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Situating interventions to bridge the intention–behaviour gap: A framework for recruiting nonconscious processes for behaviour change

Esther K. Papies[1,2]

[1] University of Glasgow

[2] Utrecht University

Correspondence
Esther K. Papies, Institute of Neuroscience and Psychology, University of Glasgow, 58 Hillhead Street, Glasgow G12 8QB, UK.
Email: esther.papies@glasgow.ac.uk

Abstract

This paper presents a situated cognition framework for creating social psychological interventions to bridge the intention–behaviour gap and illustrates this framework by reviewing examples from the domains of health behaviour, environmental behaviour, stereotyping, and aggression. A recurrent problem in behaviour change is the fact that often, intentions are not translated into behaviour, causing the so-called intention–behaviour gap. Here, it is argued that this happens when situational cues trigger situated conceptualizations, such as habits, impulses, hedonic goals, or stereotypical associations, which can then guide behaviour automatically. To be effective in changing such automatic effects, behaviour change interventions can attempt to change situational cues through *cueing interventions* such as priming, nudging, upstream policy interventions, or reminders of social norms. Alternatively, behaviour change interventions can attempt to change the underlying situated conceptualizations through *training interventions*, such as behavioural inhibition training, mindfulness training, or implementation intentions. Examples of situated behaviour change interventions of both types will be discussed across domains, along with recommendations to situate interventions more strongly and thus enhance their effectiveness to change automatic behaviour. Finally, the discussion addresses the difference between tailoring and situating interventions, issues of generalization and long-term effectiveness, and avenues for further research.

KEYWORDS

behaviour change, intention–behaviour gap, intervention, nonconscious processes, situated

1 | INTRODUCTION

Behaviour change interventions inspired by social psychology often run into the intention–behaviour gap: They create good intentions, but those intentions are not translated into the desired behaviour (e.g., Rothman et al., 2015; Sheeran & Webb, 2016). Indeed, as a crucial meta-analysis by Webb and Sheeran (2006) indicates, although effective interventions typically have a medium-to-large effect on intentions, they only have a small-to-medium effect on behaviour, suggesting that part of an intervention's effectiveness gets lost between intentions and behaviour. At the same time, social psychological research has created a valuable knowledge base on automatic and situated cognitive processes and their influences on behaviour (e.g., Bargh, 1997; Barsalou, Niedenthal, Barbey, & Ruppert, 2003; Strack & Deutsch, 2004; Wood & Neal, 2007). Indeed, studying these processes has allowed us to understand why our actions are often driven by factors other than our conscious intentions. The current paper will bring these two areas together and use insights on situated and automatic cognitive processes to inform the development of interventions to bridge the intention–behaviour gap.

Research in social psychology provides ample evidence of the intention–behaviour gap across domains. Many people intend to protect their health, make environmentally sustainable choices, and treat other people without bias and aggression, but these intentions often get lost in the complex circumstances of our daily lives. Indeed, research has shown that perceiving unhealthy food can trigger rewarding simulations of eating it and lead to unhealthy choices despite healthy intentions, especially under low control resources (Chen, Papies, & Barsalou, 2016; Hofmann, Friese, & Wiers, 2008; Papies, 2013). Similarly, even those consumers who report strong environmental concerns often end up choosing unsustainable products due to competing hedonic motives or time constraints (Young, Hwang, McDonald, & Oates, 2010). More generally, proenvironmental attitudes and intentions have been found to predict only a small part of the variance in actual sustainable behaviour (for a review, see Unsworth, Dmitrieva, & Adriasola, 2013). In interpersonal behaviour, much research has shown that implicit stereotypes, prejudice, and aggressive impulses can influence our behaviour despite egalitarian and nonaggressive intentions, especially when we cannot easily monitor and control the behaviour in question (e.g., Correll, Hudson, Guillermo, & Ma, 2014; Denson, DeWall, & Finkel, 2012; Derous, Nguyen, & Ryan, 2009; Dovidio, Kawakami, & Gaertner, 2002).

How do these failures in enacting one's intentions come about? Here, it is suggested that in many of these instances, situational cues trigger specific cognitive structures such as habits, impulsive behaviours, hedonic goals, or stereotypic associations. These cognitive structures then guide our behaviour despite our conscious intentions, and often even outside of conscious awareness. Therefore, interventions to bridge the gap between intentions and behaviour need to take these mechanisms into account. More specifically, interventions should be situated by targeting the critical cognitive structures that guide behaviour, by targeting the situational cues that trigger them, or both (Papies, 2016a, 2016b).

1.1 | The role of situational cues in the intention–behaviour gap

Much research supports the pervasive effects of situational cues on behaviour. Work on habits has shown that goal-directed behaviours consistently performed in certain situations become associated with features of those situations. As a result, situational cues can then trigger habitual behaviour and guide our actions automatically (Aarts & Dijksterhuis, 2000; Wood & Neal, 2007). Indeed, when strong habits exist in a certain domain of behaviour, conscious intentions—as well as behaviour change interventions that rely on intentions—are less likely to affect behaviour than if habits are weak (Danner, Aarts, & de Vries, 2008; Ouellette & Wood, 1998; Webb & Sheeran, 2006). In a similar way, situational cues can lead to impulsive behaviours. Impulsive behaviours can be defined as relatively automatic behavioural responses to a specific cue (Hofmann et al., 2008), for example reaching for a piece of cake when this is offered or honking one's horn in response to an aggressive driver on the road. Furthermore, situational cues can trigger hedonic goals, which represent the motivation to pursue enjoyable states and activities, even when they are in contrast with long-term investment goals, such as buying a brand new car despite high financial

and environmental costs (e.g., Lindenberg & Steg, 2007). Finally, perceiving people with certain characteristics, such as a name or facial features suggesting out-group membership, can activate information associated with social categories, such as stereotypes (e.g., Derous et al., 2009; Dovidio et al., 2002; Wittenbrink, Judd, & Park, 2001), and can thus lead to prejudiced behaviour, despite one's conscious intentions to treat all people in an unbiased manner.

