

Helpdesk Report: Categorising Behavioural Characteristics

Date: 17th February 2012

Query: What types of alternative categorisations have been (or could be) applied to health-related behaviours, what would the contents of these different categories look like? Which approach to categorising human behaviours looks the most appropriate for moving forwards our understandings of and effectively changing behaviour?

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1. Overview

There are lots of models of human behaviour which can be used to conceptualise behaviour change for more effective learning and future programming within, across and beyond human development.

Traditional approaches to reviewing the effectiveness of behaviour change interventions in the fields of human development have focused upon categorising studies according to the specific behaviour of interest, for example promoting handwashing with soap or the desired outcome, for example, HIV prevention. However, behaviours might be more usefully classified in a more cross-cutting manner according to 'type' of behaviour allowing human development specialists to better identify the most promising behaviour change intervention or theory to the behaviour of interest.

This report includes summaries of categorisations that have been, or could be, applied to health-related behaviours and information on the theory behind the categorisations and the contents of these different categories.

2. Overview Texts

Kinds of Behaviour

Robert Aunger and Valerie Curtis, In press *Biology and Philosophy*
<http://hygienecentral.org.uk/pdf/AungerCurtis%20KindsofBehaviour.pdf>

Human brains are the product of an evolutionary history of selection for component systems which produced behaviours that gave adaptive advantage to their hosts. These structures, behaviour production systems, are the natural kinds that psychology seeks. We argue these can be identified deductively by classing behaviour first according to its level of behavioural control.

Early animals in our lineage used only *reactive* production, Vertebrates evolved *motivation*, and later Primates developed *executive* control. Behaviour can also be classified by the type of evolutionary benefit it bestows: it can deliver either immediate benefits (food, gametes), improvements in the individual’s position with respect to the world (resource access, social status), or improvements in the ability to secure future benefits (knowledge, skill). Combining history and function implies the existence of seven types of behaviour production systems in human brains responsible for *reflexive*, *instinctual*, *exploratory*, *driven*, *emotional*, *playful* and *planned* behaviour. Discovering scientifically valid categories of behaviour can provide a fundamental taxonomy and common language for understanding, predicting and changing behaviour, and a way of discovering the organs in the brain – its natural kinds – that are responsible for behaviour.

Classes of behaviour production units

End State/Control Level	Physiological	Situational	Aptitudinal
Reactive	Reflex	Instinct	Exploration
Motivated	Drive	Emotion	Play
Executive	Planning		

Consolidating Behaviour Change Approaches: A Theoretical and Practical Reduction

<http://hygienecentral.org.uk/pdf/AungerCurtis%20BC%20Consolidation.pdf>

There is little consensus about how behaviour change specialists should go about choosing from the large number of available approaches which are most likely to make their program effective. Here we engage in a systematic consolidation, classifying approaches into four categories, based on their explanatory goals:

- Psychological approaches focus on the proximate psychological determinants of behaviour,
- Stage approaches seek to divide the target population into categories according to their state of preparedness for behaviour change,

- Environmental approaches target the physical and social ecological context of behaviour,
- Process approaches are concerned with the process of designing behavioural interventions.

The elements characteristic of each of these four classes are then identified and used to produce consolidated models of each class, which identify the specific claims made by each class about how behaviour is determined. These four consolidated models are then amalgamated into a single generic framework, which shows how the various classes relate to one another in determining behaviour and suggests how those designing programs of behaviour change could use behaviour determination processes for insight. We argue that academic and behaviour change practitioners should combine their efforts at theory development and testing if we are to find better means of changing behaviour in future.

Making psychological theory useful for implementing evidence based practice: a consensus approach

S Michie, M Johnston, C Abraham, R Lawton, D Parker, A Walker, on behalf of the "Psychological Theory" Group, *Qual Saf Health Care*, 2005;14:26–33

Evidence-based guidelines are often not implemented effectively with the result that best health outcomes are not achieved. This may be due to a lack of theoretical understanding of the processes involved in changing the behaviour of healthcare professionals. This paper reports the development of a consensus on a theoretical framework that could be used in implementation research. The objectives were to identify an agreed set of key theoretical constructs for use in: (1) studying the implementation of evidence based practice and (2) developing strategies for effective implementation, and to communicate these constructs to an interdisciplinary audience.

Six phases of work were conducted to develop a consensus:

- (1) identifying theoretical constructs;
- (2) simplifying into construct domains;
- (3) evaluating the importance of the construct domains;
- (4) interdisciplinary evaluation;
- (5) validating the domain list;
- (6) piloting interview questions. The contributors were a "psychological theory" group (n = 18), a "health services research" group (n = 13), and a "health psychology" group (n = 30).

Twelve domains were identified to explain behaviour change: (1) knowledge, (2) skills, (3) social/ professional role and identity, (4) beliefs about capabilities, (5) beliefs about consequences, (6) motivation and goals, (7) memory, attention and decision processes, (8) environmental context and resources, (9) social influences, (10) emotion regulation, (11) behavioural regulation, and (12) nature of the behaviour.

A set of behaviour change domains agreed by a consensus of experts is available for use in implementation research. Applications of this domain list will enhance understanding of the behaviour change processes inherent in implementation of evidence-based practice and will also test the validity of these proposed domains.

Planned, motivated and habitual hygiene behaviour: an eleven country review

Valerie A. Curtis, Lisa O. Danquah, and Robert V. Aunger, *Health Education Research*, 2009 August; 24(4): 655–673.

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2706491/>

The authors classed people's explanations of the causes of their handwashing behaviour as (i) habitual, (ii) motivated or (iii) planned.

