Questioning Our Attitudes and Feelings Towards Persuasive Technology

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Abstract. Definitions regarding Persuasive Technology are often introduced with the accompanying remark: without using coercion and deception. For this position paper, we investigated, evaluated, and discussed the term Persuasive Technology and its connotations. We invesstigated whether Persuasive Technology is perceived with negative connotations such as coercive and deceptive, and, how in comparison, similar labels (such as Behavior Change Support System and Digital Behavior Change Intervention) were perceived. We conducted an online survey where participants (N = 488) rated their attitude towards these systems in the context of a system description, indicated to what extent they agreed with 10 descriptors (such as, manipulative, motivating, or supportive) in the context of a system description, and whether this system in general, is at risk of being perceived as coercive, manipulative, deceptive, or propagandistic. We found that when considering risks of systems in general, labeling them as PT results in them being perceived significantly more forceful than all other labels, and switching the labeling of a system to Digital Behavior Change Intervention results in them being perceived significantly more captivating compared to a neutral system label. The findings suggest that when choosing labels to use for technology or systems it is essential to consider the impact labels can have on how the system or technology is perceived, regardless of the actual function of the system. These findings are relevant for the field of Persuasive Technology and the Persuasive Technology conference specifically. This paper is meant to spark further discussion in the field and at the conference.

Keywords: Persuasive Technology · Behavior Change Support Systems · Digital Behavior Change Interventions · Terminology

1 Introduction

"An attempt to change attitudes or behaviors or both *(without using coercion or deception)*" is Fogg's definition of persuasion [6, p. 15]. He adds (between parentheses) that some people might confuse it with *coercion* (i.e., forceful instead of voluntary), or with *deception* (i.e., with the use of false information instead of transparency). This is noteworthy—not only because more than a decade later this definition is still used—but even more so because it seems the confusion

about the term remains and the part that used to be within parentheses is still needed to describe persuasive technologies.

In this paper, we investigate the term Persuasive Technology (PT) and its connotations. One of the questions central to this paper is whether this previously described confusion with more negative connotations indeed remains, including the link to coercion and deception, even though the field intended to place coercion and deception outside of PT. To answer this question we carried out a survey where participants had to rate their attitude towards and perceptions of PT and similar systems, such as Behavior Change Support Systems (BCSS) [12] and Digital Behavior Change Interventions (DBCI) [19]. We argue that answering this question is relevant, interesting, and timely, which we will explain in the following sections by quoting relevant literature, but also by sharing anecdotes from within the community.

1.1   Investigating Attitude Towards PT is Relevant

We argue that PT has a negative connotation for some people, and therefore investigating this connotation is *relevant*. If people have a negative attitude towards PT, labeling 'our' work as Persuasive Technologies can have negative consequences. After all, Cialdini in his book *Pre-suasion* shows how small changes in, among other things, wording might be used to—even before there is a true interaction—prompt people to focus on certain parts (e.g., negativity - are you *unhappy* versus are you *happy*, or by making it more personal - *they* might versus *you* might) in order to subsequently influence their attitude or behavior in an intended direction [4]. The PT label, or alternatives, are likely to be used throughout our daily practice as researchers and might prompt people (e.g., practitioners, participants, or users) to focus on certain aspects of our design, development, theory-forming, and evaluation practices.

1.2   Investigating Attitude Towards PT is Interesting

Spahn, explains how in a communicative act being truthful and honest is essential in building trust [14]. Spahn argues that a PT twisting the truth, presenting misinformation, or exaggerating feedback might be powerful on the short term but can have negative effects on PT in the long term as well as impact the truthfulness. To exemplify that the question of how the PT label is being perceived is of *interest* for our research community, we refer to the brief discussion of a possible name change and anticipated effects during 2018's (open) steering committee meeting of Persuasive Technology conference. Several points relating to the PT brand were discussed for possible opportunities for growth of the conference. Although the general consensus was that PT was a strong brand, several attendees stated they found it an *'awful'* and *'aggressive'* term. Alternative terms were mentioned but most seemed to be perceived as less strong or less related to the technological background, interests, and profiling of several researchers.