Although impulsive and habitual behaviours, hedonic goal pursuit, and stereotyping are typically discussed in separate literatures, it is argued here that their structures and effects can be understood through the same underlying cognitive mechanism. Specifically, all these phenomena can be described as relatively effortless responses to situational cues that occur independent of conscious intentions. In addition, these responses result from previous learning in which features of situations have become associated with specific cognitions and behaviours, so that these can later be reactivated by situational cues. This mechanism of learning and producing situated automatic responses will now be described in more detail, using the concept of situated conceptualization (Barsalou, 2009, 2016). Then, we will describe a framework for situated interventions to change these responses (see also Papies, 2016a, 2016b).

1.2 | Situated conceptualizations in the intention–behaviour gap

The cognitive structures underlying the effects of impulsive and habitual behaviours, hedonic goal pursuit, and stereotyping can be described as situated conceptualizations that have been stored in memory through learning in relevant situations (Barsalou, 2009, 2016; Papies, 2016b; Papies & Barsalou, 2015), for example, when eating, when shopping, or when interacting with out-group members. As people perform such behaviours throughout their daily lives, they store comprehensive representations of these experiences in memory, integrating sensory information; information about cognitions, affect, internal states, and actions, but also information about the goals they are pursuing; and contextual information about time and space, people, and objects present (Barsalou, 2009). Importantly, storing situated conceptualizations may not be limited to learning directly from one's own experience. Due to our tendency to spontaneously simulate the behaviour and experiences of others (Jeannerod, 2001), it could also occur vicariously through observation, for example, by watching movies, advertisements, or live interactions of other people.

Once a situated conceptualization has been stored, any part of it can be reactivated through internal or external cues, and pattern completion inferences can activate the rest of the memory pattern as simulations (Barsalou, 2009; Papies & Barsalou, 2015; see Figure 1). To provide an example, while eating a muffin in a coffee house, we may store a situated conceptualization of a coffee house experience that includes the action of peeling the muffin out of the paper lining, the taste and texture of the muffin, the action of lifting one's cup to drink coffee, and the background noises of music, other people in the café, and the hissing and humming of the coffee maker. As a result, passing by a coffee
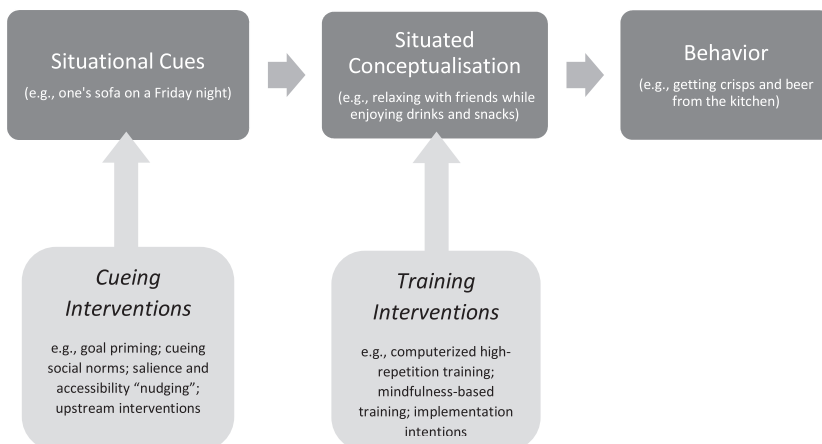

FIGURE 1 A framework for situated interventions that change the effects of situational cues on behaviour

house on a later occasion may trigger a simulation of this experience, including the pleasure of eating a muffin. This simulation may trigger the desire to enter and have coffee and a muffin, despite one's best intentions to save money, time, and calories. Similarly, when repeatedly watching violent movies or playing violent video games, we may store situated conceptualizations of responding to certain people, situations, or objects with arousal, vigilance, and aggressive behaviour. As a result, encountering similar cues later can trigger simulations of those same responses and can lead to their enactment. In the domain of intergroup contact, learning stereotypical information about out-group members, for example, through media exposure, can increase the likelihood that one will activate these as situated conceptualizations about out-group members' behaviour when encountering them later. As a result, one may simulate, for example, that a Black person will behave in an aggressive way (e.g., Hugenberg & Bodenhausen, 2003). This can affect behaviour and lead to self-fulfilling prophecies of negative interactions (e.g., Dotsch & Wigboldus, 2008; Dovidio et al., 2002). Similarly, it can lead to a job applicant with an Arabic name or facial features being perceived less positively and competent than a Western candidate with the same qualifications (Derous et al., 2009; Rooth, 2010), thus maintaining inequalities.

