

Response

Some Burning Issues in Research on Health Behavior Change

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This response to five excellent commentaries is intended to clarify some issues in research on health behavior change that appear to be ambiguous or controversial, such as the debate about stage models versus continuum models or the search for moderators and mediators. The assumption of stages can be useful, but the quest for truly existing stages is considered fruitless because stage is a scientific construct, not nature. The Health Action Process Approach (HAPA) is designed as an implicit or explicit stage model, based on the distinction between a motivational and a volitional phase. As a template for targeted interventions, it suggests grouping individuals into preintenders, intenders, and actors. Due to indistinct boundaries between stages and to unstable social-cognitive constructs, the validity of stage assessment becomes the foremost problem. However, if stage-tailored interventions turn out to be superior to nontailored interventions, then the choice of the corresponding stage model is justified. When analysing the mechanisms of health behavior change or when predicting behaviors, the HAPA is also in line with nonstage (continuum) models. In the latter case, it examines moderators and mediators within a path-analytic research design. It is suggested that more research be conducted on moderated mediation.

Cette réponse aux cinq excellents commentaires tente de clarifier certains des résultats des recherches sur la modification des comportements relatifs à la santé, résultats qui semblent ambigus ou sujets à controverse, ce qui est le cas de la discussion sur les modèles en stades ou en continuum ou encore de la recherche de modérateurs et de médiateurs. L'hypothèse des stades peut se révéler fructueuse, mais il est inutile de considérer que les stades existent réellement puisque le stade, concept scientifique, ne relève pas de la nature. L'Approche des Processus d'Action en faveur de la Santé (HAPA) est par construction un modèle en stades implicites ou explicites basé sur la distinction entre une étape motivationnelle et une étape volitionnelle. Comme cadre pour des interventions ciblées, il propose de regrouper les individus en trois catégories:

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ceux qui n'ont pas encore l'intention d'agir, ceux qui ont cette intention et enfin ceux qui agissent. En raison des frontières fluctuantes entre les stades et de l'instabilité des concepts socio-cognitifs, la validité de l'évaluation des stades devient le problème principal. Cependant, si les interventions programmées à partir des stades se révèlent plus efficaces que les autres, le choix de ce modèle est défendable. Quand on analyse les mécanismes des modifications du comportement en faveur de la santé ou quand on prédit ces comportements, l'HAPA accepte aussi le modèle en continuum. En ce cas, elle aborde les modérateurs et les médiateurs avec un plan de recherche en pistes causales. Il faut développer les recherches sur modérateurs et médiateurs.

INTRODUCTION

The commentaries on the lead article by Schwarzer (2008) present thoughtful and stimulating ideas for the elaboration of this field of research, and they contribute constructively to the progress of the academic debate on health behavior change theories. I see many points of agreement as well as some controversies. There is not enough space to provide a point-by-point response to all the issues and helpful criticisms that were raised. Instead, in this brief concluding article, I will make general comments on some selected issues. In particular, I will discuss the distinction between stage and nonstage models and the implications of this distinction.

STAGE IS A CONSTRUCT

The debate about stages of change as opposed to a continuum of change resembles a debate on the scientific truth about the objective world. The quest for the existence of stages assumes that the nature of health behavior change is either one or the other, and that the only task is to “discover” whether stages truly exist. However, stage is a construct, not nature. We invent the notion of stages to help understand how people change, and to provide better treatment to those who have difficulties in changing their behaviors. We construct stages to open another window that allows for a different view on the change process. Thus, the question is not whether stages truly exist, but whether stage is a useful construct.

Moreover, there is no difference between stages and “pseudostages”. The latter term refers to a categorisation of a “truly existing continuum” into stages. However, continuum is also a construct. A continuum is frequently subdivided into categories, although this is accompanied by the loss of some information because it is regarded as useful to illustrate unique characteristics of a variable's distribution or its relationship to others. Then, the question remains: When does the assumption of stages appear to be useful?