Habit

The most primitive psychological system involved in handwashing behaviour is 'habit', which is learnt, automated behaviour that can be regularly triggered by a particular cue. Mothers often ascribed handwashing (HW) habits to what they were taught when they were young. The habit of washing with plain water was much more frequent than HW with soap (HWWS) and sometimes occurred as a part of religious ritual, a special form of habit.

Motivation

The motivations concerning HWWS that emerged from the transcripts were disgust, nurture, status, affiliation, attraction, comfort and fear.

This review highlights the importance of continuing to develop the theory and practice of health promotion so as to be able to encompass concepts such as motivation, emotion and habit, in the light of emerging developments in psychology, anthropology and marketing.

A taxonomy of behaviour change techniques used in interventions

Charles Abraham and Susan Michie, In press – *Health Psychology*

Objective: Without standardised definitions of the techniques included in behaviour change interventions it is difficult to faithfully replicate effective interventions and challenging to identify techniques contributing to effectiveness across interventions. This research aimed to develop and test a theory-linked taxonomy of generally-applicable behaviour change techniques (BCTs).

Design: Twenty six BCTs were defined. Two psychologists used a five-page coding manual to independently judge the presence or absence of each technique in published intervention descriptions and in intervention manuals.

Results: Three systematic reviews yielded 195 published descriptions. Across 78 reliability tests (i.e., 26 techniques applied to 3 reviews), the average Kappa per technique was 0.79 with 93% of judgments being agreements. Interventions were found to vary widely in the range and type of techniques employed, even when targeting the same behaviour among similar participants. The average agreement for intervention manuals was 85% and a comparison of BCTs identified in 13 manuals and 13 published articles describing the same interventions generated a technique correspondence rate of 74% with most mismatches (73%) arising from identification of a technique in the manual but not in the article.

Conclusions: These findings demonstrate the feasibility of developing standardized definitions of BCTs included in behavioural interventions and highlight problematic variability in the reporting of intervention content.

Misleading tests of health behaviour theories

Weinstein, N.D., *Annals of Behavioural Medicine*, 33, 1–10, 2007.

<http://www.ncbi.nlm.nih.gov/pubmed/17291165>

Most tests of cognitively oriented theories of health behaviour are based on correlational data. Unfortunately, such tests are often biased, overestimating the accuracy of the theories they seek to evaluate. These biases are especially strong when studies examine health behaviours that need to be performed repeatedly, such as medication adherence, diet, exercise, and condom use. Several misleading data analysis procedures further exaggerate the theories' predictive accuracy. Because correlational designs are not adequate for deciding whether a particular construct affects behaviour or for testing one theory against another, most of the literature aiming to test these theories tells us little about their validity or completeness. Neither does the existing empirical literature support decisions to use these theories to design interventions. In addition to discussing problems with correlational data, this article offers ideas for alternative testing strategies.

Design with Intent: 101 Patterns for Influencing Behaviour Through Design

http://research.danlockton.co.uk/toolkit/designwithintent_cards_1.0_draft_300dpi.pdf
<http://architectures.danlockton.co.uk/>

There are lots of models of human behaviour, and as the design of systems becomes increasingly focused on *people*, modelling behaviour has become more important for designers.

This toolkit is in the form of 101 simple cards, each illustrating a particular 'gambit' for influencing people's interactions with products, services, environments, and each other, via the design of systems. They're loosely grouped according to eight 'lenses' bringing different disciplinary perspectives on behaviour change.

Health Behaviour Constructs, Theory, Measurement and Research Cancer Control and Population Sciences

<http://dccps.cancer.gov/brp/constructs/index.html>

This website provides definitions of major theoretical constructs employed in health behaviour research, and information about the best measures of these constructs. This resource is designed for health behaviour researchers in public health, health communications, nursing, psychology, and related fields. Each behaviour categorisation below is described in detail on their website.

- Barriers
- Dispositional Optimism
- Environments
- Illness Representations
- Implementation Intentions
- Intention, Expectation, and Willingness
- Perceived Control
- Perceived Severity
- Perceived Vulnerability
- Self-Efficacy
- Self-Reported Behavior
- Social

- Normative Beliefs
- Optimistic Bias
- Perceived Benefits
- Influence
- Social Support
- Stages
- Worry

3. Routine Behaviour

Efforts to change any behaviour should begin with an understanding of how it is caused. A routine is a recurring sequence of behaviours controlled as a unit or 'chunk'. Routine behaviour occurs on an everyday basis, typically in a regimented manner. In particular, it follows a standard sequence of actions which can be analysed in hierarchical fashion.

Tooth brushing as routine behaviour

Robert Aunger, LSHTM, International Dental Journal (2007) 57, 00-00

<http://hygienecentral.org.uk/pdf/Aunger%20Toothbrushing%20routines.pdf>

The most robust three-level model in psychology, the Norman-Shallice-Cooper ('NSC') model, has been implemented computationally and applied to relatively complex real-world tasks. The three levels of control are Reactive, Motivated and Cognitive:

- In human brains, the bottom layer of control (and oldest in evolutionary terms) is reactive. It couples motor outputs tightly to sensory inputs, and produces 'atomic' actions
- The middle level of control, called 'motivational', produces goal-directed behaviour. Goal pursuit can be necessary when persistent behaviour is warranted so that a particular end-state can be achieved even though the environment is changing.
- The highest level of control, called 'cognitive' here, only evolved recently in our primate ancestors. It provides long-term planning and problem-solving abilities. Cognition can represent abstract objectives and intervene to take control in situations when automatic responses are not appropriate. It can override motivated action in favour of a better long term outcome.