1.3   Investigating Attitude Towards PT is Timely

We also consider the matter to be *timely*. With a rising number of PT's we are also getting in contact with more PT that could be considered unethical. Recently, Kampik et al. even argued that due to the rise of coercive and deceptive PT the definition of PT itself should be updated to include this [9]. In their investigation leading up to that conclusion, they mention the use of deceptive headlines, coercive strategies such as purposeful disempowerment to reach the persuasive goal, Facebook's reluctance to limit the spread of miss-information, as well as social media's coercive effect related to the fear of missing out. Based on the work of Spahn we can see that the negative effects of PT can affect the technology itself, the designer of the PT, or the implementing party [14]. Additionally, we have recently seen an impact on a more personal level for the researchers of PT. For instance, the authors of this paper listened to an invited talk from a pioneer in the PT and persuasive profiling field that felt the need to distinguish himself and his work from the recent scandals around Facebook with Cambridge Analytica. Moreover, Fogg publicly defended himself this year from a piece on Medium[1], that as he described it, 'mischaracterized' his work[2]. In conclusion, the investigation of attitude towards PT is a *timely* matter.

1.4   Approach to Investigate Attitudes and Feelings Towards PT

Numerous publications have revolved around the ethics and ethical guidelines behind PT (e.g., [6,14]), questions relating to voluntariness and intentionality of PT [13], and reviewing, redefining or adding terminology to PT [2,6]. In this paper, we are interested in the attitude towards and perceptions of PT from a wider set of people. We investigate this by letting people rate their attitude towards one of two representative scenarios containing one of four labels. Moreover, we ask people to rate these systems on dimensions that could inform how forceful or captivating these technologies are perceived to be.

2   Survey: Attitudes Toward System Labels

To investigate attitudes and feelings toward system labels, we designed an online survey study. The survey was carried out through Amazon Mechanical Turk[3] (AMT) on SurveyMonkey[4].

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[1] The tendency of the piece was roughly that hidden influencing techniques are applied in gaming and social media context to lure children away of real-life activities, see: https://medium.com/@richardnfreed/the-tech-industrys-psychological-war-on-kids-c452870464ce, last accessed 25-11-2018.

[2] For the response of Fogg see: https://medium.com/@bjfogg/the-facts-bj-fogg-persuasive-technology-37d00a738bd1, last accessed 25-11-2018.

[3] https://requester.mturk.com/.

[4] https://www.surveymonkey.com/.

2.1   Labels and Terminology

In order to investigate the attitude towards PT or alternative terms, we needed to select alternative labels that were used in the field to include in the survey. We selected two alternative terms that are used in the field: Behavior Change Support System and Digital Behavior Change Intervention.

The term Behavior Change Support System, introduced by Oinas-Kukkonen is defined as follows: "*(BCSS) is a sociotechnical information system with psychological and behavioral outcomes designed to form, alter or reinforce attitudes, behaviors or an act of complying without using coercion or deception*" [12, p. 1225].

Yardley et al. in their special issue on Digital Behavior Change Interventions (DBCI) defined them as follows: "*'DBCI' is used to refer to an intervention that employs digital technology to promote and maintain health, through primary or secondary prevention and management of health problems*" [19, p. 814].

For our purposes, where we want to explore possible alternative labels for PT that hopefully implicitly exclude several negative connotations that people might have (such as coercion and deception), it seems the term BCSS is suitable. Furthermore, DBCI seems to be a term that relates both to the technological side, as it starts with the digital component, and it does fit the various types of PT research, although the informed reader might know the focus on health care. We were mainly interested in pre-existing connotations so no explanation was given about the used labels.

2.2   Descriptors of Accompanying Connotations Towards PT

Investigating the 'without coercion and deception' component of PT that was explained in the introduction, we wanted descriptors more specific for the forcefulness of PT and other feelings relating to PT. Based on our research interests and related work we selected a set of ten terms, these terms were transformed into the following adjectives: manipulative [13,14], deceptive [1,12–14], propagandistic [14], coercive [1,12–14,17], steering [5], convincing [14], motivational [5,12,14,17,18], persuasive [1,5,12,14,17], influencing [5,9,17] and supportive [1,12]. We are well aware that these choices include some personal preferences regarding terminology (e.g. supportive and steering), that the references can be selective, or that the choices exclude other terms such as nudging, which we found less related to a connotation or a feeling.

2.3   Scenario Selection

We chose to write two 'scenarios' in which to use the labels based on systems presented at the Persuasive Technology conference. To make this selection we looked at the most cited papers over the last 5 years. The first scenario we chose is a system related to health in the form of physical activity by Herrmanny et al. [7], and the second scenario we chose is a system to promote 'customer engagement in sharing feedback' by Stibbe and Oinas-Kukkonen [16]. Based on the description found in the title, abstract and conclusion, we compiled the two scenarios of systems to be investigated, see Table 1.