To sum up, we continuously store and update situated conceptualizations throughout our daily lives, which include situational features. Once we later encounter these situational features, they can activate previously learned situated conceptualizations, which then guide our cognitions and behaviour through pattern completion inferences (see Figure 1). This may manifest in ways that we typically describe as habits, impulses, hedonic goal pursuit, or out-group bias. Although these constructs clearly have distinct cognitive, affective, and behavioural features, their learning, underlying structure, and effects on behaviour can be understood through the common framework of situated conceptualization (see also Barsalou, 2016; Strack & Deutsch, 2004).

This approach to self-regulation, and thus to developing interventions, explicitly takes a situated cognition approach. Thus, it recognizes that the effects of cognitive constructs, such as people's conscious and unconscious preferences, goals, and habits, are highly malleable and sensitive to details of the current situation (see Smith & Semin, 2007). Thus, current needs, internal states, and external cues can all influence the representations triggered in a given situation and modulate their effects on behaviour (see also Papies, Best, Gelibter, & Barsalou, 2017). In other words, even though much of our behaviour is guided by automatic responses, these are still highly context sensitive (Gawronski & Cesario, 2013; Lebois, Wilson-Mendenhall, & Barsalou, 2015). As a result, context features need to be taken into account to change automatic behaviour. This contrasts with a perspective assuming that behaviour is guided by relatively stable representations independent of context (e.g., Fazio, 2007; Fishbein & Ajzen, 2011). The current paper offers an integrative framework to systematically apply a situated cognition perspective to behaviour change interventions. Although this is only a first step in a novel approach to intervention development, it offers a theoretical base to develop this approach further in future research.

2 | SITUATING INTERVENTIONS TO BRIDGE THE INTENTION–BEHAVIOUR GAP

Interventions to bridge the intention–behaviour gap should attempt to target the mechanism by which situational cues affect behaviour and override the effects of intentions. A recent framework suggests that this can be achieved by two types of intervention tools (see Figure 1): *cueing interventions*, which modify features of the critical situations such that they change which of a person's situated conceptualization gets activated and affects behaviour, and *training interventions*, which modify the existing situated conceptualizations, so that novel memory structures can get activated in a critical situation to guide behaviour (Papies, 2016a, 2016b). Here, a selection of existing cueing and training interventions will be presented, along with research examples testing intervention tools from the domains of health behaviour, environmental behaviour, stereotyping, and aggression. This is by no means intended to be a comprehensive overview, but rather an illustration of how the principles of situating interventions can be applied to interpret and further develop existing intervention tools (see Table 1).

Both cueing and training interventions can be described as situated to the degree that they take into account the cognitive processes that are typically triggered in the situation in which behaviour change needs to take place and

TABLE 1 An overview of selected cueing and training intervention tools, their strategies and underlying mechanisms, and ways to increase their situatedness

Intervention type	Intervention tool	Strategy and mechanism	Increasing situatedness
Cueing	Goal priming	Use positive, goal-related cues to activate goal-directed cognition and behaviour	Target motivated individuals by activating specific motivation, through positive cues that attract attention at the right time, when effective goal-directed behaviour is accessible; see Papies (2016b)
	Cueing social norms	Cue behaviour of other people's expectations or behaviour to activate representation of what is appropriate to do	Integrate normative cues into decision context as closely as possible to when decision is made; design cues such as to refer to others who are motivationally relevant to target group
	Nudging and prompting	Change salience or accessibility of options through product placement, design, or default settings	Integrate nudge into decision context as closely as possible to when decision is made
	"Upstream" interventions	Use law and policy to change salient situational cues in decision context	Change cues in decision context as closely as possible to when decision is made
Training	Computerized high-repetition training	Task or "game" to repeatedly withhold responses or attention to critical stimuli, "move away" from critical stimuli, or process pairing of critical and affective stimuli	Include critical stimuli that require behaviour change in training; include contextual cues from critical situation into training
	Mindfulness-based training	Meditation instruction and training to learn to regulate attention, become aware of experiences and patterns of thoughts and emotions, and learn to accept these experiences as no more than mental events; to change situated conceptualizations of events that can cause craving or negative affect	Direct training specifically at domain, situations, and stimuli where behaviour change is desired
	Implementation intentions	Form specific if–then plans for responding to certain cues with specific behaviours	Encourage imagery of critical situational cue and imagery of performing desired behaviour in critical situation

attempt to change them (Papies, 2016b). In addition, however, both types of interventions can be situated more or less strongly, which affects their effectiveness. In general, an intervention can be situated in one of two ways. First, it can be situated by integrating it into the critical situation in which behaviour change is desired, as is typically the case in most cueing interventions. Alternatively, an intervention can be situated by integrating features of the critical situation into the intervention, which is most relevant for training interventions. To clarify the implications of these principles, each of the following sections will also discuss possible ways of situating existing interventions more strongly in order to enhance their effectiveness at changing the automatic responses that contribute to the intention–behaviour gap, starting with cueing interventions and then turning to training interventions.