Determining what to do in many situations is a difficult task. Rigorously and systematically considering all the alternatives can sometimes take too long: for example, a predator may already have eaten you before you identify the optimal response. This kind of extended search has been mathematically proven an unrealistic model of intelligent behaviour. This is because search is combinatorially explosive: more behaviours to consider or a more complex task to solve leads to an exponentially longer search.

From a public health perspective, the implication of tooth brushing being routine is that interventions should seek to instigate these routine practices within families which then train their offspring to brush their teeth.

Contention scheduling and the control of routine activities

Richard Cooper, Tim Shallice, Cognitive Neuropsychology, 2000, 17: 297–338.

<http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.123.2689>

The control of routine action is a complex process subject both to minor lapses in normals and to more severe breakdown following certain forms of neurological damage. A number of recent empirical studies (e.g. Humphreys & Ford, 1998; Schwartz et al., 1991, 1995, 1998) have examined the details of breakdown in certain classes of patient, and attempted to relate the findings to existing psychological theory. This paper complements those studies by presenting a computational model of the selection of routine actions based on competitive activation within a hierarchically organised network of action schemas (cf. Norman & Shallice, 1980, 1986). Simulations are reported which demonstrate that the model is capable of organised sequential action selection in a complex naturalistic domain. It is further demonstrated that, after lesioning, the model exhibits behaviour qualitatively equivalent to that observed by Schwartz et al., in their action disorganisation syndrome patients.

Promoting good hygiene practices: Key elements and practical lessons

WaterAid Australia, International WaterCentre, IRC International Water and Sanitation Centre, 2011.

www.wateraid.org/documents/plugin_documents/110623_final_hygiene_web.pdf

The FOAM model describes four core elements of hygiene promotion programs that all need to be addressed in order to achieve behaviour change. An 'S' has been added to the model here, in order to draw attention to the importance of sustaining behaviour change.

Other Useful References

Wood, W., Quinn, J. M., & Kashy, D. (2002). Habits in everyday life: thought, emotion, and action. *Journal of Personality and Social Psychology*, 83, 1281–1297.

4. Planned Behaviour

The Theory of Planned Behaviour (TPB; Ajzen, 1991) is among the leading theories used to predict a range of health behaviours, such as physical activity (Armitage, 2005; Eng & Martin Ginis, 2007; Johnston et al., 2007), eating (Conner, Norman, & Bell, 2002), and other health behaviours (Kiene, Tennen, & Armeli, 2008; van den Berg et al., 2008). The TPB is a social cognition model that proposes that behaviour is a linear function of behavioural intentions and perceived behavioural control (PBC), the perception of individual control over performing the behaviour. Intentions, in turn, are assumed to be a linear function of three types of cognitions: Attitude (positive or negative evaluation of the behaviour), subjective norm (perceived approval of performing the behaviour), and PBC. Attitudes, subjective norm, and PBC are based on a set of more specific salient behavioural, normative, and control beliefs that reflect perceived outcomes associated with the target behaviour (behavioural beliefs), approval of important others (normative beliefs), and barriers and facilitators (control beliefs) (Ajzen, 1991; Sutton, 2002).

While automatic and motivated behaviours tend to reflect immediate benefits, planned behaviours reflect the pursuit of longer-term goals through conscious plans. While health psychology models (such as the Theory of Reasoned Action) often place emphasis on planned behaviours and the role of rational thought in determining behaviour, the pursuit of longer term goals often necessitates a person consciously ignoring immediate (frequently very salient) motives, something that can represent a challenge; e.g. rational thought might result in the intention to use a condom during intercourse though the more immediate, unconscious motivation/drive to reproduce and enjoy the experience might undermine that intention.

Behavioural Interventions Based on the Theory of Planned Behaviour

Icek Ajzen

<http://people.umass.edu/aizen/pdf/tpb.intervention.pdf>

According to the theory, human behaviour is guided by three kinds of considerations: beliefs about the likely outcomes of the behaviour and the evaluations of these outcomes (behavioural beliefs), beliefs about the normative expectations of others and motivation to comply with these expectations (normative beliefs), and beliefs about the presence of factors that may facilitate or impede performance of the behaviour and the perceived power of these factors (control beliefs). In their respective aggregates, behavioural beliefs produce a favourable or unfavourable *attitude toward the behaviour*; normative beliefs result in perceived social pressure or *subjective norm*; and control beliefs give rise to *perceived behavioural control*. In combination, attitude toward the behaviour, subjective norm, and perception of behavioural control lead to the formation of a behavioural *intention*. As a general rule, the more favourable the attitude and subjective norm, and the greater the perceived control, the stronger should be the person's intention to perform the behaviour in question. Finally, given a sufficient degree of *actual* control over the behaviour, people are expected to carry out their intentions when the opportunity arises. Intention is thus assumed to be the immediate antecedent of behaviour. However, because many behaviours pose difficulties of execution that may limit volitional control, it is useful to consider perceived behavioural control in addition to intention. To the extent that perceived behavioural control is veridical, it can serve as a proxy for actual control and contribute to the prediction of the behaviour in question. The website has a schematic representation of the theory.

Interventions directed at behavioural, normative, or control beliefs may succeed in producing corresponding changes in attitudes, subjective norms, and perceptions of behavioural control — and these changes may further influence intentions in the desired direction. The intervention will still be ineffective, however, unless individuals are in fact capable of carrying out their newly formed intentions. It is therefore incumbent on the investigator to ensure that there is a strong link from intentions to behaviour. When this relation is weak, steps must be taken to strengthen it. One of the most effective means available to date is to induce individuals to form an *implementation intention*, i.e., to form a specific plan detailing when, where, and how the desired behaviour will be performed (cf. Gollwitzer, 1999). The formulation of such plans makes it easier for people to carry out their intended actions.