2.4   Participants

The sample size consisted of 600 respondents. We set the following AMT requirements for the respondents: completed more than 100 tasks, $>98\%$ approved, and located in the US. We received (partial) data of 720 respondents (due to respondents opening a survey but never completing it). We excluded 172 respondents based on attention checks (clicking on the right scenario and labels to proceed to next page) most of which (116) were from the neutral system condition (see the Discussion section for an explanation). Moreover, we excluded 21 based on an incomplete questionnaire, 31 based on an unrealistic quick answer time ($<90\,\mathrm{s}$), and 8 because they used the same IP-address. The final sample included 488 respondents (216 female, 271 male, and 1 other). The minimum age was 19 and the maximum was 75, the average age was 37.73 ($\mathrm{SD}=11.92$) and the median was 35. One respondent rated his English level as average, all other participants rated this as either good or very good, 12 respondents did have a non-English native language. With respect to reported education, 8 obtained a PhD, 67 obtained a masters degree, 225 obtained a college degree, 137 respondents received some college education, 42 completed their high school, and 9 received other types of education.

2.5   Conditions and Measures

The study was set up as a four (system labels: BCSS, PT, DBCI, neutral system) by two (scenarios: one involving sharing feedback (SF) and one involving physical activity tracking (PA), see Table 1) between-subjects study.

For the measures we used the 5-item Attitude toward the Brand [15] measure (from here on Attitude toward the System), which asks participants to describe their overall feelings about the system described on a 7-point semantic differential scale with anchors: Unappealing – Appealing, Good – Bad, Unpleasant – Pleasant, Favorable – Unfavorable, and Unlikeable – Likeable. Moreover, we asked how well the previously introduced 10 descriptor-list (see Sect. 2.2) fit the system description on a 7-point Likert item response format (i.e. Strongly disagree – Strongly agree). Lastly, we asked if the system label they just read, *in general* (so without considering the previous scenario), is at risk of being perceived as Forceful, which we operationalized with the four descriptors coercive, manipulative, deceptive, and propagandistic (e.g., "Persuasive Technologies, in general, are at risk of being perceived as") on the same 7-point Likert item response format.

2.6   Procedure

At the start of the survey participants had to fill in a consent form and demographics. This was followed by a short instructions page and a follow-up page that directed them randomly to either survey SF or survey PA. The version of the system label (i.e., BCSS, PT, DBCI, neutral system) that the participant

Table 1. The two scenarios with two example system labels each.

Sharing Feedback scenario, inspired by [16]
This Behavior Change Support System, in order to collect feedback from their customers, draws upon design principles intended to change customer engagement in sharing feedback. For that purpose, an information system consisting of social influence design principles of Behavior Change Support Systems was implemented on large public screen displays.
This Persuasive Technology, in order to collect feedback from their customers, draws upon design principles intended to change customer engagement in sharing feedback. For that purpose, an information system consisting of social influence design principles of Persuasive Technologies was implemented on large public screen displays.
Activity Tracking scenario, inspired by [7]
This Digital Behavior Change Intervention implements goal setting as its core principle to support users in setting effective goals in activity tracking. It uses two Digital Behavior Change Intervention strategies to support users in setting realistic goals, namely reference routes and personal recommendation calculation, as well as manual goal input.
This system implements goal setting as its core principle to support users in setting effective goals in activity tracking. It uses two strategies to support users in setting realistic goals, namely reference routes and personal recommendation calculation, as well as manual goal input.

would get within the survey (i.e., SF or PA) was chosen randomly. We introduced the systems with, *'the following paragraph describes the system we want you to consider'*. We asked participants to complete the Attitudes toward the System measure and the 10-item descriptor-list. After, they were asked to answer whether the same label of systems (e.g., PT), in general, is at risk of being perceived as Forceful. The participants were debriefed and given a completion code to fill in on AMT to receive payment. The survey took about 3 min to complete. Participants were compensated 0.6 US dollars for their participation.

3   Data Analysis

The distribution of the included participants over the conditions after attention check (N = 488) was as follows: in total, 245 participants were in the SF condition, split between BCSS (80), PT (67), DBCI (69), and the neutral system (29), and 243 participants in the PA condition, split between BCSS (65), PT (73), DBCI (83), and the neutral system (22).

