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Persuasive Data Videos: Investigating Persuasive Self-Tracking Feedback with Augmented Data Videos

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Abstract

Self-tracking feedback with engaging and persuasive visualizations not only helps convey data but can also affect people's attitudes and behaviors. We investigate persuasive self-tracking feedback by augmenting data videos (DVs)—novel, engaging storytelling media. We introduce a new class of DVs, called Persuasive Data Videos (PDVs), by incorporating four persuasive elements—primary task, dialogue, system credibility, and social supports—drawn from the Persuasive System Design Model. We describe the iterative design of PDVs and a within-subjects preliminary validation to check their persuasive potential. We then assess PDVs' feasibility using the Persuasive Potential Questionnaire in a between-subjects study comparing a PDV against a conventional DV on Amazon Mechanical Turk (N = 252). Our results indicate the feasibility of using PDVs in providing individuals' self-tracking feedback to convey persuasive health messages, based on which we discuss opportunities for designing persuasive behavioral feedback in an engaging way.

Introduction

Self-tracking technologies such as wearable devices and mobile health apps are advancing rapidly, enabling people to collect a wide range of personal data. Compared to a large amount of research and advancements in the data collection and sensing side of self-tracking technologies, we have not seen much innovation in designing effective self-tracking feedback: existing approaches in feedback designs are limited to simple counts, graphs, stylized representations, and texture feedback.[15] Furthermore, current feedback designs portrayed in commercial trackers often lack persuasive elements delivered in an engaging way.

Designing engaging and persuasive self-tracking feedback is important in enhancing the efficacy of self-tracking. Engaging with personal data can provide personal insights[12] and promote self-reflection.[13] Moreover, well-designed feedback can help people alter their self-efficacy and achieve goals.[11] In this work, we investigate ways to design engaging and persuasive self-tracking feedback.

Data videos (DVs)[2] are novel, popular storytelling media, which would be beneficial in presenting self-tracking data. Being recognized as one of the seven genres of narrative visualizations,[37] data videos combine both visual and audio stimuli to promote data-driven stories in an engaging manner. They also have the capacity to guide people's cognitive processing for the data interpretation, and thus could make self-tracking data easily digestible.

While we employ data videos to deliver easy-to-understand self-tracking feedback in an engaging way, we specifically aim to realize their persuasive potential. In creating Persuasive Data Videos (PDVs), we augment data videos with persuasive elements drawn from the Persuasive System Design (PSD) model.[34] This model was created in response to the upsurge in the development of persuasive software applications to aid in their design and evaluation. We carefully extracted four persuasive constituents from the PSD model—primary task support, dialogue support, system credibility support, and social support—that fit the context of delivering self-tracking data.

In this paper, we aimed to answer two research questions: (1) can data videos (DVs) convey persuasive elements drawn from the PSD model (i.e., the feasibility of creating PDVs), and (2) do persuasive data videos (PDVs) demonstrate higher persuasive potential than data videos? To answer these questions, we conducted a between-subjects study on Amazon Mechanical Turk (AMT) with 252 participants. We used the Persuasive Potential Questionnaire (PPQ)[33] to assess DV's and PDV's persuasive potential and individual's susceptibility to persuasion. Our study results indicate that participants in the PDV condition recognized the persuasive elements in the video at a higher level than those in the DV condition. Moreover, PDV demonstrated higher potential to persuade than DV.

The key contributions of this paper are twofold. First, we introduce PDVs, a new class of self-tracking feedback framework that includes four elements of persuasion, carefully adopted from the PSD model. Second, we provide the evaluation of PDVs with AMT participants, demonstrating their general persuasive potential in influencing people's attitudes.

Related Work

Self-Tracking Feedback

Self-tracking (or self-monitoring) is an activity of recording one's behaviors, thoughts, or feelings.[29] Through self-tracking, people can enhance awareness, which may lead to self-discoveries and positive behavior changes[30]. Providing effective feedback can augment such process,[26] which is why designing effective self-tracking feedback is important for designers and researchers working in this field.[1,7,11,15,23,27]

Many existing approaches in feedback design rely on text-based numerical representations, often augmented with simple visualizations.[7] Some research on self-tracking feedback goes beyond simply presenting the collected data. For example, researchers inspired by the well-known "Framing Effects"[41] investigated how different framing of self-tracking data (e.g., emphasizing either a positive or negative aspect of a target behavior) affects people's perceptions and behaviors. They found that a feedback design with a particular framing could enhance self-efficacy[11] or promote behavior change.[27] These feedback helps people understand their current state, and furthermore, change behavior, but they are often static and lack actionable insights—a reason people may abandon self-tracking.[31]

In this light, we aim to design persuasive and engaging self-tracking feedback. We explicitly incorporate persuasive elements and measure their persuasive potential, as we employ an engaging medium—data video—that could be appropriate to convey the summary of aggregated data.

