“It Might Break but It Has to Work”: Challenging and Comparing Values in Personal Physical Activity Systems

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Values play a key role in how we experience technology. Understanding the rationale behind choices between values may help future designers to build systems better aligned with user wants and needs. We present the outcomes of a workshop centred around an adversarial tournament-style ‘values deathmatch’ containing 32 values derived from the literature. These values were discussed in the context of personal exercise systems, with choices based around users’ preferences. Participants debated and chose from randomly paired values, and we analysed their arguments to understand their rationales. We found participants typically prioritised values relating to more effective system outcomes (e.g. *Usefulness*, *Alignment*), and gave less weight to values they felt could be as effectively satisfied by themselves, such as *Safety* or *Direction*. We highlight how users prioritise values, and we provide rationale-centric framing for discussing values in the context of behaviour change and technologies for supporting physical activity.

Values, Behaviour Change, User Experience, Physical Activity

1. INTRODUCTION

Values define how we design and engage with technology. Prominent methods such as Value Sensitive Design (Friedman et al. 2006) ensure that the design of technology aligns with the user. However, values in this context are often abstracted. In reality, the selection and prioritisation of values varies based on what the application is used for, e.g. the important values of *Strava* will differ from those of *Angry Birds*. Prioritisation is needed in application areas where user motivation is key, as the system must align with the user to keep them engaged, e.g. personal exercise systems. Such systems are highly popular (Sullivan and Lachman 2017), but also face high levels of attrition and disengagement (Gouveia et al. 2014; Kidman et al. 2024). Understanding what users value in these systems – as well as *why* they value certain things over others – may highlight design decisions that could increase user interest and allow for more effective outcomes.

In this paper, we present the findings of a workshop where we discussed values within the context of physical activity (PA) systems, with a focus on value comparisons and trade-offs. This focus was distilled into two research questions:

1. What values do users prioritise in the context of personal exercise systems?
2. What reasoning is presented to rationalise the preference of values within such systems?

We sought to understand what values potential users find highly desirable and why they may place certain values over others. The logic used when arguing for desired values can help designers resolve value trade-offs in future design.

2. BACKGROUND

Values are defined as something important to either an individual or a group (Friedman et al. 2006). Pereira et al. (2015) define it further as “something that denotes importance to somebody for something in some respect or capacity”. Values define how we engage with technology, with Consolvo et al. (2006), Mejova and Kalimeri (2019) and Liu et al. (2023) highlighting values and requirements when promoting physical activity. Gøthesen et al. (2023) and Li et al. (2025) similarly define value sets, but more in line with how technology interacts with *us*; they focus on the context of smart home technologies, and how we perceive their

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actions. As we see here, there is not a single standardised list of 'values', with designers often seeking to establish bottom-up value sets (Bednar and Spiekermann 2024) through processes such as Value Sensitive Design (VSD). VSD effectively marries value and technology enquiries (Manders-Huits 2011), but lacks established methods for navigating the emotional foundation many values rest upon (Friedman et al. 2021).

Values represent a major component of human-centred design (Iversen et al. 2010), but current methods for exploring them risk misunderstanding the preference for values. Shallow discussions of values reduce them to buzzwords, and overly in-depth discussions unearth philosophical discussions HCI practitioners lack the means to resolve (Pereira et al. 2015). Methods like VSD also struggle with navigating situations where values may not align (Kozlovski 2022). Value conflicts are an inevitable part of design: as they play a major part in decision making during the design process (Teixeira and Barbosa 2020), their relative incommensurability makes it difficult to draw a line between conflicting decisions (Kozlovski 2022). Common methods of resolution, such as Dams and Flows (Miller et al. 2007), effectively identify tensions within values but do not explore the reasoning behind this. Within the context of design, ambivalence and voluntarist reasoning (Felber et al. 2025) can often be used to commit to a decision when rational logic has run out. However, this may come across as a compromise, moving the process along without effectively resolving the underlying tensions.

