

original article

Habit as automaticity, not frequency

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Many health behaviours are enacted repeatedly, with little forethought.

This has led research-

ers to question the utility of concepts and models based on conscious deliberation for understanding real-world health actions. There has been a resurgence of interest in the role of 'habits'—i.e. automatic responses to everyday contexts, learned through repeated performance in those contexts—in determining health behaviour (for a review, see Gardner, de Bruijn & Lally, 2011). Empirical work has demonstrated that, because habits are triggered directly and immediately in associated contexts, they tend to override deliberative intentions in directing behaviour in those settings: where habits and intentions conflict, behaviour is more likely to proceed in line with habit than intention (Gardner et al., 2011). This has implications for behaviour change: boosting motivation may be insufficient to disrupt health-risk behaviours controlled by learned cue-response links (i.e. 'bad' habits). Conversely, intervention developers should treat habit formation for health-promoting behaviours ('good' habits) as an outcome goal, because habitual behaviours are less likely to be disrupted by losses in motivation (for a review of habit formation and disruption techniques, see Lally & Gardner, in press).

Progress in habit theory and application depends on coherent conceptualisation and measurement of habit. In this piece, I argue that there are inconsistencies in how habit has been operationalised within health psychology and

propose that habit be viewed as a form of automaticity, independently of performance frequency. This generates ideas for future research and calls for greater precision in habit measurement.

'Habit as frequency' versus 'habit as automaticity and frequency'

Habit is an abstract concept, and consequently, can have no 'correct' or 'incorrect' definition. Definitions must be judged according to their coherence and usefulness for research purposes. In lay discourse, the term 'habit' is often used to refer to an action done frequently. This definition ('habit as frequency') is unsatisfactory to the psychologist: it proposes that people frequently do what they do frequently, but does not explain why this should happen. A psychological operationalisation of habit has emerged, which incorporates an explanatory mechanism: habits are actions that are frequently performed *because they are initiated automatically* ('habit as automaticity and frequency'; e.g. Verplanken & Orbell, 2003). Repeating an action in a particular context reinforces context-action associations in memory, and control over the initiation of the behaviour passes from a conscious reflective processing system (initiated by intentions) to an automatic impulsive system (initiated by environmental cues). Once a habit has formed, encountering the associated context is likely to directly trigger the behaviour with minimal deliberation. A recent study showed that repetition of a dietary or exercise behaviour in response to a salient once-daily cue prompted increases in self-reported behavioural

automaticity (Lally, van Jaarsveld, Potts & Wardle, 2010). In a qualitative study, participants repeating weight-loss actions within existing routines reported that the actions became 'pretty much second nature' and 'wormed their way into my brain', reflecting development of automaticity (Lally, Wardle & Gardner, 2011).

From a research perspective, 'habit as automaticity and frequency' is a more useful conceptualisation than is 'habit as frequency', because automaticity explains the persistence of habits, and discriminates between frequent actions done automatically (habits), and those done deliberately (not habits). 'Habit as automaticity and frequency' underpins the Self-Report Habit Index (SRHI; Verplanken & Orbell, 2003), which scores habit according to reflections on behavioural automaticity (e.g. 'Behaviour X is something I do without thinking') and performance frequency ('Behaviour X is something I do frequently')¹. The SRHI has become the most popular habit measure within the European psychology community (Gardner et al., 2011).

'Habit as automaticity, not frequency'

On closer inspection, the 'habit as automaticity and frequency' perspective is inconsistent. If an action is automatically activated by cues, frequency of enactment will be a function of the frequency with which cues are encountered. Where a habitual behaviour is performed often, this suggests only that the behaviour is associated with frequently encountered settings. Learned automatic responses need not be frequently performed: where contextual cues are rarely encountered, responses may continue to be automated by cue-response mechanisms, but automatic cue-responding will be infrequent. For example, the habit of saying 'amen' at the conclusion of public prayer will be enacted on a weekly basis for weekly churchgoers, but annually for those who

attend church only at Christmas. The behaviour would be automatic in both instances, but its frequency would differ considerably. Similarly, the frequency with which football fans automatically offer loud vocal support for their team within the stadium environment will vary with match attendance (see Neal, Wood, Labrecque & Lally, 2012), and will not be prompted at all during off-season months.

For these reasons, habits should be seen as a form of context-dependent automaticity which, once formed, are not necessarily enacted frequently unless the environmental triggers are frequently experienced ('habit as automaticity, not frequency'). This viewpoint is important for two reasons. First, it views automaticity as the essence of habit and explains the effects of established habits on action through automatic processes. It is because habits are automated that they can override effortful intentional responses. Development of automaticity is the aim of habit formation, and discontinuation of automatic responding the aim of habit disruption (Lally & Gardner, in press). Automaticity should be seen as the 'active ingredient' of a habit, and repetition frequency as its precursor and possible consequence (Sniehotta & Pesseau, 2012). Second, the definition rejects frequent performance as a necessary component of habit. Many habits are performed often (see Gardner et al., 2011), but this is because associated cues are frequently encountered, not because learned automatic responses necessarily have a propensity to be

¹ The SRHI also includes an item indicating the relevance of the focal behaviour to self-identity ('Behaviour X is something that's typically "me"). Identity-relevance is not however consensually agreed to be a central component of habit, and we recently showed that the self-identity item from the SRHI loads onto a conceptually distinct factor to other SRHI items (Gardner, de Bruijn & Lally, in press).

frequently activated regardless of context.