Persuasive System Design

Persuasive technology concerns "computerized software or information systems designed to reinforce, change or shape attitudes or behaviors or both without using coercion or deception."[34] Theories and practical applications of persuasive technology have been explored in preceding decades.[18–20] Such technologies span from social media apps such as Facebook that persuades its active user base to regularly upload pictures and share personal information[20] to mobile apps designed to persuade people to lead more active lifestyles.[9,14,17,20,44]

The Persuasive System Design (PSD) model expands the earlier work of Fogg[20] and provides a framework to assist in the design of persuasive systems[34]. The PSD model is composed of four persuasive categorical elements, namely (a) Primary Task Support, (b) Dialogue Support, (c) System Credibility Support, and (d) Social Support. Each of these categorical elements further contains psychological constructs known to enhance the persuasive potential of systems, which we adopt in the design of PDVs.

Also based on the PSD is the Persuasive Potential Questionnaire (PPQ),[33] a subjective measurement tool that can aid in assessing the persuasive potential of a system. The PPQ is composed of fifteen questions grouped along three dimensions: (1) individuals' susceptibility to persuasion which represents the degree by which an individual can be persuaded by a given feedback mechanism (IS); (2) the general persuasive potential of a system (GPP); and (3) the individual persuasive potential of the user (IPP). We build on the PSD to design our persuasive data videos and further assess their potential to persuade using the PPQ.

Data Videos

Data visualizations have been applied as a means to analyze and present personal data.[6,12,24,40,43] Previous research suggests that data presentations tailored to an individual can facilitate motivation and possibly promote behavioral change.[25,34] Data visualizations as a storytelling medium—data-driven storytelling or narrative visualization—have in recent years become increasingly popular among data scientists and journalists.[32,37,38]

In particular, largely employing short animated data clips (or data-driven motion graphics), data videos[2] appeal to a broad range of audiences as an emerging data-driven storytelling medium. When integrated with camera motion effects, such as zooming, audio stimuli, and a well designed narrative, data videos can effectively communicate data-driven facts in a short period of time. In addition, with appropriate attention cues, they can captivate and engage audiences.[3]

We argue that data videos can further be equipped with the potential to persuade their viewers when conveying self-tracking data. The novelty of our work is in identifying those visual and narrative elements that can be integrated into data videos while offering self-tracking data feedback, and in evaluating their persuasive advantage.



Figure 1: The top row shows a regular Data Video (DV), while the bottom row shows its counterparts—the frames from a Persuasive Data Video (PDV). Each column of the bottom row represents one of the four persuasive elements we incorporated in the design of PDVs: (a) Primary Task Support; (b) Dialog Support; (c) Credibility Support; and (d) Social Support.

Persuasive Data Video

Persuasive Elements Selection

To design Persuasive Data Videos (PDVs), we carefully selected only those transferable persuasive constructs from the Persuasive System Design (PSD) framework[34]. Transferable constructs refer to those that can be applied to a narrative structure and visual effects that make up a data video, without distracting from the core message, in our self-tracking context. Four major categorical elements from the PSD matched our criteria: (a) Primary Task Support; (b) Dialogue Support; (c) System Credibility Support, and (d) Social Support. Each of these four categories further contains specific persuasive constructs. Below, we summarize these four categories and their constructs we applied to design persuasive data videos (Table 1).

From the *Primary Task Support*, we included the following constructs: Reduction, Personalization, and Simulation. These constructs are designed to encourage people in carrying out their task. For example, Figure 1-a demonstrates how we emphasized Personalization in the PDV by indicating "Your Wednesday class ends at 1:00pm. A perfect time for a walk!" with step counts visualization, whereas the DV's message was simply set to "You are somewhat active," while showing the same step count data.