One way to understand preferences is to place them in direct competition. Adversarial methods can help increase transparency and test rivalling claims directly (Nov et al. 2026), and can even challenge 'taken-for-granted' beliefs to create a more enriched view of the design landscape (Lupetti et al. 2023). As current tools for dealing with value tensions are an element of designing a system, the aim is to balance tensions such that all parties are satisfied (Friedman et al. 2021). However, tensions can also help identify which values to prioritise by highlighting user rationale (Haghighi et al. 2023). By actively creating value tensions for participants to engage with, we can explore the rationale behind preference for certain values to understand how users perceive separate values when not seeking compromise and harmony within a contextual design.

3. METHODS

The workshop focused on examining important values in home PA technology. It was conducted in August 2025 as the final part of a workshop series looking at designing home technology for exercise snacking (small exercises completed throughout the day, building up to meaningful exercise (Stawarz et al. 2023)) with the results of the remaining workshops presented elsewhere. Participants were offered a £40 shopping voucher for their participation. All workshops in the series were approved by the ethics board at the host institution.

3.1. Participants

Six participants took part in the workshop (3 men and 3 women). Ages were evenly split with two participants each aged 20-29, 30-39, and 50-59. Participants were recruited through university channels and word of mouth. All participants engaged in some form of physical activity, e.g. light walking, home exercise or gym classes.

3.2. Materials

To help explore the values present in PA systems, we produced low-fidelity prototypes as provocations. These basic prototypes had no exercise functionality, instead demonstrating certain concepts that would help prompt value discussions in the workshop. For Activity 1, we produced two hypothetical examples of feasible home exercise technology: *Fit Family Leaderboard* (a digital leaderboard with a companion wearable device) and *Emotion-Driven Coach* (a smart home assistant that uses facial, voice and posture recognition to suggest suitable activities). Each prototype was presented with a basic explanation of the functionality and an example of use. For Activity 2, we presented three low-fidelity prototypes designed to promote some values while neglecting others: an intrusive home surveillance system that analyses lifestyle and suggests healthier routines; a wearable collar that responds to inactivity with electric shocks; and a tangible device that asks users to reflect on their physical activity with no further functionality. We offered craft supplies (pipe cleaners, beads, felt, etc.) and modelling clay for creative design activities. We also provided post-it notes, flip-chart paper, whiteboards and markers.

3.3. Procedure

The workshop lasted 4 hours. It was facilitated by the first author with the second author present to take notes and provide support.

We opened by giving an overview of values, using examples from our work and from previous literature; see Figure 1 for the full set. We provided definitions, and participants were given reference sheets.

Activity 1 examined values through hypothetical tech examples we developed. Participants were given five minutes to describe what values were served well,

and then five minutes for what values were served poorly for each example. This exercise was then repeated with real world technologies (a standard fitness watch, the fitness video game Ring Fit Adventure for the Nintendo Switch, and the *Tonal 2* home gym system (Tonal 2025)) that were selected to provide varied approaches to activity: a wrist-worn fitness tracker focusing on steps; a cardio-focused gamified exercise system; and a strength and fitness system with built in trainer support. Initial discussions were held within the six-person group, then shared in open dialogue with workshop facilitators. Activity 1 helped participants understand how values may manifest in technology, and also to understand where positively-viewed design features may link to certain values.

Activity 2 challenged values. We presented participants with the physical prototypes one at a time, explaining the functionality. Group discussions focused on positive and then challenged values in each device. By drawing direct attention to conflicting values in play, this activity helped participants to examine how values relate to each other in design; if a design they liked promoted certain values while diminishing others, this may help them understand their own internal hierarchy of values.

Finally, Activity 3 directly compared values, pitting them against one another. We approached this through a tournament bracket format, with 32 values randomly paired into match-ups (see Figure 1). Participants were asked to imagine two identical systems that only differed by which value was prioritised. They then chose sides of the room to vote for their preferred value in each pair before debating their choices. Any ties were decided by the note-taker not directly involved in the discussions, based on the strength of arguments. The first round engaged in full debates, with subsequent rounds holding shorter discussions. We ended the workshop by discussing the final ranking of values.

