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Charting variability to ensure conceptual and design precision

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Science needs explanatory precision

Ogden (2016) is right to celebrate our recognition of variability. When scientists fail to identify variability in the phenomena they study their categories and theories cannot represent critical structural and processual detail. Such crude categorisation cannot generate explanatory models of complex systems that enable scientists to accurately intervene to change the operation of those systems. For example, if water and mercury are categorized as “liquids”, this acknowledges one common feature but fails to articulate other critical differences. ‘Water’ itself is a category describing varying subsets of molecule combinations. For example, when water includes greater proportions of deuterium, a hydrogen isotope (or variant), this changes the characteristics and behavior of the water. Such detailed categorisation provides the foundation for sciences that enable engineering of complex systems.

A cornucopia of explanations and related behavior-change interventions

Psychologists face greater challenges than natural scientists because of the complexity of variation within any one person across time and circumstances. Categorising processes that can initiate specified behaviour change among particular groups of people in particular circumstances requires multiple sophisticated theories describing a wide variety of regulatory processes.

Only by understanding and articulating this detail can an intervention designer specify precisely which technique, or technique combination, is needed to
influence particular psychological processes that may, in turn, shape behaviour patterns.

The term 'behaviour change technique' (Abraham & Michie, 2008) is useful insofar as it encourages designers of behaviour change interventions to differentiate between intervention contents on the basis of the specific regulatory mechanisms targeted by intervention components, for example, whether a particular change technique is intended to alter descriptive or, instead, injunctive normative beliefs (Borsari & Carey, 2003). This specificity is critical to effectiveness, replicability and fidelity of intervention implementation. Behavior change scientists need to follow the example of natural scientists and carefully report targeted mechanisms and the particular techniques used to alter them (Abraham, 2012; Abraham, Johnson, de Bruin & Luszczynska, 2014; Albrecht, Archibald, Arseneau & Scott, 2013). The term ('behaviour change technique') is, however, a misnomer because the definitions it refers to are, in reality, categories of techniques that demonstrate considerable design and implementation variability.

Cognitive dissonance theory (Festinger, 1957) proposes that we are motivated to maintain a consistent view of the world because cognitive inconsistency creates dissonance that is inherently unpleasant. Setting aside the many debates that have refined our understanding of dissonance generation and reduction processes (see e.g., Harman-Jones & Harman-Jones, 2007), it can be claimed, on the basis of experimental studies, that ‘inducing cognitive dissonance’ (ICD) can result in behaviour changes relevant to health. Is it not then helpful to refer to ICD as a ‘behaviour change technique’? No, because, by doing so, we lose sight of processual detail and implementation variability critical to the effective use of ICD techniques. ICD techniques are designed to change beliefs and attitudes. If they are effective in doing so they may or may not generate changes in motivation and behaviour - so they are more precisely categorised as one of many groups of ‘attitude-change techniques’. Moreover, even when an intervention designer decides that an ICD technique is an appropriate tool to instigate attitude change, she must determine what type of ICD technique to employ. In a useful review of 20 experimental tests of ICD techniques, Freijy and Kothe (2013), assessed evidence of effectiveness of five types of ICD techniques across a range of health-related behaviour patterns. They concluded that, on average, the ‘hypocrisy paradigm’ (Stone, Aronson, Crain, Winslow & Fried, 1994) was most effective in initiating health-related behaviour change. Ignoring the processual details described by cognitive dissonance theory or the variability of ICD techniques tested in the experimental literature hampers our capacity to understand when to employ particular ICD techniques.

Another useful category of change technique is implementation intention formation (IIF), or if-then planning. IIF techniques have proved effective in helping motivated people to translate their intentions into action (Gollwitzer, 1999; Gollwitzer & 2006). Sheeran and Orbell (2000) found that inclusion of a planning prompt in a questionnaire increased attendance for cervical cancer screening. The prompt advised questionnaire recipients that they would be more likely to go for a cervical smear if they decided when and where to go. They were provided with space to write "when, where and how you will make an appointment". In this case, motivated respondents who had not yet made an appointment were prompted to make specific action plans (e.g., specifying a time) to later prompt a response that they had the skills to enact (making an appointment). This IIF technique was effective in changing behaviour; 92% of those offered this planning
opportunity attended for screening compared to 67% in the control group, despite equivalent levels of reported motivation across the two groups. In another IIF intervention, Sheeran, Aubrey and Kellett (2007) aimed to increase attendance at psychotherapy appointments among those who had already made appointments. The researchers undertook a needs assessment and identified worrying about the appointment as a common precursor to missing an appointment. Consequently, recipients were advised to use a self-talk technique to terminate such worrying: “As soon as I feel concerned about attending my appointment I will ignore that feeling and tell myself this is perfectly understandable”. Unlike the technique employed by Sheeran and Orbell (2000), this technique does not prompt ‘action’ planning – no behavioural response is specified. This is a thought-regulation technique designed to reduce cognitive elaboration of appointment-related worries. Note too that it is not an example of thought suppression (Wenzlaff & Wegner, 2000). Recipients were not advised not to think about appointment concerns but rather to avoid elaborating appointment-related concerns when they became aware of them. This clarification is critical because thought suppression techniques have been found to ineffective (Erskine, Georgiou & Kvavilashvili, 2010). The researchers found that those who received a questionnaire containing this advice were more likely to attend their psychotherapy appointment with 75% attending compared to 63% in the control group. These two experimental studies demonstrate the potential effectiveness and versatility of IIF techniques and also the variability in implementation needed to precisely tailor IIF techniques to relevant barriers to action. Both interventions aimed to change attendance and both used questionnaires as the delivery format. Yet they targeted conceptually distinct changes and offered different advice appropriate to their target audiences. To subsume this detailed theoretical and experimental literature under a category such as “action planning” or assume that all IIF change techniques are the same would great undermine the precision with which IFF techniques could be adapted and deployed.