An experimental test of the theory of planned behaviour

FF Sniehotta, Appl Psychol Health Well-Being 2009;1:257–70.

<http://onlinelibrary.wiley.com/doi/10.1111/j.1758-0854.2009.01013.x/full>

In contrast to the experimental findings, regression of intention and behaviour on post-intervention TPB measures confirms TPB assumptions that attitudes, subjective norms, and PBC are highly (cross-sectionally) predictive of intentions, and PBC and intention are predictive of behaviour. While these predictive findings are well in line with existing evidence, they are misleading because the experimental findings in the same study suggest that the TPB does not *explain* behaviour. This study suggests that TPB assumptions do not stand up to experimental tests, despite strong predictive effects using correlational approaches. While the changes in intention found in this study are in line with TPB assumptions, the theory does not account for the findings on behaviour change found in this experimental study. This limits the TPB's potential to contribute to the science of behaviour change.

So what is wrong with the TPB? The theory's various conceptual problems have been discussed (Ogden, 2003; Sniehotta, 2009). The key shortcomings from an experimental and behaviour change point of view are that (a) the theory does not specify techniques to modify hypothesised cognitive determinants of intention and behaviour, (b) possible changes in beliefs will be attenuated through the hypothesised causal chain of events from beliefs, to intention, to behaviour caused by the imperfect empirical relationships between these variables, and (c) the TPB does not account for intention-behaviour discrepancies. Thus, the Theory of Planned Behaviour is neither about planning, as it does not address how people translate their intention into behaviour, nor an accurate theory of behaviour (Schwarzer, 2008; Sniehotta, Scholz, & Schwarzer, 2005). While future research is needed to confirm these findings, it calls into serious question the leading role of the TPB in the health psychology literature.

It is time for a new research agenda to be set, aimed at testing and developing theories of health behaviour by using more rigorous tests and designs and setting criteria for abandoning theories which fail these tests.

The theory of planned behaviour: A review of its applications to health-related behaviours.

Godin, Gaston;Kok, Gerjo, American Journal of Health Promotion, Vol 11(2), Nov-Dec 1996, 87-98.

<http://psycnet.apa.org/index.cfm?fa=search.displayRecord&uid=1997-02984-001>

The authors reviewed the literature for applications of I. Ajzen 's (1985) theory of planned behaviour in the domain of health and verified the efficiency of the theory to explain and predict health related behaviours. 56 studies (but 58 behavioural applications) published from 1985 to date were identified. Findings indicate that the theory performs very well for the explanation of intention. Attitude toward the action and perceived behavioural control were most often the significant variables responsible for this explained variation in intention. Intention remained the most important predictor, but in half of the studies reviewed perceived behavioural control significantly added to the prediction.

Other Useful References

Presseau J, Sniehotta FF, Francis JJ, Gebhardt WA. With a little help from my goals: integrating intergoal facilitation with the theory of planned behaviour to predict physical activity. *Br J Health Psychology* 2010;15:905–19.

Ajzen, I. (1991). The theory of planned behaviour. *Organizational Behaviour and Human Decision Processes*, 50, 179–211.

Armitage, C.J. (2005). Can the theory of planned behaviour predict the maintenance of physical activity? *Health Psychology*, 24, 235–245.

Eng, J.J., & Martin Ginis, K.A. (2007). Using the theory of planned behaviour to predict leisure time physical activity among people with chronic kidney disease. *Rehabilitation Psychology*, 52, 435–442.

Johnston, M., Bonetti, D., Joice, S., Pollard, B., Morrison, V., Francis, J.J. et al. (2007). Recovery from disability after stroke as a target for a behavioural intervention: Results of a randomised controlled trial. *Disability and Rehabilitation*, 29, 1117–1127.

Conner, M., Norman, P., & Bell, R. (2002). The theory of planned behaviour and healthy eating. *Health Psychology*, 21, 194–201.

Kiene, S.M., Tennen, H., & Armeli, S. (2008). Today I'll use a condom, but who knows about tomorrow: A daily process study of variability in predictors of condom use. *Health Psychology*, 27, 463–472.

Van Den Berg, M., Timmermans, D.R.M., Knol, D.L., Van Eijk, J.T.M., De Smit, D.J., Van Vugt, J.M.G. et al. (2008). Understanding pregnant women's decision making concerning prenatal screening. *Health Psychology*, 27, 430–437.

Sutton, S. (2002). Testing attitude–behaviour theories using non-experimental data: An examination of some hidden assumptions. *European Review of Social Psychology*, 13, 293–323.

5. Stage Theories

Stage theories assume that behaviour change involves movement through a sequence of discrete stages, that different variables influence different stage transitions, and that effective interventions need to be matched to stage.

Weinstein, N. D., Rothman, A. J., & Sutton, S. R. (1998). Stage theories of health behaviour: Conceptual and methodological issues. *Health Psychology*, 17, 290-299.

The Transtheoretical Model of Behaviour Change

The Transtheoretical Model of Behaviour Change assesses an individual's readiness to act on a new healthier behaviour, and provides strategies, or processes of change to guide the individual through the stages of change to Action and Maintenance. The

Transtheoretical Model is also known by the acronym 'TTM' and by the term 'stages of change'. A popular book, *Changing for Good* discussed the model.