3.4. Analysis

Activity 3 discussions were recorded and transcribed by a professional transcription company. They were thematically analysed using an emergent coding process, exploring the rationale used when placing one value over another. Initial codes were assigned based on specific justifications (‘responsibility’, ‘interest’, ‘priority’), and then sorted into groups. Finally, we defined themes from these groups representing what we perceived these justifications to mean in wider technology discussions.

4. RESULTS

In this short paper we focus on the results of Activity 3. We identified two core themes that are framed as perspectives of the user, as this aligns with how one would justify one value over another.

4.1. What Can Technology Do for Me?

When comparing two values, participants rarely discarded a value entirely. They more frequently prioritised what they wanted more from their device since both values were often seen as desirable. An example of this was *Safety*: participants wanted their devices to be safe, but voiced concerns that too great a focus on safety could affect other elements, reducing the overall quality of the device:

“You put in as many safety measures as you can, but if that becomes the main concern, then for me it just... saps all the fun out of it.” [P5]

The case here was not necessarily that safety was not desirable, but that safety to the point of limiting enjoyment and engagement was problematic. This is reflected in the standings of the bracket, with *Safety* losing its second round pairing and *Enjoyable* finishing in the top four. This same concept of prioritisation was seen for values such as *Ease of Use* over *Size* when referencing the *Tonal 2* exercise system from Activity 1:

“That big thing on the wall that I’m going home with, that’s big, but I like it.” [P4]

Similarly, *Efficacy* was preferred over *Clarity*, with participants valuing the benefits of the device over more subjective values relating to engagement:

“If it works anyway, I don’t care that it’s not clear. We’ll work it out somehow.” [P6]

Discussions not only concerned values during active use, but values that may influence user interest. Values such as *Direction* were connected to initial uptake, where participants felt a lack of direction would act as a significant barrier to use:

“I think if you don’t know exactly what you’re doing then that’s probably a barrier to exercise and that will prevent you from using it in the first place.” [P2]

Alternatively, *Aesthetics* may passively keep users interested – participants believed anything looking nicer would make it more appealing to use:

“Good design encourages me to use something more, whether it’s a spatula or an Apple watch.” [P5]

Another factor that influenced the selection of values was how they aligned with what the participants

Safety	4	Safety	1	Usefulness	6	Usefulness	5	Usefulness	6
Reward	3								
Trustworthiness	0	Usefulness	5						
Usefulness	6								
Ease of Use	6	Ease of Use	4	Ease of Use	0				
Size	0								
Harmlessness	2	Ethical	3						
Ethical	4								
Aesthetics	4	Aesthetics	0	Convenience	3	Enjoyable	1		
Affordability	3								
Convenience	6	Convenience	6						
Transparency	0								
Acceptability	0	Enjoyable	6	Enjoyable	4				
Enjoyable	6								
Autonomy	4	Autonomy	0						
Cost-Saving	2								
Flexibility - Time	5	Flexibility - Time	4	Flexibility - Time	1	Alignment	4	Alignment	0
Direction	1								
Efficacy	6	Efficacy	3						
Clarity	0								
Flexibility - Structure	3	Sociability	1	Alignment	5				
Sociability	4								
Alignment	5	Alignment	5						
Security	1								
Privacy	4	Privacy	0	Sustainability	1	Regulation	2		
Simplicity	3								
Sustainability	5	Sustainability	6						
Adaptability	1								
Regulation	5	Regulation	5	Regulation	5				
Education	1								
Accessibility	6	Accessibility	1						
Equitability	0								