From *Dialogue Support*, we included Praise, Rewards, Suggestion, Similarity, Liking, and Social Role. A system with these constructs can offer a dialogue to support a user progress toward their goals. For example, providing Praise via giving compliments such as "Great Job!" with a virtual trophy should lead people to a more positive attitude. We included messaging such as "Walk from home to the UofM. It's 2.7 km!" as a means to support Suggestion (Figure 1-b).

From *System Credibility Support*, we included Trustworthiness, Expertise, Surface Credibility, Real-World Feel, Authority, Third-Party Endorsements, and Verifiability. Application of these constructs should endorse overall credibility of the system, and thus enhance persuasiveness. For example, to emphasize Surface Credibility, the narrator in our PDV was Dr. McKenzy, a hypothetical physician, who carries the persona of someone that people could trust to provide health recommendations (Figure 1-c). We also considered other representations of authority, such as to suggest the information coming from the World Health Organization or other well-known and credible sources. However, their identity was difficult to convey with a cartoon-style character, and stronger impressions could be delivered through inclusion of world-reputed experts.

Finally, from *Social Support*, we included Social Learning, Social Comparison, Normative Influence, Social Facilitation, Cooperation, Competition, and Recognition. Applying these constructs should motivate people via social influences. For example, in our PDV, Dr. McKenzy informs the viewer that they have 839 steps to beat Lisa (Figure 1-d). This instills a degree of Social Comparison by letting them observe their accomplishments in light of those of others.

We settled on these mappings through iterative discussion among authors, and by experimenting and considering the various visual options available in Animaker,[5] the animated video authoring tool we used. In the next section, we describe how we realized the PDV with the self-tracking data through a preliminary validation.

Table 1: Four major elements and 23 constructs from the Persuasive System Design framework. *Similarity was removed in the revised Persuasive Data Video.

Elements	Constructs	Descriptions of how the constructs were applied
Primary Task Support	Reduction	Provided activity with instructions.
	Personalization	The persona in the video talked specifically to the person.
	Simulation	Provided clear tips which should lead to the desired outcome.
Dialogue Support	Praise	Provided praise when the person's behavior was positive.
	Rewards	Provided virtual prizes when the person's behavior was positive.
	Suggestion	Suggested activities which should lead to the desired goal.
	Similarity*	Used relatively casual language.
	Liking	The video was designed to be visually attractive with data visualization effects.
	Social role	The persona in the video was a doctor or professor.
System Credibility Support	Trustworthiness	Provided data from the person's weekly activity records.
	Expertise	Provided quotes and suggestions taken from research.
	Surface credibility	The video was designed to look competent.
	Real-world feel	Provided actual organization and authors.
	Authority	Provided references to scientific studies.
	Third-party endorsements	Provided well-known organization names.
	Verifiability	Provided organization names with links.
Social Support	Social learning	Provided friends' ranking results.
	Social comparison	Provided graphs that presented the person's data against their friends' data.
	Normative influence	Provided relevant health information to the person and their friends.
	Social facilitation	The person's friends performance were made salient.
	Cooperation	The person participated in a program with their friends.
	Competition	The person's performance was compared against their friends.
	Recognition	Each person's accomplishment was celebrated in the video.

Persuasive Data Video Development

We developed Persuasive Data Videos (PDVs) to examine whether the PSD elements described above can be properly implemented, and thus be perceived by the viewers. To ensure that the persuasive impact is the result of the persuasive elements we employed, we compared the PDV against the regular data video (DV), which was bereft of any persuasive elements. We developed the video stimuli to suit an online experiment environment (i.e., Amazon Mechanical Turk).

Preparing the Videos. Both the PDV and DV presented the summary of an imaginary person's health data (i.e., Cameron, 22 years old). While the DV primarily focused on the presentation of weekly health summary data (step count, heart rate, & sleep duration), the PDV further included persuasive elements (as we detailed in the earlier section). The video structure had the following sequence of main items: An introduction showed the average number of steps taken during the week using a line graph and a bar chart. This was followed by a bar chart displaying the average number of hours slept. A line graph was then used to display the daily average heart rate during the week. And finally, a data summary of week 1 was presented and compared to recommendations (PDV: tailored recommendation, DV: generic recommendation).