In the Transtheoretical Model, change is a 'process involving progress through a series of stages':

- Precontemplation (Not Ready)–'People are not intending to take action in the foreseeable future, and can be unaware that their behaviour is problematic'
- Contemplation (Getting Ready)–'People are beginning to recognise that their behaviour is problematic, and start to look at the pros and cons of their continued actions'
- Preparation (Ready)–'People are intending to take action in the immediate future, and may begin taking small steps toward behaviour change'
- Action–'People have made specific overt modifications in modifying their problem behaviour or in acquiring new healthy behaviours'
- Maintenance–'People have been able to sustain action for awhile and are working to prevent relapse'
- Termination–'Individuals have zero temptation and they are sure they will not return to their old unhealthy habit as a way of coping'

In addition, the researchers conceptualised 'relapse' (recycling) which is not a stage in itself but rather the 'return from Action or Maintenance to an earlier stage'.

When Popularity Outstrips the Evidence

Thaddeus Herzog, *Addiction*, Volume 100, Issue 8, 25th July 2005

<http://onlinelibrary.wiley.com/doi/10.1111/j.1360-0443.2005.01214.x/pdf>

A sharp divide of opinion about the TTM has surfaced in recent years. On one side the model enjoys substantial popularity in the form of a voluminous research literature and a large following among clinicians. On the other side there is discontent among many scholars (e.g. Sutton 2001) who have closely scrutinised the scientific rigor of the model. There can be no questioning the popular success of the TTM: it is established fact. But the scientific merit of the model can be questioned.

The lynchpin of the TTM is, of course, the stages of change. Thus it would seem essential to take great care in formulating how the stages were to be conceptualised and measured. However, there has never been a peer-reviewed account of the developmental research that led to the creation of the stages of change algorithm. In fact, it is not clear that any systematic developmental research took place at all, and the consequences of this omission plague the model to the present time.

Other Useful References

West, R. (2005). What does it take for a theory to be abandoned? The transtheoretical model of behaviour change as a test case. *Addiction*, 100, 1048–1050.

Bandura, A. (1998) Health promotion from the perspective of social cognitive theory. *Psychology and Health*, 13, 623–649.

Etter, J.-F. & Sutton, S. R. (2002) Assessing 'stage of change' in current and former smokers. *Addiction*, 97, 1171–1182.

Sutton, S. R. (2001) Back to the drawing board? A review of applications of the transtheoretical model to substance use. *Addiction*, 96, 175–186.

West, R. (2005) Time for a change: putting the Transtheoretical (Stages of Change) Model to rest. *Addiction*, 100, 1036–1039.

The Precaution Adoption Process Model

<http://dccps.cancer.gov/brp/constructs/stages/index.html>

The PAM was originally developed to describe and explain the process by which people adopt precautions against a new risk, i.e., one that they have recently learned about rather than one they have been aware of for some time. For example, the model was applied to understanding the adoption of precautionary behaviour after warnings were released about the high levels of radon in homes in specific geographic areas. It is also applicable in the situation where a new precaution against an "old" risk becomes available (e.g., the introduction of the HPV vaccination to prevent cervical cancer).

The model specifies seven discrete stages. The model specifies seven discrete stages. In Stage 1, people are unaware of the health issue. People in Stage 2 are aware of the issue but they have never thought about adopting the precaution; they are not personally engaged by the issue. People who reach Stage 3 are personally engaged but they are undecided about whether to adopt the precaution. If they decide against adopting the precaution, they move into Stage 4, or out of the sequence of action adoption. If they decide in favour, but have not yet acted on this decision, they are in Stage 5. People who act on their decision move to Stage 6.

Finally, for some behaviours, a seventh stage (maintenance) may be appropriate. Although only a handful of studies using the PAM have been conducted to date, it is a promising approach that avoids some of the problems with the TTM. For example, it defines the stages without reference to arbitrary time periods and, e.g., between having never thought about adopting a particular precaution and having thought about it and decided not to act. Key tasks for future research on the PAM are to specify the variables that are important for each of the stage transitions and to test whether they predict and influence these transitions.

6. Motivated/Goal Driven Behaviour

Motives are defined by Aunger & Curtis (2010) as 'psychological mechanisms designed by evolution to cause animals to seek to meet a need through goal-driven behaviour); particular human motives include lust, hunger, fear, attraction, nurturance, affiliation, status. In better understanding the salience of these various motivations marketers often utilise Maslow's *Hierarchy of Needs* to frame their formative research.

Three kinds of psychological determinants for hand-washing behaviour in Kenya

Robert Aunger, Wolf-Peter Schmidt, Ashish Ranpura, Yolande Coombes, Peninnah Mukiri Maina, Carol Nkatha Matiko, Valerie Curtis, *Social Science & Medicine*, November 2009

<http://hygienecentral.org.uk/pdf/Aunger%20et%20al%20Kenya%20handwashing%20SSM.pdf>

Washing hands with soap at the right times – primarily after contact with faeces, but also before handling food or feeding an infant – can significantly reduce the incidence of childhood infectious disease. Here, we present empirical results which substantiate a recent claim that washing hands can be the consequence of different kinds of psychological causes. Such causes can be divided into three kinds of control over behaviour: automatic or habitual responses, motivated or goal-driven behaviour to satisfy needs, and cognitive causes which reflect conscious concerns.

Empirical results are based on 3-hour-long structured observations of hand-washing behaviour in 802 nationally representative Kenyan households with children under five, and structured interviews with the primary female caretaker in these households, collected in March 2007. Factor analysis of questionnaire responses identified three psychological factors which are also significant predictors of observed hand-washing behaviour: having the habit of hand-washing at particular junctures during the day, the motivated need for personal or household cleanliness, and a lack of cognitive concern about the cost of soap use. These factors each represent a different kind of psychological cause. A perceived link between clean hands and sexual attractiveness also appeared in the factor analysis, but was not a determinant of actual behaviour. We also report evidence that those who express concern about the cost of soap use are those with relatively few economic resources. We suggest that those developing hygiene promotion programmes should consider the possible existence of multiple types of strategies for increasing hand-washing behaviour.