Dormant habits and habit recovery

Conceptualising habit as automatic processes allows for them to be performed infrequently, and this generates some interesting research ideas. Habit theorists have proposed that major context changes—such as moving home or starting a new job—can break habitual patterns of behaviour by discontinuing exposure to cues. Such changes offer ‘windows of opportunity’ during which behaviour will proceed in line with underlying intentions and new habits may form (Lally & Gardner, in press). However, such an approach may offer lasting behaviour change because associated cues are no longer encountered, rather than because cue-response associations are necessarily dismantled or overwritten. More work is needed to document the impact on health habits and behaviour of a temporary major context change followed by a return to previously habit-cuing settings. If mental representations of cue-response links remain intact despite discontinued exposure, habits may be recovered and reactivated upon reencountering cues, even after considerable time. In a seminal chapter on habit, James (1890) cited a wonderful anecdotal example of habit reactivation in a retired soldier:

“There is a story ... of a practical joker, who, seeing a discharged veteran carrying home his dinner, suddenly called out, ‘Attention!’ whereupon the man instantly brought his hands down, and lost his mutton and potatoes in the gutter.” (Huxley, 1866, cited in James, 1890, p120)

In enacting a learned response (standing to attention) associated with a rarely encountered cue (‘attention!’), the unfortunate veteran—or rather, his dinner—appears to have fallen victim to what might be termed a ‘dormant habit’, i.e. a propensity to act automatically in line with learned cue-response associations despite not

having done so for some time, because cues have not been encountered². The concept of dormant habits has potentially important implications for predicting and changing behaviour. Interventions based on context modification may fail to bring about lasting changes in behaviour because returning to previous contexts at the end of the intervention period may reactivate dormant habits, so undermining behaviour gains. Additionally, calls for habit formation to be treated as an intervention goal require qualification, because habits developed in settings that are subsequently infrequently encountered may not serve the purpose of eliciting frequent behaviour. Habit development will best support behaviour change where habits are formed in the presence of frequently encountered cues.

The Self-Report Behavioural Automaticity Index

Treating automaticity as primary also has implications for habit measurement. If habit-behaviour relationships are solely attributable to automaticity, then the inclusion of frequency in the SRHI poses a problem for the estimation of habit-behaviour relationships. Frequency measures capture both actions prompted by learned automatic tendencies for which the cue is frequently encountered (in my view, habits), and those arising from frequent deliberate action without a specific environmental cue. The inclusion of frequency items in the SRHI may therefore inflate true habit-behaviour relationships (Gardner et al, 2011). We have proposed elsewhere an automaticity-specific

² Of course, most habits are ‘dormant’ for most of the time; for example, even the most ardent habitual nail-biter will spend only a minority of her time biting her nails. I use the term ‘dormant’ here to crudely discern an established habit performed rarely due to rare encounters with associated cues from that which is performed frequently due to frequent cue encounters.

abbreviation of the SRHI: the 'Self-Report Behavioural Automaticity Index' (SRBAI). A content validity assessment of the SRHI showed that four items ('Behaviour X is something...' '...I do automatically', '...I do without having to consciously remember', '...I do without thinking', '...I start doing before I realise I'm doing it') were most consistently and strongly judged by a panel of researchers to match the definition of automaticity (Gardner, Abraham, Lally & de Bruijn, 2012). Applications to physical activity, unhealthy snacking and alcohol consumption showed that the SRBAI was at least as sensitive as the SRHI to the hypothesised moderating effect of habit on the intention-behaviour relationship. A subsequent meta-analysis of published SRHI applications, re-analysed using the SRBAI, generally replicated these findings (Gardner et al, 2012). The SRBAI was consistently less strongly correlated with behaviour frequency than was the SRHI, presumably because the inclusion of behaviour frequency within the SRHI inflates the purer habit-behaviour relationships revealed by the SRBAI. Habit is distinguished from other forms of automatic action—such as unconscious mimicry, priming, action prompted by the formation of implementation intentions—by its acquisition through repetition, and so it may be necessary to incorporate a measure of behaviour frequency where research questions focus on distinguishing habit from other forms of automaticity. However, the SRBAI, which captures the 'habit as automaticity, not frequency' conceptualisation, is better placed to estimate habit-behaviour relationships, and offers the most parsimonious measure available to track habit formation or disruption.

Conclusion

Progress in habit theory depends on a coherent conceptualisation of the term 'habit'. While habits arise through repeated performance, it is necessary to separate the

central quality of a habit (cue-dependent automaticity) from its cause (context-dependent repetition). Habit is therefore better conceptualised as a form of automaticity which, once formed, need not be defined by frequent performance. Research efforts could usefully be directed towards understanding the behavioural implications of automatic cue-responses that are infrequently elicited. ■

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