The truth is still out there

Mulder and Scully understood that they lacked persuasive scientific explanations. Similarly, psychologists need more, and more sophisticated explanations, of the regulatory process underpinning variability in behaviour patterns before claiming the establishment of a science-based approach to engineering behaviour change interventions. This is especially true in health psychology where many of the behaviour patterns we seek to change are recognised by participants as damaging and even those motivated to change need help to do so. Acknowledging the importance of impulsive and habit-sustaining processes (Strack & Deutsch, 2004) has been an important step forward. IIF techniques are effective, in part, because they are built on a clear understanding of the interplay between reflective and impulsive process that regulating behaviour.

In a systematic review aiming to identify and categorise techniques used to modify or manage impulsive processes associated with unhealthy eating behaviour – and describe the mechanisms targeted by such techniques - van Beurden, Greaves, Smith and Abraham (2016) defined 17 distinct categories of impulse management techniques (including IIF techniques) that had been tested in 92 experimental studies. This review illustrates that, in just one behavioural domain, a large number of techniques based on a variety of theoretical explanations are being tested. Our science needs further high-quality experimental work testing mechanism-linked change techniques. To ignore this burgeoning variability would be ossify the science of behaviour change.
How useful is deconstructing intervention descriptions?

The utility of deconstructing intervention descriptions into components and characteristics that may or may not be present across an intervention set (for example in meta-analytic sub-group analyses) depends on the quality of descriptions used. Despite calls for fuller descriptions of intervention content, delivery and implementation (Abraham, 2012; Abraham, Johnson, de Bruin, & Luszczynska, 2014) many intervention descriptions in published papers are not detailed enough to allow accurate replication. Consequently, categorisation of the content of such descriptions will generate different findings to categorisation of detailed manuals that permit accurate replication. For example, a study that categorised both manuals and papers (describing the same interventions) found that only two thirds of categories of change techniques identified in the manual descriptions could be identified in papers describing the same intervention (Abraham & Michie, 2008). Categorising impoverished intervention descriptions results in incomplete characterisations of the variability across interventions.

Assume, however, that, in future, supplements to all journal articles reporting behaviour change intervention evaluations accurately described intervention content such that fidelity of replication was unproblematic. How useful then would it be to categorise change techniques included in these intervention descriptions and relate this categorisation to effectiveness? If such categorisation is viewed as a starting point that directs intervention designers to relevant experimental literatures then this could be helpful. So, for example, if is useful to know, that when promoting condom use intervention designers should seriously consider techniques capable of changing normative beliefs when targeting young people but that such techniques may be less effective among older recipients (Albarracín, Gillete, Earl Glasman & Duranti, 2005). It is critical, however, to acknowledge such broad-based recommendations only set the stage for detailed consideration of which (norm-changing) techniques will optimise intervention effectiveness in context.

Imagine a comprehensive systematic review and meta-analysis of high-quality descriptions of group-based interventions to promote weight loss. Imagine that this review found that when papers report that facilitators explicitly encouraged group discussion, the mean, weight loss difference is significantly greater in intervention than in no-intervention control groups. Should this lead to recommendations that intervention designers train facilitators to encourage group discussion? What if, instead, as in a recent review, the opposite was observed, that is reporting of encouragement of group discussion was associated with lower mean intervention-control group weight-loss differences (Borek, Abraham, Greaves, & Tarrant, 2016). Perhaps in groups with poor cohesion and trust encouraging discussion could undermine effectiveness. So should these researchers have recommended that facilitators of weight loss groups should not encourage discussion? No because it is also possible that this finding is due to unassessed confounds. For example, interventions that are less well planned may rely on simple “discussion” rather precisely specified change techniques. So it may be that another intervention feature (e.g., poor articulation of targeted change mechanisms) rather than encouragement of discussion is responsible for poorer effectiveness. Since we cannot control for all such confounds, associations between particular reported intervention characteristics and effectiveness such associations should be treated skeptically (Peters, de Bruin, & Crutzen, 2015).
Meaningful intervention design work begins after one identifies potentially useful categories of techniques. Then a detailed consideration of the experimental data combined with needs assessment co-creation of the intervention materials can facilitate optimal adoption of specific and tailored techniques and technique combinations (Bartholomew, Parcel, Kok, Gottlieb & Fernandez, 2011; Denford et al., 2015).

**Conclusion – charting variability to create precise conceptual distinctions**

The science of behaviour change is in its infancy. Progress will depend on testing myriad theories using a variety of change techniques tailored to address particular behavior change challenges. This will involve progressive experimental tests assessing the potential of new change technique variants to change particular processes relevant to particular behavior change challenges. Understanding, through experimentation, how ICD or IIF techniques can be applied to meet a variety of behaviour change challenges in healthcare systems represents scientific advance. Applying crude categorisations that bundle together distinct types of techniques targeting separate change mechanisms is a step backwards. So I agree with Ogden. Health psychologists should celebrate variation in the phenomena they study. I have also argued that, as behaviour change scientists, we need to chart variability to develop precise distinctions and conceptualisations that support the development and testing of multiple, varying sets of change techniques.
References