If we find that certain groups of individuals undergoing a change process share common features and have similar mindsets that are distinct from

those in a different group at a different point in the change process, then we might want to label them as residents of a particular stage, such as preintenders, intenders, or actors (Lippke, Ziegelmann, & Schwarzer, 2005). This is useful because we obtain a fresh view on the features of individuals within a hypothetical change process. Whether this process is truly a series of qualitative steps or an underlying action-readiness continuum remains a matter of choice. We do not discover the existence of one or the other; we rather choose a construct that provides a convenient template for subsequent research efforts. If, for example, scientists regard some individuals as “inclined abstainers”, they have deliberately chosen a category and created a label that improves communication about the phenomenon in question. Due to its biological connotations, the choice of the stage label may have been unfortunate, but, meanwhile, it has proven useful and has led to a success history in health psychology (Velicer & Prochaska, 2008).

The focus is not on the illusion of scientific truth, but on practicability, and one important aspect of the latter is the therapeutic effectiveness. If stage-tailored interventions turn out to be more effective than untailored ones, the construct of stage has proven useful. The HAPA allows both the researcher and the practitioner to make a number of choices. Although it was initially inspired by distinguishing between a motivational and a volitional stage, and later extended to the distinction between preintenders, intenders, and actors, one need not necessarily group individuals according to such stages. If the purpose is to predict behavior change, one would specify a mediator model that includes postintentional constructs (such as planning and volitional self-efficacy) as proximal predictors of performance.

For the purpose of stage-tailored interventions, however, usually three stage groups would be established. This does not exclude the possibility of generating more than three stages. For example, for some research questions, one might want to subdivide the preintenders into precontemplators and contemplators, according to the Transtheoretical Model (TTM; Velicer & Prochaska, 2008), or opt for a distinction between preintenders who are either (a) unaware of an issue, (b) aware but unengaged, or (c) deciding (Weinstein, Lyon, Sandman, & Cuite, 1998). Thus, HAPA is not a puristic stage model, but a versatile theoretical framework that allows for a variety of approaches.

STAGE ASSESSMENT VALIDITY

The usefulness of stages also depends on the validity of their assessment. Stages are based upon discontinuity; thus the assessment tool must identify individuals who belong to a relatively homogeneous group that is clearly distinct from the previous and/or the subsequent group. The stage algorithm,

thus, must produce such homogeneous groups on the basis of relevant criteria. This, however, poses a major problem. In the TTM, the main criterion for grouping is the passage of time. For example, someone is judged to be a preparer when he intends to change within a month, or someone is promoted from actor to maintainer after adhering to the desired behavior for 6 months. Obviously, this is based upon average clinical experience. Therefore, we rather avoid time as a criterion and use psychological variables, in particular intention and behavior, to build a staging algorithm (Lippke, Ziegelmann, Schwarzer, & Velicer, 2007). Nevertheless, all criteria suffer from arbitrariness.

There are indistinct boundaries between stages (Abraham, 2008) that make misclassification likely. Even the best set of social-cognitive variables cannot attain perfect validity because person characteristics are often unstable. Intentions may change within a day, rendering the staging outcome unreliable. However, intention instability is not a problem germane to stage theories. It causes trouble in continuum theories as well. Predicting Time 2 performance by Time 1 intention may be biased due to changes in intention during the observation period. Instability of predictors is a general problem in all approaches that deal with change. Misclassification of individuals would, however, be a serious matter if these persons were to be treated with an adverse intervention. So far, there is not much evidence of harm created by stage mismatch (except for selective dropout from treatment). All treatments appear to be more or less beneficial or are, at worst, ineffective. A stage assessment procedure of poor validity may underestimate the usefulness of stages and lead to unsuccessful health promotion efforts. But if stage-matched individuals, on average, gain more than mismatched or unmatched individuals, they do have an advantage.

Thus, more research is needed on valid stage assessment and on potential side effects of misclassification as well. Abraham (2008) proposes an interesting alternative to avoid the initial screening of participants with a staging algorithm, namely menu-based interventions that allow participants to select desirable treatment components as they pass through a continuum process of change. Individuals, then, are expected to make their own valid choices based upon their perceived needs and deficits. The research question remains whether such self-tailored interventions turn out to be more effective than evidence-based stage-tailored interventions.