2.1 | Targeting situational cues: cueing interventions

2.1.1 | Goal priming

Goal priming refers to the activation of a goal by external cues, which can affect information processing as well as behaviour in order to pursue the primed goal. A goal can be defined as a desired outcome or behaviour, associated

with reward, and therefore motivating a person to pursue it, either consciously or nonconsciously (Custers & Aarts, 2005). Once a person is motivated to pursue a goal, for example, due to a goal prime, this triggers a variety of coordinated processes in support of goal pursuit, such as shifting attention towards goal-relevant stimuli, evaluating goal-relevant stimuli more positively, and shielding the goal from distractions (Papies & Aarts, 2016). To use goal priming as an intervention tool, the primes should activate a long-term investment goal (Papies, 2016a) directly within the critical situation. This goal can then guide subsequent cognition and behaviour in pursuit of the long-term goal and as a result override habits, impulses, hedonic goals, and stereotypic associations.

Goal priming has been studied in a variety of domains. In health behaviour, primes referring to healthy eating and dieting have been shown to direct eye movements towards healthy options (van der Laan, Papies, Hooge, & Smeets, 2017), trigger healthy menu choices (Papies & Veling, 2013), reduce unhealthy purchases in the grocery store (Papies, Potjes, Keesman, Schwinghammer, & van Koningsbruggen, 2014) and at vending machines (Stöckli, Stämpfli, Messner, & Brunner, 2016), and curb a variety of unhealthy snacking behaviours (e.g., Anschutz, Van Strien, & Engels, 2008; Buckland, Finlayson, Edge, & Hetherington, 2014; Papies & Hamstra, 2010; Versluis & Papies, 2016a). In environmental behaviour, goal primes reminding participants of the importance of waste reduction increased choices of unpackaged products (Tate, Stewart, & Daly, 2014). In interpersonal behaviour, activating a goal of individuation or of self-control prevented the activation of stereotyped responses when processing in-group and out-group information (Araya, Akrami, Ekehammar, & Hedlund, 2002; Wheeler & Fiske, 2005), and priming the goal of being nonprejudiced reduced implicit prejudice (Legault, Gutsell, & Inzlicht, 2011). These findings support the idea that goal primes can be an effective tool to activate a different situated conceptualization than the situation typically would, with beneficial effects on subsequent cognition and behaviour.

2.1.2 | Cueing social norms

External cues can be used to activate representations of other people's behaviour in the situation and thus affect what is perceived as appropriate or desirable to do. Interventions using cues that suggest specific social norms or provide feedback on one's own behaviour in comparison to the behaviour of relevant others have been found to increase healthy food choices (e.g., Mollen, Rimal, Ruiter, & Kok, 2013; for a meta-analysis, see Robinson, Thomas, Aveyard, & Higgs, 2014), reduce alcohol consumption (Miller & Prentice, 2016; Moreira, Smith, & Foxcroft, 2010), and boost energy-saving behaviour (Ayres, Raseman, & Shih, 2012; Miller & Prentice, 2016; Nolan, Schultz, Cialdini, Goldstein, & Griskevicius, 2008). In the interpersonal domain, perceived social norms about aggression have been shown to affect aggressive behaviour (Henry et al., 2000; Mercer, McMillen, & DeRosier, 2009). Although social norm cues have also been shown to increase prosocial behaviour (e.g., Powell, Roberts, & Nettle, 2012), relatively few published interventions have used social norms to reduce aggression (but see Botvin, Griffin, & Nichols, 2006; Perkins, Craig, & Perkins, 2011). Providing information on relevant others' levels of prejudice, or feedback on one's own levels of prejudice relative to that of others, has been shown to affect subsequent prejudice (Crandall, Eshleman, & O'Brien, 2002; Stangor, Sechrist, & Jost, 2001).

Across domains, interventions focusing on social norms are most effective if they refer to behaviours of groups that are relevant to an individual, for example, by being perceived as in-group or by being physically or geographically close (Goldstein, Cialdini, & Griskevicius, 2008; Miller & Prentice, 2016), possibly because simulating a behaviour that is approved by relevant others is associated with the most anticipated reward and thus most likely to be pursued.

2.1.3 | Nudging and prompting

Nudging is an umbrella term that has been introduced recently to describe the use of research insights from behavioural economics to influence relatively automatic human behaviours (Dolan et al., 2012; Thaler & Sunstein, 2009). Some of the strategies sometimes referred to as *nudges* can more precisely be described as, for example, goal priming or cueing social norms, which are discussed above. Here, nudging and prompting strategies that change the salience and/or accessibility of behavioural options will be discussed.

In the domain of eating behaviour, a robust finding is that people eat more from larger portions than from smaller portions and packages of food, the so-called portion size effect (Hollands et al., 2015), possibly because the portion affects how much is perceived as appropriate to eat (Kerameas, Vartanian, Peter, & Polivy, 2015; Versluis & Papies, 2016b). Presenting smaller portions, presenting food in smaller units, or presenting alternative cues to appropriate portion sizes have all been shown to reduce intake (Geier, Rozin, & Doros, 2006; Spanos, Kenda, & Vartanian, 2015; Versluis, Papies, & Marchiori, 2015). Possibly, these cues activate situated conceptualizations of eating smaller amounts, which then affect behaviour.