We also ensured that both videos had the same length (1 min 59 sec), with the same background music, displayed data, and structure. Both videos were constructed with the same self-tracking data provided by one of the authors. The videos were created using Animaker[5], an online tool that allowed us to pick characters, narration styles, and animated data charts.

Preliminary Validation. We assessed the implementation of persuasiveness with seven HCI graduate students (all males; 22 to 41 years old), who were unfamiliar with the goal of the study and the PSD. To conduct the assessment, we generated 46 statements, two for each of the 23 constructs of the four PSD persuasive elements (Table 1) to which participants responded using a 7-point Likert scale (1 = Strongly Disagree; 7 = Strongly Agree). For example, for the Liking construct, the two statements were "The video was visually attractive." and "Overall, the video's look and feel have appealed to you."

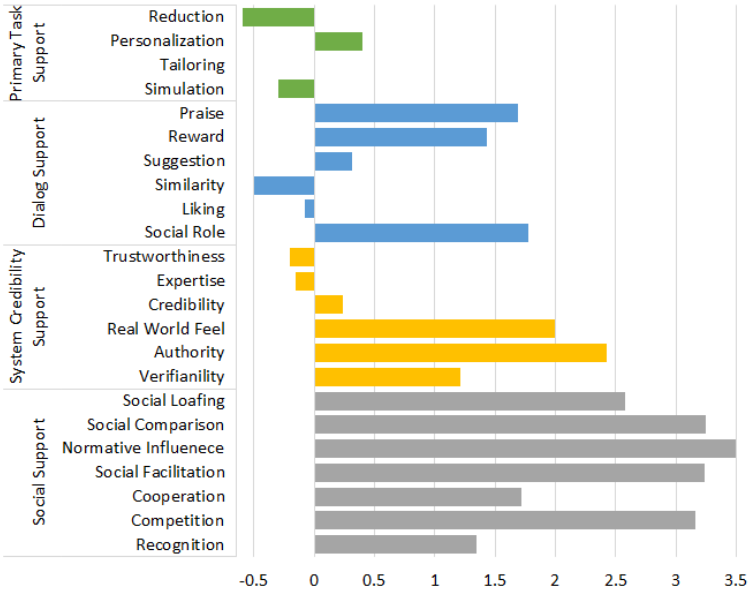


Figure 2: Subtracted perceived persuasiveness (i.e., PDV - DV) from the preliminary validation. Positive numbers indicate higher persuasive elements in PDV.

We conducted this assessment using Qualtrics.[35] Participants first read the following preamble:

> "Imagine students at the University of Monty are participating in a health program, where their health related data are tracked using their smartwatches. At the end of each week, all the students receive summaries of their data in a video format. We would like you to imagine that you are watching the weekly review of a 22 year-old student, Cameron, after his first week. Cameron is participating in the program with a few of his friends, along with many other students."

Participants watched the PDV first and then the conventional DV, to prevent possible ceiling effects[21]: They watched full HD (1080p) videos uploaded to YouTube. Participants were allowed to replay the video after they finished watching the entire video once, but not allowed to skip or go back. After watching a PDV, they answered the 46 questions we prepared. Subsequent to this, they watched a DV, followed by the same set of 46 question items. At the end of the session, we asked for suggestions to improve the PDV with an open ended question.

Revising the PDV. The two question items within each construct were highly correlated (Cronbach's αs$>$.85). Participants showed an equal liking to both video styles, and yet, persuasive elements were successfully recognized at a higher level in the PDV than in the DV, except for the Primary Task Support (Figure 2). This result affirms that our choice of PSD elements, and further, our interpretation of these into a data video medium has the potential to persuade. However, based on the preliminary assessment results and qualitative feedback, we made three changes to the stimuli for a large-scale study (see the next section).

First, we revised PDVs not to include the Similarity construct as it involves "imitating users in some specific way," for example, by using phrases or slang used by the user, from everyday conversation.[34] We realized that this was not possible as we did not personalize the PDV to each viewer; and furthermore, Similarity clashed with our Trustworthiness, Credibility, and Authority representation in the PDV condition. We wished to maintain a similar degree of persuasion without losing generality for the participants in the online experiment setting. Thus, we embedded 22 persuasive aspects in the revised PDV and not 23 as used earlier. Second, we removed the heart rate data to shorten the video length to 1 min 38 sec, thus leaving the video with only step count and sleep duration data. Third, we changed the character of the persona in the DV as the viewers mistook him (a Caucasian male wearing a bandana) as a fitness coach and thus unintentionally attributed him a higher credibility. The new character was also a Caucasian male but physically larger than the previous one.