STAGE TRANSITIONS AND SOCIAL-COGNITIVE VARIABLES

When using HAPA as an explicit stage model, two forward transitions are studied: from preintenders to intenders, and from intenders to actors. (Regression is possible as well, but will not be addressed here.) Which are the determinants that are supposed to move people from one stage to the

next? The first transition should be facilitated by outcome expectancies and self-efficacy, and less so by risk perception (susceptibility). This is in line with findings by Noar, Benac, and Harris (2007). “Outcome expectancies” is simply another term for pros and cons or behavioral beliefs (as precursors of attitudes in the Theory of Planned Behavior [TPB]). Outcome expectancies can be emotional variables (such as anticipated regret) or social variables (in line with the subjective norm in the TPB).

According to Conner (2008), affective beliefs deserve particular attention as predictors of an intention. The fact that we use such social-cognitive variables as predictors and as transition determinants does not mean that we misunderstand the motivational phase as a passive process (Leventhal & Mora, 2008). Contemplating the pros and cons of a health behavior, and eventually forming an intention, is an active process. The chosen variables simply serve as status indicators of a self-regulatory activity. This is appropriate when analysing a prediction model or observing transitions. However, when designing interventions, one would develop components that help to elevate these variables up to the point where a decision in favor of a health behavior is likely. Being told to compose a list of pros, for example, represents a simple treatment component within the motivation phase.

The second transition is facilitated by volitional variables such as action planning and coping planning, and by self-efficacy as well. There is abundant evidence for the effectiveness of these variables in the volitional phase (e.g. Schüz, Sniehotta, Mallach, Wiedemann, & Schwarzer, in press).

GOAL CONFLICT, HIERARCHIES, AND PRIORITY MANAGEMENT

Studies are usually limited to one behavior and a corresponding behavioral goal (intention). This is a deliberate choice because the more complex the research question, the less likely it becomes that evidence will be found. But we need to acknowledge the fact that people do have multiple goals that are often in conflict. For example, the intention to work out every day might serve the goal to become slim, which, in turn, may serve the broader goal to become attractive for a potential partner, and so on. Depending on the value placed on the superordinate goal, the subordinate goal might have a certain chance to be pursued while competing goals (enjoying dinner parties) are being downgraded. A variety of action-control components operate in the volition phase that help to adhere to a chosen regimen. Relapse prevention and harm reduction strategies are needed to stabilise intentions and behaviors in times of conflict. Such strategies need to be part of interventions designed to preclude people from regressing from action to earlier stages.

UNDERSTANDING THE MECHANISMS OF HEALTH BEHAVIOR CHANGE

Health behavior change is viewed as a self-regulatory process that can be subdivided into a goal-setting phase (motivation) and a goal-pursuit phase (volition). All social-cognitive variables that are involved in this process are present all the time, although the path-analytic illustration of the HAPA does not reflect this. For example, outcome expectancies are specified only as predictors of the intention, and they do not show up again later as predictors of the behavior. This might create the impression that they are absent in the volition phase (Leventhal & Mora, 2008). However, outcome expectancies are always present, which does not mean that they account directly for behavioral variance. The mediator model suggests an indirect effect of outcome expectancies via the intention on behavior. It is hypothesised that outcome expectancies are distal predictors, and that they would not account for additional behavioral variance if specified again as proximal predictors. This may also depend on the time windows chosen.

All variables change over time, and postintentional changes of outcome expectancies could influence their predictive power. When people move forward through stages, the pros increase by about one standard deviation, while the cons decrease by about half a standard deviation, but these mean level changes seem not to be associated with changes in the rank order of scores (Velicer & Prochaska, 2008). Thus, the correlation between outcome expectancies and behavior does not change during the process, and the indirect effect of preintentional outcome expectancies might sufficiently represent the influence that these variables have on behavior.

Moderators

To better understand the mechanisms of health behavior change, we need to identify mediator effects as well as moderator effects. The HAPA as a parsimonious mediator model does not explicitly include moderators, except of stage. Stage as a moderator indicates that a prediction model within one stage group operates in a different way than a prediction model within an adjacent stage group. This is similar to the assumption that one set of social-cognitive variables can move people from stage A to B, whereas a different set of variables can move people from stage B to C (Velicer & Prochaska, 2008). Sutton (2008) argues that planning might represent a suitable moderator of the intention–behavior link. In the group of individuals who plan, the relationship between intention and behavior is relatively strong, whereas in those who don't plan, this association is relatively weak. This is highly plausible, and it has been found in our data. But whether we regard either intention or planning as the moderator remains a matter of

interpretation. Technically it is the same, which means we compute a statistical interaction between intention and planning, with behavior as the dependent variable. If this interaction is substantial, we would argue that either (a) intention is the moderator of the planning–behavior relationship, or (b) planning is the moderator of the intention–behavior relationship. It has been a weakness of earlier HAPA studies not to examine explicitly the potential moderator effects.