Salience interventions may work similarly, by triggering situated conceptualizations and the associated simulations of behaviours that one would not typically perform. Prominent examples of this strategy are prompts that point towards the use of stairs, which have been shown to increase the use of stairs over the elevator (Lee et al., 2012; Soler et al., 2010). Similarly, signs, menu design, or buffet arrangements that increase the salience of healthy options have been shown to boost healthy choices (Allan, Johnston, & Campbell, 2015; Bucher, Siegrist, & van der Horst, 2014; Dayan & Bar-Hillel, 2011; Policastro, Smith, & Chapman, 2015). Cues that increase the salience of the stairs or of a healthy dish may trigger simulations of using or consuming them, which makes subsequent enactment of this behaviour more likely.

2.1.4 | Upstream interventions

Law and policy interventions that change salient cues in critical situations are a potentially powerful tool to affect how people behave in a given situation (see Verplanken & Wood, 2006). Approaches such as taxation or salient charges for undesired behaviours, restriction of access to unhealthy options, or enforcement of procedures such as anonymous job applications change the situated conceptualizations activated in the critical situations, making individuals simulate benefits of behavioural options that they otherwise would not have pursued or reducing the attractiveness of their default behaviours, essentially "levelling the playing field" (see Best & Papies, 2017, for a comprehensive discussion).

Findings from several domains suggest the effectiveness of such measures. To name a few examples, banning smoking from workplaces reduces overall smoking rates as well as smoking-related illness (Fichtenberg & Glantz, 2002; Longo, Johnson, Kruse, Brownson, & Hewett, 2001; Sargent, Shepard, & Glantz, 2004). Clearly, lighting up a cigarette and standing alone outside in the cold is not a very attractive situated conceptualization of smoking. Reducing the density of alcohol outlets has been shown to reduce alcohol-related violence (Campbell et al., 2009), suggesting that the reduced exposure to alcohol cues and its reduced availability decrease the likelihood that rewarding situated conceptualizations of drinking are triggered and affect behaviour. Congestion charges for driving in certain areas have been found to reduce traffic, air pollution, and pollution-associated mortality (Tonne, Beevers, Armstrong, Kelly, & Wilkinson, 2008). Charges for plastic bags have decreased their use dramatically (Convery, McDonnell, & Ferreira, 2007). Finally, anonymous job application procedures reduce discrimination against female (but not against non-Western) applicants in a Western context (Åslund & Skans, 2012). These findings suggest that using policies to systematically change the situational cues people are exposed to when making choices can have a strong impact, without relying on conscious intentions to change behaviour.

2.1.5 | Strongly situating cueing interventions

This brief, nonexhaustive overview of interventions to change situational cues in order to change automatic behaviours suggests that cueing interventions can be highly effective for behaviour change. In order to most effectively trigger the desired behaviour, the critical cues should be added or removed as close to decision-making as possible. Although nudging interventions that change salience and accessibility are typically integrated into the situation per definition, goal primes and norm cues should be placed for example on the menu, product, or website where a choice is made in order to increase their effectiveness in complex and busy environments. With regard to *upstream interventions*, research shows, for example, that taxes on alcohol are most effective for reducing consumption when they are displayed on the price label, rather than added at the register (Chetty, Looney, &

Kroft, 2007), again suggesting that the critical cue must be salient close to the decision point. In addition, cueing interventions work best when the cued behaviour is motivationally relevant to the target group. This has been demonstrated in goal priming and social norms research, where the situated conceptualization triggered by a situational cue is most likely to trigger a reward response and affect actual behaviour if the goal or reference group is important for the perceiver (Papies, 2016b; Papies & Aarts, 2016).

2.2 | Targeting situated psychological representations: training interventions

2.2.1 | Computerized high-repetition training

In recent years, a number of novel, computer-based training paradigms have been developed where participants complete a high number of trials in a task in order to change cognitive, affective, or motor biases to specific target stimuli. Prominent examples are response inhibition training, where participants repeatedly withhold motor responses to target stimuli, although they do respond to control stimuli (for a recent review, see Stice, Lawrence, Kemps, & Veling, 2016); approach avoidance retraining, where participants repeatedly make symbolic or actual movements towards or away from target stimuli and away from or towards control stimuli (Wiers, Rinck, Kordts, Houben, & Strack, 2010); attentional bias modification training, where participants repeatedly direct visual attention away from target stimuli and towards control stimuli instead (Field, Duka, Tyler, & Schoenmakers, 2009); evaluative conditioning, where target stimuli are repeatedly paired with valenced, typically negative unconditioned stimuli (Houben, Schoenmakers, & Wiers, 2010); and stereotype retraining, where participants repeatedly affirm stereotype-incongruent and negate stereotype-congruent information about in-groups and out-groups (Kawakami, Dovidio, Moll, Hermsen, & Russin, 2000). In all of these practice-based training approaches, a novel cognitive or behavioural response is repeatedly associated with a critical stimulus, so that in a later encounter with the same or similar stimulus, the new, trained behaviour is elicited.

This is still a relatively novel research area, and most of the work on these computerized training programmes has been done in the domains of health behaviour and stereotyping. With regard to health behaviour, the available evidence suggests that the effects of retraining attentional biases may be limited (Field et al., 2009), and the evidence on evaluative conditioning procedures changing behaviour through actually changing representations is not fully conclusive (Hollands & Marteau, 2015; Hollands, Prestwich, & Marteau, 2011; Houben, Havermans, & Wiers, 2010; Houben, Schoenmakers, & Wiers, 2010). Training programmes to change motor responses to food and alcohol stimuli seem to be effective at reducing food and alcohol intake in short-term laboratory studies, and a more limited body of work also suggests some effectiveness at decreasing body weight and at delaying alcohol relapse (see Allom, Mullan, & Hagger, 2016; Jones et al., 2016; and Stice et al., 2016, for reviews and meta-analyses). In the domain of stereotyping, retraining has been shown to reduce automatic stereotype activation as well as to protect against stereotype threat effects (Forbes & Schmader, 2010; Gawronski, Deutsch, Mbirkou, Seibt, & Strack, 2008; Kawakami et al., 2000), although effects on real-life behaviours remain to be studied.