The reliability of the Attitude toward the System [15] measure was very good and similar to original findings (cf. two separate measurements .97 and .94), with a Cronbach's alpha of .93. Moreover, a principal components analysis (PCA) was carried out on the 10-item descriptor-list selected to measure the connotations of the systems described in the scenario. Following [10], the suitability of PCA was assessed prior to analysis. Inspection of the correlation matrix showed that all variables had at least one correlation coefficient greater than 0.3. The overall

Kaiser-Meyer-Olkin (KMO) measure was 0.86 with individual KMO measures all between .84 and .90, classifications of 'meritorious' according to [8]. Bartlett's test of sphericity was statistically significant ($p < .0005$), indicating that the data was likely factorizable.

PCA revealed two components that had eigenvalues greater than one and which explained 37.8% and 33.2% of the total variance, respectively. Visual inspection of the scree plot indicated that four components should be retained [3]. In addition, a two-component solution met the interpretability criterion. As such, two components were retained.

The two-component solution explained 71.1% of the total variance. A Varimax orthogonal rotation was employed to aid interpretability. Interpretation of the data suggests two dimensions of connotations of systems. One dimension with strong loadings on items could be interpreted to describe to what degree autonomy is supported by the system, i.e., Perceived Forcefulness (PF) measured with the items Manipulative, Deceptive, Propagandistic, and Coercive (these items were also selected a-priori to measure systems, *in general*, being at risk for Perceived Forcefulness (GPF)). The other dimension with strong loadings on items could be interpreted to describe to what degree the system is Perceived as Captivating (PC), measured with the items Supportive, Motivating, Influencing, Persuasive, and Convincing. Component (or dimension) loadings and communalities of the rotated solution are presented in Table 2. Of note is that the Steering descriptor loaded on both dimensions and was therefore left out of either. The Supportive descriptor also loaded on both dimensions, however, it loaded negatively on the PF dimension, and quite strongly on the PC dimension and was therefore kept in the dimension. Moreover, the subsequent reliability analysis showed that leaving out Supportive decreased the PC reliability score, while leaving out Steering increased the PF reliability score. The final reliability of our four selected terms to measure the PF of the described system was very good, with a Cronbach's alpha of .89. The final reliability of our five selected terms to measure the PC of the described system was very good, with a Cronbach's alpha of .87. Moreover, the reliability of our four selected terms (Manipulative, Deceptive, Propagandistic, and Coercive) to measure systems *in general* being at risk for PF was also very good, with a Cronbach's alpha of .93.

Table 2. Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 3 iterations.

				Rotated Component Matrix			
Items	C1	C2	Comm.	Items	C1	C2	Comm.
Manipulative	**.894**	-.107	.811	Convincing	**.869**		.762
Deceptive	**.849**	-.149	.744	Motivating	-.277	**.827**	.761
Propagandistic	**.832**		.697	Persuasive	.124	**.826**	.697
Coercive	**.820**	.113	.685	Influencing	.290	**.774**	.684
Steering	.569	.470	.545	Supportive	-.459	**.712**	.718

4   Results

We ran four two-way ANOVA's to determine the effects of our two independent variables (scenario version: SF or PA and system label: BCSS, PT, DBCI, and neutral system) on our four dependent variables (Attitude toward the System, PF, PC, and systems in general being at risk for PF). For all four ANOVA's, there were no statistically significant interactions between scenario version and system label for the separate dependent variables, see Table 3. Therefore, we can investigate the main effects of the two scenario versions and the four system labels on the four dependent variables.

Table 3. Tests of Between-Subjects Effects for four dependent variables.

Indep. var.	Dep. var.	Type III SoS	df	Mean Square	F	Sig.	Partial η_p^2
Scenario * Label	AttS	4.289	3	1.430	.758	.518	.005
	PF	4.093	3	1.364	.618	.604	.004
	PC	5.736	3	1.912	1.089	.353	.007
	GPF	14.777	3	4.926	1.938	.122	0.012
Scenario	AttS	76.628	1	76.628	40.628	<**.001**	.078
	PF	182.643	1	182.643	82.671	<**.001**	.147
	PC	21.112	1	21.112	12.022	**.001**	.024
	GPF	86.933	1	86.933	34.210	<**.001**	0.067
Label	AttS	6.959	3	2.320	1.230	.298	.008
	PF	13.948	3	4.649	2.104	.099	.013
	PC	15.129	3	5.043	2.872	**.036**	.018
	GPF	65.792	3	21.931	8.630	<**.001**	0.012