Table 2: Adjusted Persuasive Potential Questionnaire.

Susceptibility to Persuasion (SP)	**Q1**	When I hear others talking about something, I often re-evaluate my attitude toward it.
	Q2	I do not like to be influenced by others.
	Q3	Persuading me is hard even for my close friends.
	Q4	When I am determined, no one can tell me what to do.
General Persuasive Potential (GPP)		I feel that _____.
	Q5	the video would make its viewer change their behaviors.
	Q6	the video has the potential to influence its viewer.
	Q7	the video gives viewer a new behavioral guideline.
Individual Persuasive Potential of the System (IPP)		Now, please imagine being Alex who is trying to improve his/her health.
	Q8	This program is exactly what I need to change my attitude.
	Q9	Thanks to the program I reach my goals.
	Q10	I will use this program as often as I need to regulate my activity.
	Q11	I think that I will also use such a program in the future.
	Q12	I will use this program on a weekly basis.
	Q13	This video does not cause a change in behavior with me.
	Q14	This video causes me to do certain things differently.
	Q15	With the help of the video, I will behave differently the next week.

Study

To investigate whether Persuasive Data Videos have higher potential to alter lay people's attitude than conventional data videos, we conducted a between-subjects study via Amazon Mechanical Turk (AMT). We were primarily interested in their "potential" only, as a longitudinal study would be necessary to assess their effective persuasive power over an extended time.

Procedure and Participants

After the participants read the consent form and agreed to participate, they read following preamble:

> "Imagine some people are participating in a health promotion program, where their health related data are tracked using their smartwatches. At the end of each week, they receive summaries of their data in a video format. We would like you to imagine that you are watching the weekly review of a 22 year-old Alex, after his/her first week. Alex is participating in the health promotion program with a few of his/her friends, along with many other people."

Subsequent to this, they watched either a PDV or a DV, and answered questions about the video and their demography. We ensured that participants could only view either a PDV or DV.

We recruited AMT workers who resided within either Canada or the US with HITs (or Human Intelligence Tasks) approval rate of 97% or above, and speak English. Participants recruited for both conditions saw the identical study description: "First, you will be asked to watch a short Video Clip (approximately 2 minutes). Subsequently, you will be asked to complete a survey asking you about your background, and experience of watching the video clip." Altogether, 339 AMT Workers participated in this study. Following the recommendation to enhance response quality on AMT through inclusion of verifiable questions,[8,28] we excluded AMT workers who did not pay careful attention to the study instructions as indicated by two gotcha questions (e.g., "How many words are in this sentence?"). Out of 339, 87 participants did not pass our two gotcha questions. This left us with 252 participants (PDV = 123; DV = 129), and their age ranged between 22 and 60 (PDV: $M = 35.07$, $SD = 9.37$; DV: $M = 36.26$, $SD = 9.68$). In both conditions, 42% of participants were female. Participants who completed the study received 1.54 USD as a compensation, and they spent 8 mins 44 secs on average.

Questionnaire

We adapted the Persuasive Potential Questionnaire (PPQ)[33] to match the presentation and assessment of PDVs, resulting in the 15 questions (Table 2). This allowed us to measure (1) individuals' susceptibility to persuasion (SP; four questions), (2) the general persuasive potential of the system (GPP; three questions), and (3) the persuasive potential of the system to the individual (IPP; eight questions), using a 7-point Likert scale (1 = Strongly Disagree; 7 = Strongly Agree). We added one question to ask participants' interest in improving their own health, and worded it as follows: "I am interested in improving my health" again on a 7-point Likert scale.