Figure 1: *The bracket of values from the workshop. The score shows the number of participants who voted. Any final score outcomes of 4-3 indicate a tiebreaker by the non-facilitating team member. These tie-breaker results are marked in orange, and the winning value is shaded in the following match-up. No value that won by tie-break won its following match-up.*

expected of their technology. Values such as *Usefulness*, *Alignment* and *Sustainability* were often selected as they represented core functionality, as opposed to values that were only seen as desirable. For example, *Sustainability* was valued over *Adaptability* mainly because an adaptable system would be a nice benefit, and potentially even an expendable one, but participants expected – and therefore valued – a device being productive for extended periods of time:

"I don't wanna do one of those things where I'm saving up to buy something that's expensive and it dies in a year. That's ridiculous." [P6]

On a similar note, some participants valued *Flexibility - Structure* over *Sociability* because one was functional and one was additive – adding social elements was nice, but in itself would not resolve poor fit between user and system:

"If it's not the right exercise for me, what's the point of having other people's around me doing something that is not suitable for me." [P3]

When compared to each other, the core effective functionality won out. Participants generally chose values which related to a more successful behavioural outcome, with desirable criteria directly relating to functionality (such as *Ease of Use*, *Convenience*, *Flexibility-Time*, *Sustainability*) performing well but falling out earlier in the process:

"It might break, but it has to work." [P6]

When deciding between values, a key concern was what participants wanted from the technology, in a sense prioritising what would help the device best achieve its purpose. They valued this direct connection to outcome over values such as *Safety* and *Aesthetics*, but did not outright call these unwanted – in a scenario where only one value was

permitted, participants abandoned desirable criteria to ensure the system worked.

4.2. What Can Technology Do Better Than Me?

While the Activity 3 focused on values desired within personal technology, a core theme of discussions was the role of the individual using the device, and the relationship between these two elements. For example, in the opening pairing of *Safety* and *Reward*, participants discussed whether safety was a necessary value for the device. They felt that *Safety* was more controllable by the user, whereas *Reward* was harder to find separate to the device:

"There's always gonna be a baseline of safety, but you can make absolutely anything unsafe... but in terms of getting people to exercise and this type of technology, reward, that's the incentive, and that is what I think is gonna be more important in making this sort of thing a success." [P1]

This discussion narrowed further to the desire for reward – a user can create their own plans and define their own safe limits, but the desire for a device implies a missing factor which is more likely to be an external reward:

"I [can] *go out for a walk and not need any of this technology, I clearly need something to push me otherwise I wouldn't be invested in any of this to begin with."* [P5]

Another element of this discussion was whether values discussed as potential technology benefits could be just as effectively realised by the user alone. An example of this was when comparing *Flexibility - Time* against *Direction*. Participants felt that if they could only have one value present, *Flexibility* was more important as direction on how to do exercises was more easily obtainable from other sources:

"And we'd do it in our own time... we would find the direction another way, we'd find a forum, we'd find another way of doing it." [P5]

The conflict between what the technology is responsible for and what the user is responsible for extended to values which may be more subjective, comparing a value the user needs all the time with one they may want occasionally. This could be seen in the discussions comparing *Flexibility - Structure* and *Sociability*, with social elements being wanted sometimes but not prioritised as a core value:

"For me, exercise is really quite a personal thing... Every now and again, I might do a social thing, but that's not what I'm in this tech for." [P5]

When determining important values, what is better provided by technology and what could just as effectively be satisfied by the user may be key factors in decisions.

5. DISCUSSION

We have approached the exploration of values to understand their worth respective to each other by placing them in direct competition. This method was chosen to provoke stronger reactions from participants and in turn unearth the central rationale for why values were chosen. In the context of personal exercise systems, our participants prioritised practical values over those with more abstract impacts. The arguments for or against certain values were typically framed around what participants wanted the system to do, rather than what they wanted the system to account for. The results contrast the common understanding of values and their respective importance, and also present a more accurate representation of values in technologies to support physical activity.