Following [11], it is generally recommended to still keep the interaction term in the model when looking at the main effects. For the main effects, we found that the scenario version had a statistically significant effect on all dependent variables (see Table 3 and Figs. 1 and 2). For the system label, there was no statistically significant main effect on Attitude toward the System. Moreover, there was no statistically significant main effect of system label on PF. However, there was a statistically significant main effect of system label on PC. For further analysis (see also Table 4), we use the estimates and pairwise comparisons tables, as we have an unbalanced design and need to use unweighted marginal means (and Type III sums of squares). As is shown in Table 4 and Fig. 2, the DBCI label is Perceived significantly more Captivating than the neutral system label.
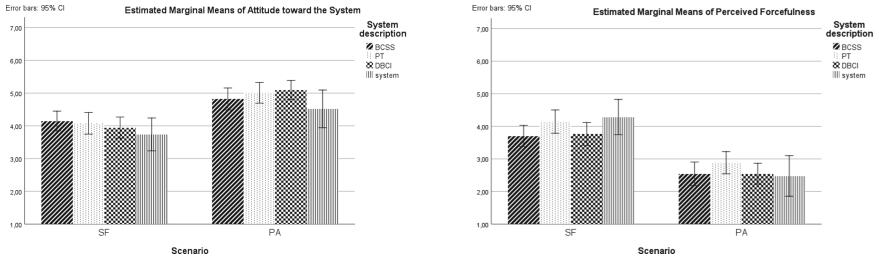
Fig. 1. The estimated marginal means for attitude towards the System (L) and Perceived Forcefulness (R) for the scenario versions and the four system labels.
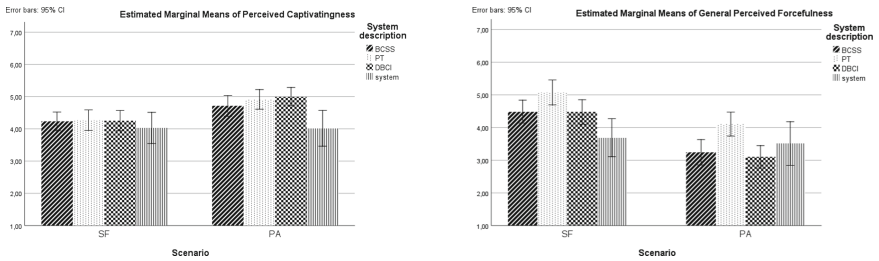

Fig. 2. The estimated marginal means for Perceived Captivatingness (L) and the General Risk for Perceived Forcefulness for the scenario versions and the four system labels.

Table 4. Six pairwise comparisons based on estimated marginal means for the Captivating measure, Bonferroni adjusted.

System 1	System 2	Mean diff.	Std. Error	Sig. ($p < 0.05$)	Lower CI	Upper CI
neutral	BCSS	-0.450	0.218	0.234	-1.027	0.126
	PT	-0.570	0.218	0.056	-1.149	0.008
	DBCI	-0.605	0.216	**0.032**	-1.178	-0.032
PT	BCSS	0.120	0.158	1.000	-0.297	0.537
	DBCI	-0.034	0.156	1.000	-0.447	0.378
DBCI	BCSS	0.155	0.155	1.000	-0.255	0.564

Regarding the risk of PF of systems in general (GPF), there was also a statistically significant main effect. As is shown in Table 5 and Fig. 2, the Persuasive Technology label is at risk of being Perceived as significantly more Forceful than all the other system labels.

Table 5. Six pairwise comparisons based on estimated marginal means for the perceived risk of systems in general on PF measure, Bonferroni adjusted.

System 1	System 2	Mean diff.	Std. Error	Sig. ($p < 0.05$)	Lower CI	Upper CI
	BCSS	-0.264	0.262	1.000	-0.958	0.429
neutral	PT	-0.990	0.263	**0.001**	-1.686	-0.294
	DBCI	-0.188	0.260	1.000	-0.877	0.501
PT	BCSS	0.725	0.189	**0.001**	0.224	1.227
	DBCI	0.802	0.187	**0.000**	0.306	1.298
DBCI	BCSS	-0.076	0.186	1.000	-0.569	0.416

5 Discussion

We found that when considering risks of systems in general, labeling them as PT will result in them being Perceived significantly more Forceful compared to the other labels. Moreover, we found that when switching the labeling of a system to DBCI in a scenario makes it score significantly higher Perceived Captivatingness compared to the neutral label. Although we could not see a similar effect of the PT label after the Bonferroni correction, we do want to point out that there might be a positive trend regarding PC compared to the neutral label. For the other comparisons we saw no significant effects on PC, PF, or Attitude toward the System.