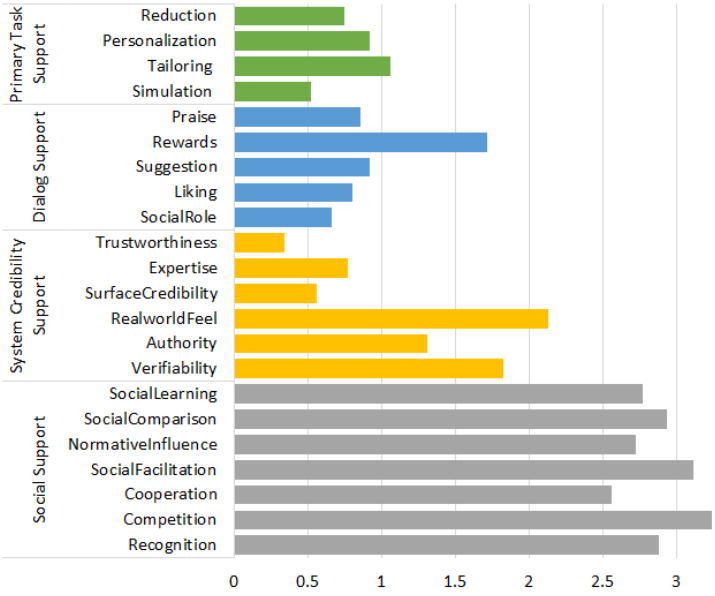


Figure 3: Subtracted perceived persuasiveness (i.e., PDV - DV) from the AMT study. Positive numbers indicate higher persuasive elements in PDV.

Next, to investigate whether the persuasive elements were embedded appropriately, we asked the same questions used in our prior assessment about the persuasiveness of the video. Note, two questions were used to investigate one construct in the prior validation where we found a high inter-item correlation within each construct (*rs*>.85). However, since we added 15 PPQ question items in this study, we were concerned about participants' potential cognitive fatigue and boredom, especially because we conducted this study using an online format. Hence, we removed the overlapping corresponding question items and made minor adjustments (rephrasing the combined question only slightly).

Results

First, we investigated the feasibility of creating PDVs by embedding persuasive elements (i.e., can data videos (DVs) convey persuasive elements drawn from the PSD model). Since the data was not normally distributed, we conducted non-parametric analyses. Results from Mann-Whitney U tests confirmed that participants in the PDV condition perceived all the persuasive elements at a higher level than those who were in the DV condition (*ps*<.05; Figure 3).

Next, we investigated whether participants in the PDV condition perceived higher persuasive potential for attitude change than those who were in the DV condition. First, we investigated Cronbach's $alpha$s for all three aspects; (1) individual's susceptibility to persuasion (SP) (α = .75); (2) the general persuasive potential (GPP) of the system (α = .86); and (3) the persuasive potential of the system to the individual (IPP) (α = .84). Since all three scales were acceptable or good[39], we created aggregates for each of the three aspects. The results from Mann-Whitney U tests (Figure 4) showed that the video type did not have any effect on the individual's susceptibility to persuasion (p = .47), indicating that participants in the PDV condition and DV condition were equally susceptible to persuasion. Next, we found that for participants' general persuasive potential (GPP) of the system, those in the PDV condition indicated higher perceived general persuasion (*Mdn* = 5.67, n = 123) relative to its counterpart (*Mdn* = 5.33, n = 129), U = 7520, z = -2.83, r = .18. Finally, no significant video type effect was found for persuasive potential of the system to the individual (IPP) (p = .30).

Discussion and Future Work

Reflecting on Study Results

After making the necessary adjustments to our Persuasive Data Video (PDV), the manipulation check (i.e.,"a measure used to determine whether the manipulation of the independent variable has had its intended effect on a participant"[16]) indicated that the persuasive elements had the effect we expected. Furthermore, participants who watched a PDV in the AMT study perceived its higher potential to influence the general population, compared to those who watched a Data Video (DV). Altogether, we

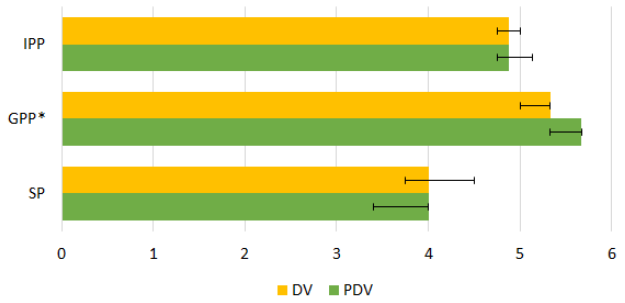


Figure 4: Medians of PPQ measures. * indicates a significant effect (SP: Susceptibility to Persuasion; GPP: General Persuasive Potential of the System; IPP: Individual Persuasive Potential of the System). Error bars represent .95 CI.

believe that our PDV might offer beneficial feedback for applications involving attitudinal change.