Moderated Mediation

Meanwhile, evidence is accumulating that the proposed mediator model works well in some groups, but not in others. By comparing men and women, younger and older individuals, and those from different cultures, we identify relevant moderators (Renner, Spivak, Kwon, & Schwarzer, 2007; Reuter, Ziegelmann, Wiedemann, Lippke, & Schüz, 2007; Ziegelmann, Lippke, & Schwarzer, 2006). When a mediator model (be it a simple three-variable model, or a more complex one like the HAPA) has strong interrelations within one category of people, but weak associations within a different category of people, then this is a case of moderated mediation. The amount to which the mediator translates the effect of the independent variable on the dependent variable depends on the levels of a moderator variable. Such moderators can be sex, age, culture, etc., but also psychological variables that are closely related to the constructs used in health behavior models. Temporal stability of intention, for example, may be a moderator (Conner, 2008). Moderated mediation is also likely within the core HAPA variables, such as intention or planning. For example, the intention–behavior link is mediated by planning, and this mediator effect can be moderated by level of intention (Wiedemann, Schüz, Sniehotta, Scholz, & Schwarzer, *in press*). Here we have a special case in which the independent variable (intention) of a mediator model serves the function of a moderator in addition. In other words, only in highly motivated persons does the intention operate via planning on the improvement of adherence, whereas in poorly motivated persons no such mediator effect is visible.

Intervention Studies

The best way to demonstrate the mechanisms of health behavior change is the experimental manipulation of those variables that are supposed to produce behaviors or to move people from one stage to another. For example, it has been questioned whether self-efficacy is really a causal factor, or if it is merely a status indicator of underlying behavioral processes (Leventhal & Mora, 2008). Various experimental studies have shown that self-efficacy interventions do make a difference, which attests to the fact that self-efficacy

is indeed an operative construct that facilitates volitional processes, such as effort and persistence (Luszczynska, Tryburcy, & Schwarzer, 2007).

An interesting point is made by Sutton (2008), who argues that a mediator model, if chosen as the basis for an intervention design, implies the use of treatment components that start with the very left-hand side of the model, working through from left to right. This might be the rare case if we start treating a population from scratch, with very low mean levels on all model variables. Usually, we would “jump into the causal chain” (Sutton, 2008) and rather target one or two variables that are insufficiently developed in a sample (such as planning or self-efficacy). In such a case, we would not regard the entire model as a template for intervention. Rather, we would intervene on the basis of a narrow hypothesis, for example on the assumption that increasing the levels of planning would make subsequent health actions more likely. Thus, the point on the chain at which an intervention appears to be effective depends on the stage. Most of the interventions based on HAPA have targeted intenders. Some also have targeted pre-intenders, intenders, and actors. Only when we target the preintenders do we need to focus on the left-hand side of the mediator model, choosing risk perception, outcome expectancies, and motivational self-efficacy as modules for corresponding treatment components. The continuum version of the HAPA serves to explore the mechanisms of health behavior change, whereas the stage version of the HAPA serves to inspire targeted interventions.

CONCLUSIONS

HAPA is certainly not a magic bullet. It is incomplete and does not provide answers to many questions that necessarily arise when trying to understand health behavior change. Yet, as the commentaries in this journal issue document, the HAPA has succeeded in challenging other health behavior models. It has become clear that models that exclude the volitional phase do not provide further insight beyond what is currently known.

The HAPA not only serves to predict cognitive and behavioral outcomes, it also helps to better understand the mechanisms of health behavior change, and it provides a template for innovative interventions. Depending on the actual research question, HAPA might also represent a parsimonious alternative to other stage models. If, for example, we treat only clients who are highly motivated to change, we need not distinguish between precontemplators and contemplators, for example. The focus then is on volitional factors, such as treatment components that aim at strategic planning, action control, and maintenance or recovery self-efficacy.

I do hope that this set of commentaries, along with the lead article, provide a better understanding of health behavior change and stimulate further

research that aims at an investigation of the unresolved and controversial issues.

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