Based on these results it seems there is a risk for PT *in general* to be perceived as PF, something that we as research community want to prevent. However, this effect of PF when labeling something PT was not present when rating this in context of the two actual scenarios from our research field. What does that mean? Although we can only speculate, perhaps this means that PT *can* be perceived to be more PF, but that this is not necessarily so when properly explained, including being transparent about some of the applied strategies/design principles, see Table 1. Or perhaps, as Kampik et al. discussed, coercion and deception might have become part of the general public's interpretation of PT.

Both explanations in turn, would mean we need to be careful to describe ourselves as PT, as there are negative connotations for the general public regarding risks of general (not well described and explained) PT. On the other hand, this might mean that we need to accurately describe the systems, taking into account but perhaps not focusing on the risks per se, so connotations might disappear due to the effect of explaining of the system. Another interpretation could be that our scenarios were not representative of PT, and therefore resulted in different ratings compared to asking for PT specifically.

The results can also be considered in a different light, as first we asked whether the descriptors (including PF and PC) were descriptive of the system in the scenario, something that might be interpreted as how *they* viewed the system, where later we asked whether in general systems were at risks of being perceived in certain ways (including only PF), something that might interpreted as how *they* thought how the *general public* would view the system. Alternatively, the additional questions might have given less focus on PF for the scenarios, which in turn could have influenced the ratings of the participants on PF. In retrospect

this selective questioning also shows we started with somewhat negative expectations to the label PT, which also made us look less into other perhaps more (positive) outcomes of using the PT label. Apart from this, we think our study was reasonably representative for a point of view relevant to this conference.

An important limitation to the current setup of our study was that the attention check was harder for the neutral situation than the other labels. In retrospect, we see that participants with the neutral label might have thought they were expected to *interpret* the system by giving it a certain label. Of the original respondents (N = 720) rating the neutral system label (N = 170), 17 interpreted it as a BCSS, 17 as a PT, 7 as DBCI, and 75 as 'a description using none of the above terms'. Only 54 interpreted it correctly as a neutral system label (3 more of this set were excluded for other reasons). This might have also influenced the results as perhaps only the more well reading participants remained.

Another limitation is that only two scenarios were used. The type of scenario had a significant effect on PC and PF. It is uncertain how these results regarding scenarios would generalize over different types of scenarios. We do not yet know if actual scenario descriptions with more 'risky' use of technology would also rate higher on PF when using the label PT instead of the other labels. It is also unknown if these more risky scenarios might have had an effect on Attitude toward the System. Furthermore, even if the term PT would strengthen PF also in these risky scenarios, it is uncertain if that influences other relevant parameters such use, satisfaction, and acceptance.

All in all, for the PT community these results show ample reasons to further debate the impact of terminology in PT, as well as a need to do so.

6 Conclusion

As part of a position paper we investigated, evaluated, and discussed the term Persuasive Technology (PT) and its connotations. With this effort, we tried to answer the question of whether PT is linked to negative connotations such as coercive and deceptive, but also, how similar labels (such as BCSS and DBCI) were perceived. We conducted a survey where participants had to rate their attitude towards these systems, indicate to what extent they found 10 descriptors (such as, manipulative, motivating, or supportive) descriptive of these systems, and whether these systems in general, were at risk of being perceived coercive, manipulative, deceptive, or propagandistic.

Our main results are that (1) when considering risks of systems in general, labeling them as PT results in them being Perceived significantly more Forceful (measured by Coercive, Manipulative, Deceptive, and Propagandistic); (2) when switching the labeling of a system to DBCI in a scenario results in them being Perceived significantly more Captivating compared to the neutral system label (measured by Supportive, Motivating, Influencing, Persuasive, and Convincing).

Overall, the findings suggest that, when choosing labels to use for technology or systems it is essential to consider the importance these labels can have on how the system or technology is perceived, regardless of the actual function of

the system. Only the additional wording of Persuasive Technology or Digital Behavior Change Intervention can have a significant impact on how Forceful or Captivating the system or technology is perceived.

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