Although PDVs' potential to influence the *general population* (i.e., others) was perceived as higher than that of DVs, this video type difference was not found when it concerns the video's potential to persuade *oneself*. This inconsistency between perceptions regarding self vs. others could be attributed to the third person effect whereby individuals normally perceive that others are more readily influenced by media than themselves.[10,22] According to these prior works, individuals estimate being shielded from such effects but not their peers. We intend on following up with this result as it may be possible that the PDV had an unmeasured effect on its viewers. Altogether, while assessing behavior change is outside the scope of this investigation, we believe that PDVs have the potential to influence peoples' attitude.

Overall, we attribute our outcomes to the use of the Persuasive System Design (PSD) framework. Specifically, the framework that PSD provides may have been particularly suitable for incorporating in data videos, as we did here. Unlike conventional feedback visualizations, videos allow us to spread the persuasive elements gradually, and throughout the entire viewing period. Videos also implicitly guide the viewer to those critical aspects of the data and as such can carefully control the amount of information delivered to the user. Further work is needed to examine which specific PSD elements and their video representation had higher potential to persuade.

Persuasive Feedback for Self-Tracking Data

A key strength of our approach is the use of data videos, a medium that resonate well with younger generations (including kids)[36,42] who routinely consume videos. Data videos could also be delivered effectively on mobile phones, where people commonly track and view their self-tracking data. On the other hand, data videos are not suitable for delivering feedback in real-time, and thus, should be used for aggregated data that fosters reflection on past behaviors. Also, even with this engaging medium, people might get bored over time and disengage. To maintain viewers' interest, we need to identify a desirable viewing cycle (e.g., once a day, a week, or a month) that can reveal interesting and surprising aspects about oneself, and which may depend on the data type.

In addition, even though there have been efforts on easing the process of creating data videos,[4] it is not easy to create data videos especially with personalized recommendations. An important direction for future research would be to develop a PDV authoring tool to cover diverse contexts (e.g., productivity, finance, screen time). Such video authoring tools will enable researchers to conveniently produce personalized PDVs, which would be beneficial for conducting deployment studies.

Limitation and Next Step

Although our overall results are encouraging, we acknowledge that this study is only an initial step. Contextual limitation of this work is using the hypothetical scenario and measuring attitude rather than actual behavior. Our scenario conveyed the data of a 22 years old self-tracker, which may not be representative of AMT workers. However, because we are still at the early stage of designing effective PDV, we argue that conducting a field deployment study to measure behavioral outcomes is not the best first approach. Moreover, as demonstrated in prior works, hypothetical scenarios have been used to test a variety of feedback design contestants to identify the most effective one before running a deployment study.[11]

In this work, conducting an AMT study using a hypothetical scenario allowed us to recruit a large number of participants with relatively low cost and helped us understand the effect of persuasive elements in a brief period. Our study will help designers and researchers create engaging, persuasive data videos, which could be embedded in a self-tracking technology for a long-term

deployment study. We intend to enhance our PDVs and examine their ability to influence behavior, and plan to run a longitudinal study, for which PDVs will be tailored to each participant's data and context. Such investigations will further advance our knowledge about new possibilities with PDVs, and will particularly be beneficial to designers of self-tracking applications.

Conclusion

We introduced Persuasive Data Video (PDV), an enhanced form of Data Video (DV) augmented with persuasive elements, for self-tracking feedback. Results from our M-Turk study were comparatively favorable toward PDV, at least indicating the potential of PDV in influencing people's attitude. We believe that these benefits were found because of two main reasons. First, we successfully translated persuasive elements from the Persuasive System Design into our PDV. Second, related to our first point, videos may be a particularly suitable format for applying the PSD framework. Our results motivate several directions for future work in the context of designing effective self-tracking feedback, including a consideration of effective viewing cycle of PDVs, designing a PDV authoring tool that supports convenient production of personalized PDVs, as well as further studies to assess the efficacy of PDVs on people's behavior change in a real-world context.

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