Although more research is needed into this issue, the evidence so far suggests that computerized training programmes works best if targeted at the specific stimuli of interest (e.g., Lawrence, Verbruggen, Morrison, Adams, & Chambers, 2015), suggesting that they need to be strongly situated to be effective. Notably, in contrast to other training interventions, research participants are often unaware of the goals of the training. At the same time, research suggests that awareness may actually increase training effectiveness (Dessel, Houwer, & Gast, 2016). In addition, these training programmes seem to work best with high contingencies (Stice et al., 2016), which may make awareness of the training goals more likely. So far, research has not systematically assessed the effects of an individual's behaviour change motivation in this context, and preliminary indirect evidence suggests that it may enhance training effectiveness.

It is worth noting that a related set of both computerized and real-world training programmes aims at increasing the ability to override automatic responses, for example, through repeated self-control or working memory training (e.g., Denson, 2015; Houben, Dassen, & Jansen, 2016; Miles et al., 2016), which have been studied mostly in the

domains of health behaviour and aggression. Because this approach, however, is not targeted at changing existing situated conceptualizations, but rather at the degree to which they affect behaviour (for an exception, see Wilkowski, Crowe, & Ferguson, 2015), it is not considered a situated training intervention and not discussed further.

2.2.2 | Mindfulness training

Mindfulness typically refers to a combination of two psychological processes: attention regulation; and metacognitive awareness and insight into the passing nature of one's experiences, while viewing them in an accepting and nonjudgmental manner (see Bishop et al., 2004). The effects of mindfulness are most often studied through comparing participants who completed an 8-week mindfulness course originally designed for stress reduction with participants in various control conditions. During the mindfulness course, participants receive meditation training and general teachings to learn to regulate and stabilize attention, become aware of their experiences, discern patterns of thoughts and emotions that affect their well-being, and learn to accept these experiences as no more than mental events. Through mental and behavioural practice, this can increase well-being (for a meta-analysis, see Grossman, Niemann, Schmidt, & Walach, 2004), possibly through laying down new situated conceptualizations that entail, for example, less intense negative affect or craving in response to critical situations (Hölzel et al., 2011; Papies, Pronk, Keesman, & Barsalou, 2015).

In addition to examining effects on stress and mental well-being, researchers have increasingly examined the effects of mindfulness training on more specific behavioural outcomes in domains relevant to social psychologists. Studies examining the effects of a general mindfulness training programme tend to show no effects on specific outcome variables related to behaviours that were not targeted in the training (for a meta-analysis, see Goyal et al., 2014; for an exception, see Lim, Condon, & DeSteno, 2015). A number of more specific training programmes have emerged, however, that focus on specific behavioural domains and address the critical cognitions and behaviours arising in specific situations (e.g., surf-the-urge training, compassion training, mindful attention, or decentering training). These approaches have shown to reduce unhealthy food choices and substance use (for an overview, see Papies, 2017) and boost relationship well-being (Atkinson, 2013). In the domain of eating behaviour, for example, a meta-analysis of mindfulness-based interventions adapted for eating behaviour in overweight and obese adults reduced impulsive eating, but not overall body weight (Ruffault et al., 2016). In the domain of out-group bias, a mindfulness-related compassion training decreased prejudice towards minorities (Kang, Gray, & Dovidio, 2014), although effects on real-life behaviours have yet to be examined (again see Lim et al., 2015). Overall, such findings suggest that possibly, becoming aware of one's automatic responses, for example, one's thoughts of reward from a piece of cake or one's feelings of anger from one's partner's behaviour, and learning situation-specific strategies for diffusing them change one's situated conceptualizations of critical situations over time and therefore allow for different behaviours to be triggered in similar situations later.

2.2.3 | Implementation intentions

Finally, a much-used and effective tool for bridging the intention–behaviour gap is making specific plans for one's behaviour in a given situation, so-called implementation intentions (Gollwitzer & Sheeran, 2006). When implementation intentions are formed, special attention is given to the situation in which the behaviour should be enacted, and a concrete situational cue is specified that becomes associated with the planned behaviour through mental imagery (Gollwitzer & Sheeran, 2006; Knäuper, Roseman, Johnson, & Krantz, 2009; Papies, Aarts, & de Vries, 2009). As a result, a new situated conceptualization is formed, which is likely to be triggered upon encountering the relevant cue, thus increasing the chances that the planned behaviour will be enacted (see also Barsalou, 2016). Thus, although the cueing by situational features is a crucial feature contributing to the effectiveness of this tool, implementation intentions are discussed here as a training intervention because a novel situated conceptualization is formed through the deliberate act of planning. In addition, it should be noted that implementation intentions differ from other training interventions in that they rely on a single trial of practice, compared with the multiple trials or episodes typically

involved in much longer, practice-based computerized and mindfulness training interventions (see also Avishai-Yitshak & Sheeran, 2017). However, like other training interventions, they are geared towards changing situated psychological representations guiding automatic behaviour, and they work best if even the single mental training episode explicitly takes into account specific behaviours in response to specific situational cues. Therefore, implementation intentions are included as a specific case of training intervention here.

