impossible behavior out by comparing its current environment (i.e., context) with the social practice. The context can afford the behavior of meat eating, vegetarian eating, or both.

In the second stage of the deliberation an agent can decide on an embodiment based on habitual triggers and past evaluation. The agent filters the least salient embodiment out by comparing its current environment (i.e., context) with the social practice. The trigger of a practice represents how frequent some embodiment co-varied with a context. The evaluation variable represents how well past enactments

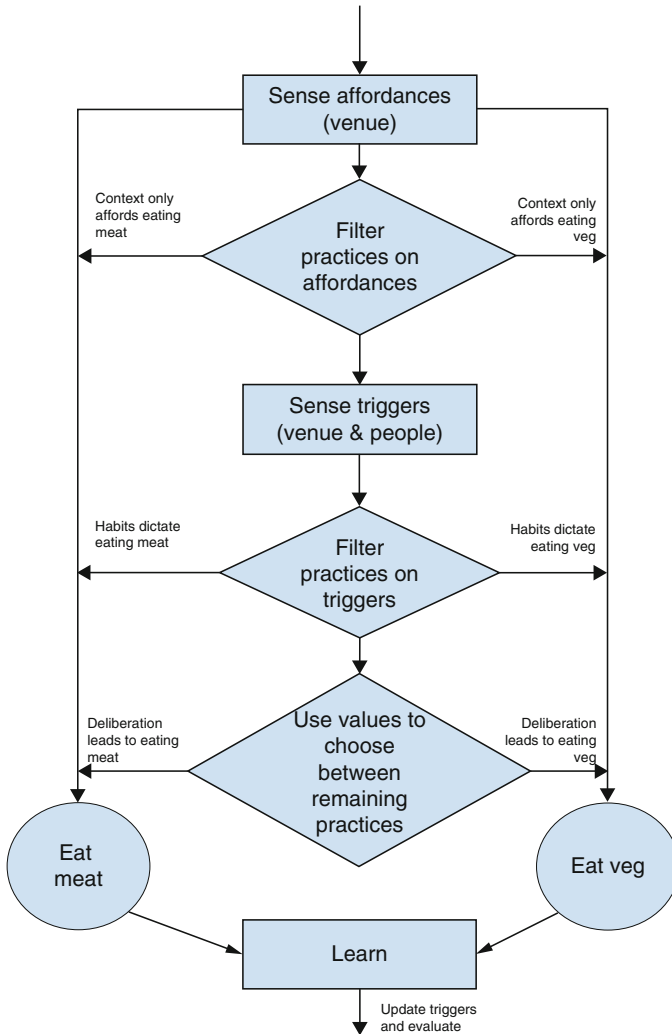


Fig. 1 Schematic overview of the deliberation cycle of an agent

went in this context. The salience of an embodiment depends thus on past success and frequency in this context. How salient certain behavior has to be to pass this filter depends on how high an agent values openness and conservation.

In the third stage of the deliberation an agent will use his values to make an intentional choice out of the remaining possible embodiments. The values of self-transcendence and self-enhancement have a threshold (corresponding to the importance they attribute to the value) and a current satisfaction level. The satisfaction level slowly decreases over time, but an action can increase the satisfaction level. The agent will choose the embodiment that furthers the value with the lowest satisfaction compared to its threshold.

After the enactment an agent will learn. Firstly, by updating its history of enactment by keeping track of the past performance context in the trigger variable of the social practice. Secondly, it will evaluate if it wants to do the behavior again. The agent evaluates by (1) comparing the level of importance of its values to the value of the enacted behavior and (2) by comparing its own behavior to the behavior of the other agents. The higher the agent values self-enhancement the more important it finds the first, the higher it values conservation and self-transcendence the more important it finds the latter.

4 Hypotheses, Experiments, and Further Work

The presented model will allow us to test hypotheses revolving around the continuum between habitual and intentional behavior. For example, one might want to motivate an agent to change its physical context (e.g., to a new restaurant) in order to move an agent from a “bad” habit to a “good” intentional action. In this model this intervention will not necessarily work. The agent’s social context might activate the old habit or reinforce the norm. Furthermore, the target agent forms the social context of other agents. The individual change of an agent might have a domino effect on the other agents, possibly resulting in a global change. This model gives more insight in what combination of intervention might bring about such a global change. One idea is to motivate the agents not only to change their physical context, but also to invite like-minded agents such that subcultures that divert from the norm can grow and develop. This paper represents research in progress, but we claim that these kinds of combined agent deliberation models can shed new insights in when and how the behavior of people can change in light of habits and social contexts.

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