Relationship between Behavior Fogg Model and Behavior Change Technique Taxonomy 93 (V1): implications for behavior designers

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Abstract. BCT taxonomy v1 is an extensive taxonomy of 93 consensually agreed, distinct Behavior Change Technics (BCTs). The BCT taxonomy offers a step change as a method for specifying interventions and becomes a very useful way to systematize a set of 93 BCT that have been developed thorough a Delphy study by Michie.

The Behavior Fogg Model (BFM) explains in an elegant and easy way how behavior happens when three elements converge at the same moment: Motivation, Ability, and Prompt.

Thus, BCT inventory is the most exhaustive and well-validated set of behavior change techniques that any researcher/professional can use both to analyze psychological interventions, with and without technology use. On the other hand BFM allows researchers and practitioners to design intervention in which the behavioral change techniques have a key role and allow researchers/professionals to analyze the "persuasibility" of an intervention. In this framework, our research question were: Could we find a relationship between BFM and BCT Inventory? Could we classify the 93 BCT's in the three "dimensions" of BFM model?

Methods*:* Two researchers classified the 93 BCT's V1 in three categories following an ad-hoc criterion: D1 Motivation, D2: Ability and D3: Prompt.

Results showed that it is possible to categorize the 93 BCT's techniques in the dimensions of Ability, Motivation and Prompt of BFM. Analyzing the 93 BCT's we concluded that it exists more techniques related to "Motivation" and "Prompt" Dimensions, that with "Ability" Dimension.

Conclusion We need further research to analyze the implication in psychological intervention aimed to change behaviors. As first conclusion we considered that since Fogg considers that the Ability dimension increases the adoption of a specific behavior it would be useful to make a reflection about how to increase the number of BCT's related with Ability dimension in our interventions.

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Keywords: First Keyword, Second Keyword, Third Keyword.

1   Background

1.1   BCT Taxonomy V1 93 & Behavior Fogg Model (B=MAP)

BCT taxonomy v1 is an extensive taxonomy of 93 consensually agreed, distinct BCTs(1) developed by Michie and colleagues thorough a Delphi study. The BCT taxonomy offers a step change as a method for specifying interventions and becomes a very useful way to systematize a set of 93 Behavioral Change Techniques (BCTs). The BCT v1 has been used in fields such physical activity(2), musculoskeletal pain (3), patient engagement(4), fall prevention programs (5) or diet habits (6). On the other hand Behavior Fogg Model (BFM) (7) explains in an elegant and easy way how behavior happens when three elements converge at the same moment: Motivation, Ability, and Prompt. In a recent work Fogg explained that modifying the Ability of subjects, making easier to do a specific behavior (both increasing subjects' skills or starting with a tiny behavior) increased the likelihood that this behavior happens if the motivator and prompt appear at the same time (8)

Apparently these two approaches to behavior design, BCT Taxonomy which analyzes the "active ingredient" of the interventions and becomes a tool for analysis and reflection about how to design using very specific techniques; and the BFM, that is a model to explain how behaviors work, does not seem to have a direct relationship and for some researchers and behavior designers can be some confusing to figure out how they can be looked in an integrative view.

Our research questions were: Could we find relationship between BFM and BCT Inventory? Could we classify the 93 BCT's in the three "dimensions" of BFM model?

2   Methods

The analysis was carried out by two independent researchers (MA and BG) who classified the 93 BCT in according the Fogg Model dimensions: D1: Motivation, D2: Ability, D3:Prompt.

In case of controversy, a third researcher (MP) took the final decision of assignment.

Before the first round of assignment a set of specific criteria that we outlined were agreed:

- D1: Motivation: When the BCT referred to psychological aspects of the person such as their attitudes, their social interaction with other people or the emotional outcome of their behavior.
- D2: Ability: When BCT referred to the subject's difficulties in carrying out a behavior and the actions to simplify this or improve their skills.
- D3: Prompt: When BCT referred to some element of the person's physical context.

Once classified the whole set of 93 BCT a second analysis to assign a "main dimension" (M, A or P) to the 16 categories of BCT were performed.

If more than the 70% of techniques of a specific BCT Cluster were classified in a specific dimension we considered that this Cluster was mainly related with this specific dimension. In some cases, and after the third expert judgement, it was not possible to achieve an agreement and the BCT Cluster was tagged in more than one BFM Dimension.

3 Results

Table 1 shows the main finding of the study.

BCT V1 93 Cluster	D1: Motivation	D2:Ability	D3 Prompt	Main BFM Dimension
1. Goals and planning	4	4	1	Motivation & Ability
2. Feedback and monitoring	5	1	1	Motivation
3. Social support	1	1	1	Motivation & Ability & Prompt
4. Shaping knowledge	1	2	1	Ability
5. Natural consequences	6	0	0	Motivation
6. Comparison of behavior	2	1	0	Motivation
7. Associations	0	1	7	Prompt
8. Repetition and substitution	0	3	4	Prompt
9. Comparison of outcomes	3	0	0	Motivation
10. Reward and threat	11	0	0	Motivation
11. Regulation	1	3	0	Ability
12. Antecedents	0	1	5	Prompt
13. Identity	5	0	0	Motivation
14. Scheduled consequences	10	0	0	Motivation
15. Self-belief	4	0	0	Motivation
16. Covert learning	3	0	0	Motivation
Total	56	17	20	

4 Conclusions

Despite some overlapping's between BFM Dimensions and BCT Clusters we could see that mostly BCT's were related with D1: Motivation. That has some implication

for behavior designers. On the one hand a big number of BCTs come from the classical theories of Psychology and have been adapted for online intervention sometimes without considering that in presential practice psychologist can work very directly patient's motivation. On the other hand, authors like BJ Fogg explain that try to intervene in motivation is very hard, saying literally: «*Motivation is Unreliable*»(8) if you want to help people to create healthy habits».

Finally, bearing in mind these aspects, we would like to share some ideas for reflection: Firstly, if most of the BCT's that we are using in our design are aiming to increase motivation perhaps we should shift to more "Ability related" techniques. Secondly, applying a "simple" design in a e.g. Mobile app, will make it «easy for all» but try to motivate the whole public is difficult and very expensive. Perhaps with IA this aspect will change offering tailored BCTs for individuals. Finally, nowadays in the field of BCTs we are very focused on motivate people and perhaps this is not the best way to persuade when we use online interventions.

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