Implementation intentions have been found to be effective for behaviour change in various domains, such as healthy eating (Adriaanse, Vinkers, De Ridder, Hox, & De Wit, 2011), alcohol consumption (Armitage, 2009), sustainable consumer behaviour (Bamberg, 2002; Holland, Aarts, & Langendam, 2006; Loy, Wieber, Gollwitzer, & Oettingen, 2016), prosocial behaviour (Trötschel & Gollwitzer, 2007), reducing the activation of stereotypes and their effects on behaviour (Mendoza, Gollwitzer, & Amodio, 2010; Stewart & Payne, 2008), and speaking up against prejudice (Gollwitzer & Brandstätter, 1997). Consistent with the principle of situating interventions, implementation intentions have been found to be especially effective if supported by mental imagery, for example, to identify the critical cue that should trigger the planned behaviour (Adriaanse et al., 2010; Kirk, Oettingen, & Gollwitzer, 2013) or to establish a vivid situated memory of the planned behaviour (Knäuper et al., 2009; Papies et al., 2009). From the perspective of situating interventions, this means that a feature of the situation is integrated into the intervention, thereby enhancing its situated nature.

2.2.4 | Strongly situating training interventions

This brief, nonexhaustive overview of training interventions suggests that this type of intervention can change the situated conceptualizations triggered by situational cues and thus lead to behaviour change. Most of the intervention tools described here have been used in highly situated ways as well as in unsituated ways, and the research discussed suggests that more situated implementations of these tools are more effective for behaviour change in specific domains. Behavioural inhibition training and mindfulness training are more effective if the same critical stimuli are used during training and testing, or in other words, when inhibition or mindfulness skills are geared towards the specific stimuli for which behaviour change is desired (i.e., suggesting *near transfer*) compared to when they are trained more generally (*far transfer*). Although implementation intentions are naturally quite situated as they refer to plans for behaviour in response to specific situational cues, they, too, are especially effective if the cue and behaviour evoked during planning closely match the critical situation. Possibly, training interventions are also more effective if they align with an individual's motivation to change the target behaviour, although this has not been addressed systematically.

In order to strongly situate training interventions, it may also be useful to consider the exact nature of the situational cues that lead to the cognitive responses that the interventions are designed to change. Typically, researchers focus on a salient stimulus in the situation, for example, an attractive food or alcoholic drink. Research suggests, however, that such stimuli are typically not represented in isolation but that contextual features of a consumption situation contribute to desire (Keesman et al., 2017; Papies, 2013; Papies & Barsalou, 2015; Wardell & Read, 2013). Unhealthy foods, for example, are especially attractive because we think about eating them in specific situations, and alcoholic drinks are particularly tempting when you think about the social connectedness associated with consuming them. This suggests that in order to change the situated conceptualization that guides behaviour in critical situations, we need to change the responses not only to appetitive stimuli in isolation but to the appetitive stimuli in the context that contributes to their motivational power. This is in line with the literature on renewal effects in conditioning, which shows that renewal of the initial conditioned response is likely to occur if extinction takes place in a different context than the initial learning (Bouton, 2004). In other words, because we learn, for example, that consuming alcoholic drinks is rewarding in a social context, retraining this association should also take place in a social context, rather than with alcoholic drinks in isolation, in order to prevent desire to resurface when an alcoholic drink is later encountered in a social context (see also encoding specificity, Tulving & Thomson, 1973). Clearly, it may not always be feasible to directly integrate a training intervention into the critical context where behaviour change should

take place (e.g., completing a behavioural inhibition training in a bar may not be feasible). A promising alternative might be to integrate features of the context into the training, for example, by evoking it through visual or other cues. Future research on situating interventions should investigate this possibility.

3 | DISCUSSION

This paper has presented a framework for situating interventions to bridge the intention–behaviour gap and discussed a selection of cueing and training interventions in the context of this framework. As we have seen, effective behaviour change can result from both types of interventions to the degree that they change the automatic responses triggered in the critical situation and which affect behaviour. Cueing interventions such as priming, cueing social norms, and changing the decision context through local nudges or more structural policy changes can change the salient cues that affect cognitive responses to a situation and the resulting behaviour. Training interventions such as computerized high-repetition training, mindfulness training, or formation of implementation intentions can change the situated conceptualizations that are triggered by situational cues and therefore change behaviour. Both types of interventions can be strongly situated by targeting the decision context as closely as possible, and by directing interventions specifically at the domain and stimuli where behaviour change is desired (see Table 1). The intervention tools as well as their situatedness were illustrated with examples from the domains of health and environmental behaviour, stereotyping, and aggression. The underlying framework of situated conceptualizations guiding behaviour in response to critical cues that was introduced here can also be applied across domains. Potentially, this focus on underlying mechanisms of nonconscious behaviour that span across domains can encourage thinking about novel ways of targeting unhealthy or unsustainable behaviours in daily life and stimulate looking across domains for tackling behaviour change in a given area.