7. Automatic/Reactive Behaviour

These are behaviours that occur in an automatic (uncontrolled) response to environmental or internal bodily cues; examples: gag reflex, fight or flight response, disgust response

8. Control Theory

Control theory: A useful conceptual framework for personality–social, clinical, and health psychology

Carver, Charles S.;Scheier, Michael F. , *Psychological Bulletin*, Vol 92(1), Jul 1982, 111-135.

<http://psycnet.apa.org/journals/bul/92/1/111/>

This study contends that control theory provides a model of self-regulation that is useful in the analysis of human behaviour. As an illustration of the breadth of its applicability, the basic construct of control theory—the discrepancy-reducing feedback loop—is presented, and certain implications for theory in 3 areas of human

psychology are discussed. In personality-social, clinical, and health psychology, the construct proves to fit well with known phenomena and with the theories most recently developed to account for the phenomena. Moreover, in each case control theory appears to make a unique contribution to the state of the area. The integrative potential suggested by these illustrations and some issues that should receive attention in future work are noted.

9. Health Action Process Approach

Health Behaviour Constructs, Theory, Measurement and Research Cancer Control and Population Sciences

<http://dccps.cancer.gov/brp/constructs/self-efficacy/index.html>

The **Health Action Process Approach** argues for a distinction between (a) **preintentional motivation processes** that lead to a behavioural intention and (b) **post-intentional volition processes** that lead to actual health behaviour. In the motivation phase, one needs to believe in one's capability to perform a desired action ("I am capable of initiating a healthier diet in spite of temptations"), otherwise one will fail to initiate that action. In the subsequent volition phase, after a person has developed an inclination toward adopting a particular health behaviour, the "good intention" has to be transformed into detailed instructions on how to perform the desired action. Self-efficacy influences the processes of planning, taking initiative, maintaining behaviour change, and managing relapses.

10. Social Cognitive Theory

According to Social Cognitive Theory (SCT) (see Bandura, 1997), a personal sense of control facilitates a change of health behaviour. Self-efficacy pertains to a sense of control over one's environment and behaviour. Self-efficacy beliefs are cognitions that determine whether health behaviour change will be initiated, how much effort will be expended, and how long it will be sustained in the face of obstacles and failures. Self-efficacy influences the effort one puts forth to change risk behaviour and the persistence to continue striving despite barriers and setbacks that may undermine motivation. Self-efficacy is directly related to health behaviour, but it also affects health behaviours indirectly through its impact on goals. Self-efficacy influences the challenges that people take on as well as how high they set their goals (e.g., "I intend to reduce my smoking," or "I intend to quit smoking altogether"). Individuals with strong self-efficacy select more challenging goals (DeVellis and DeVellis, 2000). They focus on opportunities, not on obstacles (e.g., "At my university there is a smoking ban, anyway," instead of "There are still a lot of ashtrays at my university").

See:

Self-efficacy: the exercise of control

Albert Bandura, 1997

http://books.google.co.uk/books?id=eJ-PN9g_o-EC&hl=en

This book is based on Bandura's theory that those with high self-efficacy expectancies - the belief that one can achieve what one sets out to do - are healthier, more effective, and generally more successful than those with low self-efficacy expectancies. He begins with a discussion of theory and method: what self-efficacy is and how it can be developed. Bandura then demonstrates how belief in one's capabilities affects development and psychosocial functioning during the course of life, underscoring provocative applications of this work to issues in education, health, psychopathology, athletics, business, and international affairs.

11. Theory of Reasoned Action

Dzewaltowski compared the predictive utility of the Theory of Reasoned Action (TRA) and SCT in the field of exercise motivation. The exercise behaviour of students was recorded and then related to prior measures of different cognitive factors. The variables from TRA predicted exercise behaviour. In addition, strength of self-efficacy, expected outcomes and satisfaction with level of activities were assessed. Individuals who were confident that they could adhere to the strenuous exercise program, who were dissatisfied with their present level of physical activity, and who expected positive outcomes also exercised more. TRA variables did not account for any unique variance in exercise behaviour after controlling for the social cognitive factors. These findings indicate that SCT provides powerful explanatory constructs. Other studies using constructs from different theories also show that the effects of self-efficacy on physical activity are stronger than those of other psychosocial determinants (see Rovniak, Anderson, Winett, & Stephens, 2002)

See:

Other Useful References

Ajzen, I. & Fishbein, M. (1980). *Understanding attitudes and predicting social behaviour*. Englewood Cliffs, NJ: Prentice-Hall.

Fishbein, M. & Ajzen, I. (1975). *Belief, attitude, intention, and behaviour: An introduction to theory and research*. Reading, MA: Addison-Wesley.

Hale, J.L.; Householder, B.J. & Greene, K.L. (2003). The theory of reasoned action. In J.P. Dillard & M. Pfau (Eds.), *The persuasion handbook: Developments in theory and practice* (pp. 259–286). Thousand Oaks, CA: Sage.

Miller, K. (2005). *Communications theories: perspectives, processes, and contexts*. New York: McGraw-Hill.

Sheppard, B.H.; Hartwick, J. & Warshaw, P.R (1988). The theory of reasoned action: A meta-analysis of past research with recommendations for modifications and future research. *Journal of Consumer Research*, 15, 325–343.