An important question for future research across both types of interventions and across domains is to what degree their effectiveness depends on the individual's motivation to engage in the novel behaviour. Some of the intervention tools discussed here, such as implementation intentions and goal priming, have been designed to bridge the intention–behaviour gap and thus explicitly rely on pre-existing intentions. For other interventions, it has been demonstrated empirically that they work better for motivated individuals, for example, goal priming and high-repetition training (e.g., Lawrence, O'Sullivan, et al., 2015; Papies, 2016b). In addition, for interventions that require a high involvement from participants, such as high-repetition training and mindfulness training, it is conceivable that outside of a research context, they are especially likely to be taken up by people who are motivated, such that motivation for behaviour change functions as a natural moderator for their effects. Importantly, however, the potential moderating role of motivation has not yet been examined in other interventions, for example, nudging and upstream interventions. Although these sometimes might be expected to work for everyone equally, it seems likely that someone who is determined to eat a tasty yet unhealthy meal will choose it even if it is placed in the middle of the menu or hard to reach on the buffet. Examining motivational moderators of cueing interventions may enable us to supplement them with effective motivational interventions where necessary to widen their reach.

Previous research on effective interventions has addressed the principles of tailoring interventions, and it may be useful to address how this relates to the principle of situating interventions. Tailoring interventions typically implies adapting the content of an intervention to specific, more or less stable characteristics of an individual (see Strecher, 1999). Situating interventions, in contrast, focuses on situations and how they affect cognitive processes, rather than on specific individuals. Assuming that salient situational cues may affect groups of individuals in similar ways, situating interventions means targeting them to situations in order to affect individuals. Thus, tailoring and situating interventions can be understood as complementary, rather than competing, approaches. Importantly, just as tailoring interventions requires good insights into characteristics of an individual to be effective, situating interventions requires a good understanding of the effects of situational cues and may therefore often necessitate research into specific situations before an intervention is implemented, rather than relying on a one-size-fits-all approach.

Another important question that may come up in this regard is whether the effects of situated interventions will be limited to the specific situations where they are implemented, or whether they would generalize across situations. No systematic empirical tests have addressed this issue, but the reasoning underlying situated interventions suggests that the effects should in principle be limited to situations with critical features like the ones targeted in the interventions (e.g., de Bruijn, Nguyen, Rhodes, & van Osch, 2017). If, however, the new behaviour is enacted repeatedly in response to situational cues, this may engender learning processes that change situated conceptualizations (Papies, 2016b), and if these are highly salient and are triggered easily in different situations, this could lead to generalization across situations. If, for example, a health goal prime in the workplace cafeteria repeatedly motivates an office worker to choose a healthy lunch, this could over time develop into a situated conceptualization of making healthy choices any time she or he is eating away from home and thus affect her or his behaviour in other relevant situations as well. Future research might address how such generalization processes could be stimulated.

Related to the question of generalization is the question of long-term effects of situated interventions. For most tools discussed here, this has not been studied systematically, either. Long-term effects of situated interventions can result from learning processes triggered by repeatedly performing a new behaviour in a given situation (as described above) or simply from the intervention being present over the long term. Although learning can result from both cueing and training interventions, keeping interventions in place is more feasible for cueing interventions, which can be implemented and maintained with relatively low effort compared to training interventions. Thus, the potential of an intervention to instigate learning of desired responses as well as the feasibility of maintaining an intervention should be taken into account when planning for long-term effects.

In sum, the potential strengths and weaknesses of both types of interventions naturally depend on the nature of the behaviour to be changed and on the situation in which it typically occurs. Cueing interventions may be useful in relatively stable situations, where situational cues can be altered in a reliable way to activate goals, norms, or behaviours that are in line with desired outcomes. This way, many individuals can be affected without having to engage in effortful training, possibly even at relatively low levels of motivation for behaviour change. Although it is currently unclear whether the effects of such cueing interventions transfer beyond the immediate intervention context, they can probably lead to long-lasting effects, either through the development of new habits or through simply maintaining the intervention. When behaviour change is desired in more dynamic situations, however, training interventions may be more useful, in particular if individuals are sufficiently motivated to complete a practice-based training session or to form a personal plan for behaviour change supported by mental imagery. Such training can be more easily geared to cut across situations, and it is likely to lead to longer term changes, especially if supported by repeated practice and enactment of the trained responses. Future research, however, should establish more systematically which intervention type is best suited given particular features of the target behaviour, population, and situation.

It will be clear to the reader that many other existing and effective intervention tools could be categorized as cueing or training interventions, and could as such have been included in this discussion. Individual-level counselling, for example, such as cognitive behavioural therapy or skills training, has been shown to affect behaviour in beneficial ways by changing automatic cognitive responses and the availability of healthier behavioural options to the individual. Typically, this results from deliberate, specific consideration of one's existing automatic responses and efforts to replace them with more adaptive responses to increase one's long-term health and well-being. Although such approaches are beyond the scope of social psychology and have therefore not been discussed in detail here, they are well aligned with the principles of situating interventions outlined in the current paper. Hopefully, the discussion here offers a new perspective on these and other intervention tools so that we can most effectively use them to improve the well-being of individuals and societies.

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Esther K. Papies is currently a Senior Lecturer at the Institute of Neuroscience and Psychology and the School of Psychology at the University of Glasgow, UK.