12. Maslow's hierarchy of needs

A Theory of Human Motivation

A. H. Maslow (1943), Originally Published in *Psychological Review*, 50, 370-396.

<http://psychclassics.yorku.ca/Maslow/motivation.htm>

(1) There are at least five sets of goals, which we may call basic needs. These are briefly physiological, safety, love, esteem, and self-actualisation. In addition, we are motivated by the desire to achieve or maintain the various conditions upon which these basic satisfactions rest and by certain more intellectual desires.

(2) These basic goals are related to each other, being arranged in a hierarchy of prepotency. This means that the most prepotent goal will monopolise consciousness and will tend of itself to organise the recruitment of the various capacities of the organism. The less prepotent needs are [p. 395] minimised, even forgotten or denied. But when a need is fairly well satisfied, the next prepotent ('higher') need emerges, in turn to dominate the conscious life and to serve as the centre of organisation of behaviour, since gratified needs are not active motivators. Thus, man is a perpetually wanting animal. Ordinarily the satisfaction of these wants is not altogether mutually exclusive, but only tends to be. The average member of our society is most often partially satisfied and partially unsatisfied in all of his wants. The hierarchy principle is usually empirically observed in terms of increasing percentages of non-satisfaction as we go up the hierarchy. Reversals of the average order of the hierarchy are sometimes observed. Also it has been observed that an individual may permanently lose the higher wants in the hierarchy under special conditions. There are not only ordinarily multiple motivations for usual behaviour, but in addition many determinants other than motives.

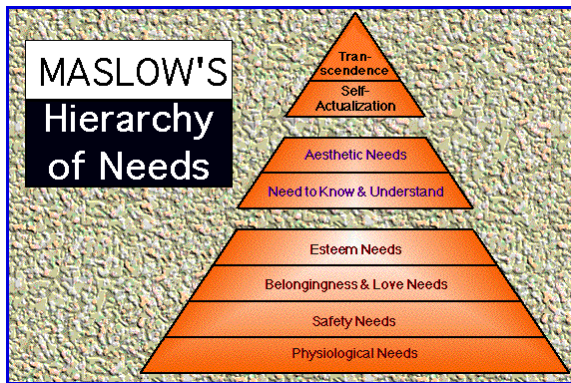
(3) Any thwarting or possibility of thwarting of these basic human goals, or danger to the defenses which protect them, or to the conditions upon which they rest, is considered to be a psychological threat. With a few exceptions, all psychopathology may be partially traced to such threats. A basically thwarted man may actually be defined as a 'sick' man, if we wish.

(4) It is such basic threats which bring about the general emergency reactions.

(5) Certain other basic problems have not been dealt with because of limitations of space. Among these are (a) the problem of values in any definitive motivation theory, (b) the relation between appetites, desires, needs and what is 'good' for the organism, (c) the etiology of the basic needs and their possible derivation in early childhood, (d) redefinition of motivational concepts, i. e., drive, desire, wish, need, goal, (e) implication of our theory for hedonistic theory, (f) the nature of the uncompleted act, of success and failure, and of aspiration-level, (g) the role of association, habit and conditioning, (h) relation to the [p. 396] theory of inter-personal relations, (i) implications for psychotherapy, (j) implication for theory of society, (k) the theory of selfishness, (l) the relation between needs and cultural patterns, (m) the relation between this theory and Alport's theory of functional autonomy. These, as well as certain other less important questions, must be considered as motivation theory attempts to become definitive.

Maslow's Hierarchy of Needs

Huitt, W., *Educational Psychology Interactive*. Valdosta, GA: Valdosta State University, 2007



Motivation to learn: An overview

Huitt, W., *Educational Psychology Interactive*. Valdosta, GA: Valdosta State University, 2011

Maslow later differentiated the growth need of self-actualisation, specifically naming two lower-level growth needs prior to general level of self-actualisation (Maslow & Lowery, 1998) and one beyond that level (Maslow, 1971). They are:

- Cognitive: to know, to understand, and explore;
- Aesthetic: symmetry, order, and beauty;
- Self-actualisation: to find self-fulfilment and realise one's potential; and
- Self-transcendence: to connect to something beyond the ego or to help others find self-fulfilment and realise their potential.

Alderfer's Hierarchy of Motivational Needs

Level of Need	Definition	Properties
Growth	Impel a person to make creative or productive effects on himself and his environment	Satisfied through using capabilities in engaging problems; creates a greater sense of wholeness and fullness as a human being
Relatedness	Involve relationships with significant others	Satisfied by mutually sharing thoughts and feelings; acceptance, confirmation, understanding, and influence are elements
Existence	Includes all of the various forms of material and psychological desires	When divided among people one person's gain is another's loss if resources are limited

13. Health Belief Model

The Health Belief Model (HBM) is a psychological model that attempts to explain and predict health behaviours. This is done by focusing on the attitudes and beliefs of individuals. The HBM was first developed in the 1950s by social psychologists Hochbaum, Rosenstock and Kegels working in the U.S. Public Health Services. The model was developed in response to the failure of a free tuberculosis (TB) health screening program. Since then, the HBM has been adapted to explore a variety of long- and short-term health behaviours, including sexual risk behaviours and the transmission of HIV/AIDS.

Core Assumptions and Statements

The HBM is based on the understanding that a person will take a health-related action (i.e., use condoms) if that person:

1. feels that a negative health condition (i.e., HIV) can be avoided,
2. has a positive expectation that by taking a recommended action, he/she will avoid a negative health condition (i.e., using condoms will be effective at preventing HIV), and
3. believes that he/she can successfully take a recommended health action (i.e., he/she can use condoms comfortably and with confidence).

The HBM was spelled out in terms of four constructs representing the perceived threat and net benefits: perceived *susceptibility*, perceived *severity*, perceived *benefits*, and perceived *barriers*. These concepts were proposed as accounting for people's "readiness to act." An added concept, *cues to action*, would activate that readiness and stimulate overt behaviour. A recent addition to the HBM is the concept of *self-efficacy*, or one's confidence in the ability to successfully perform an action. This concept was added by Rosenstock and others in 1988 to help the HBM better fit the challenges of changing habitual unhealthy behaviours, such as being sedentary, smoking, or overeating.

Table from "Theory at a Glance: A Guide for Health Promotion Practice" (1997)

Concept	Definition	Application
Perceived Susceptibility	One's opinion of chances of getting a condition	Define population(s) at risk, risk levels; personalise risk based on a person's features or behaviour; heighten perceived susceptibility if too low.
Perceived Severity	One's opinion of how serious a condition and its consequences are	Specify consequences of the risk and the condition
Perceived Benefits	One's belief in the efficacy of the advised action to reduce risk or seriousness of impact	Define action to take; how, where, when; clarify the positive effects to be expected.
Perceived	One's opinion of the	Identify and reduce barriers

Barriers	tangible and psychological costs of the advised action	through reassurance, incentives, assistance.
Cues to Action	Strategies to activate "readiness"	Provide how-to information, promote awareness, reminders.
Self-Efficacy	Confidence in one's ability to take action	Provide training, guidance in performing action.

14. Other Useful Papers

Systematic Review to identify active ingredients in behaviour change interventions targeting physical activity in adults with type 2 diabetes (2011)

Avery L, Flynn D, van Wersch A, Trenell MI, Sniehotta FF, *Psychology & Health: 25th European Health Psychology Conference, 20-24 September 2011, Volume: 26 (s2)*, Publisher: Routledge

<http://www.tandfonline.com/doi/pdf/10.1080/08870446.2011.617185>

Type 2 diabetes (T2D) is the most prevalent metabolic disease and represents a significant burden on individuals, families and society. An active lifestyle improves glucose control. There is a need to better understand how behaviour change theory and associated techniques can help adults with T2D achieve/maintain a physically active lifestyle.

Electronic databases were searched for randomised controlled trials of behavioural interventions targeting physical activity in adults with T2D. A taxonomy of theory-linked behaviour change techniques (BCTs) was used to identify intervention components.

A total of 19 studies were identified. Seven made explicit references to theory, whereas nine utilised BCTs (e.g. goal setting, self-monitoring and prompt practice) without explicit references to theory. Conclusion: There is a systematic failure to report theory and fidelity of BCTs in studies targeting physical activity in T2D. Discrepancies also exist between the description and implementation of theory, raising concerns about fidelity.

Identifying active ingredients in complex behavioural interventions for obese adults with obesity-related co-morbidities or additional risk factors for co-morbidities: a systematic review (2011)

Dombrowski SU, Sniehotta FF, Avenell A, Johnston M, MacLennan G, Araujo-Soares V, *Health Psychology Review*, 13-12-2010

<http://dx.doi.org/10.1080/17437199.2010.513298>

Reducing obesity is an important preventive strategy for people who are at increased risk of major disabling or life-threatening conditions. Behavioural treatments for obesity are complex and involve several components aiming to facilitate behaviour change. Systematic reviews need to assess the components that moderate

intervention effects. Electronic databases and journals were searched for randomised controlled trials of behavioural interventions targeting dietary and/or physical activity change for obese adults (mean BMI ≥ 30 , mean age ≥ 40 years) with risk factors and follow-up data ≥ 12 weeks. A reliable taxonomy of theory-congruent behaviour change techniques (BCTs; Abraham & Michie, 2008) was used to identify programme components. Meta-regression suggested that increasing numbers of identified BCTs are not necessarily associated with better outcomes. The BCTs provision of instructions ($\beta = -2.69$, $p = 0.02$), self-monitoring ($\beta = -3.37$, $p < 0.001$), relapse prevention ($\beta = -2.63$, $p = 0.02$) and prompting practice ($\beta = -3.63$, $p < 0.001$) could be linked to more successful interventions. Studies including more BCTs aimed at dietary change that are congruent with Control Theory were associated with greater weight loss ($\beta = -1.13$, $p = 0.04$). Post-hoc ratings of intervention components in published trials can lead to the identification of components and theories for behaviour change practice and research.

Behaviour Change and HIV Prevention: (Re)Considerations for the 21st Century
Global HIV Prevention Working Group, August 2008

http://www.globalhivprevention.org/pdfs/PWG_behavior%20report_FINAL.pdf

Based on a review of hundreds of studies, this report focuses on behavioural change prevention, and calls for significantly expanded delivery of HIV prevention programming aimed at reducing high-risk behaviours. The report also identifies gaps in knowledge about behavioural change programming.

Development of a taxonomy of behaviour change techniques used in individual behavioural support for smoking cessation.

<http://www.ncbi.nlm.nih.gov/pubmed/21215528>

Norman D, Shallice T. Attention to Action: Willed and Automatic Control of Behaviour. In R. Davidson, G. Schwartz & D. Shapiro (Eds.), *Consciousness and Self-regulation: Advances in Research and Theory*, vol. 4. pp1-18. New York, NY: Plenum, 1986.

Links to further papers by Robert Aunger on his profile page:

<http://hygienecentral.org.uk/staff-profile-robert-aunger.htm>

15. Additional information

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