Our work presents a new framing of user preferences when designing behaviour change systems, especially in the context of PA. In the space of design, we may understand how certain values relate to positive outcomes (Zhu et al. 2025), and even to some extent how the prioritisation of values may differ between experts and users (de Chantal et al. 2022). The next step in this process, and what this work begins to explore, is the core rationale behind this prioritisation. By understanding what users want to gain from technology, and how these wants are ranked relative to each other, designers can better align their future decisions with the needs of the prospective user base.

5.1. Hierarchy of Values

The outcomes seen in Figure 1 suggest a utilitarian view on technology design, with values relating to functionality and maximum happiness being prioritised. Values such as *Privacy* and *Autonomy*, i.e. those that relate to the state of the user past the point of effective behaviour change, were less valued by our participants. This hierarchy may be due to the nature of the activity: collective judgements are more likely to follow utilitarian logic (Keshmirian et al. 2022). However, the lean towards functionality may also be a case of general needs – Maslow's Hierarchy of Needs, whether the original format (Maslow 1943) or a subsequent revision (Kenrick et al. 2010), places functional needs at the base, which would be represented in this format by values such as *Usefulness* and *Alignment*.

The prioritisation of values derived from Activity 3 conflicts with the existing understanding of important values. *Privacy* is a major talking point of home-based technology (Buil-Gil et al. 2023; Haney et al. 2025; Savin and Nielsen 2025), yet for our participants it was less important than more practical factors such as *Sustainability* and *Usability*. Similarly, *Autonomy* in the context of digital health is a major point of concern with existing work presenting frameworks and processes for ensuring it is maintained (Dassow and Eßmeyer 2025; Pérez-Verdugo and Barandiaran 2023; Zhang et al. 2021). However, in the bracket, *Autonomy* was not chosen over *Enjoyable*, further supporting the focus on system outcomes and immediate user experience: participants were willing to trade some autonomy for a system they perceived as more enjoyable.

5.2. Adversarial Methods for Value Elicitation

Our adversarial lens allowed us to more effectively uncover the reasoning underpinning the choice of values. Values are inherently emotional, wrapped up in feelings and affects, but their discussion by design scholars (ourselves included) is often approached rationally in a way that ties them to discrete design choices (Friedman et al. 2021). The combination of taking an adversarial approach and separating this debate from any resulting design decisions allows for a more open exploration of how values relate to each other, approached from the heart rather than from the design specification. This also helps to uncover the root justification of a value, rather than having a value attached to an element of design which may invoke additional feelings on top of those specifically relating to the determined value. This can then more effectively uncover the reasoning behind choosing one value over another, as the reasoning behind this choice will relate more closely to what the user hopes to achieve from the system.

We do not claim that the method we have used in our study – establishing random value pairings in a tournament deathmatch format – has helped us identify the definitive hierarchy of values. Rather, we argue that it offers a more developed view of the reasoning behind why a certain value may be chosen over another. The fact that values such as usefulness and perceived enjoyment are influential is already well established (Hornbæk and Hertzum 2017). Our work expands on that by presenting insights into *why* they are so influential and especially how important they are relative to other values.

5.3. Limitations & Future Work

Our work presents some limitations. The values 'tournament' system may lead to certain values demonstrating more preference due to the nature of their random match-ups rather than their actual value to participants. While this is possible, this should only affect the early stages, as values such as *Usefulness* and *Alignment*, if truly valued, should still outperform other values even if their specific contests were different. Additionally, the progression of values through the bracket may have been slightly impacted by the intervention of the research team member when results were tied. While the researcher was instructed to comment solely based on strength of argument, there is the risk that certain biases may bleed through. However, the overall impact of these tie-break situations was limited: every value that won through tie-break was immediately eliminated in the following round. Nevertheless, we must acknowledge that any values eliminated from a tie break could have performed better. However, our results did not concern which values would perform 'better', but rather how our participants rationalised selecting certain values over others, which would have emerged regardless of the specific pairings. There is also the potential that without a real device to map impacts onto, participants were more willing to set aside values relating to mitigating harms.

This work presents some initial themes regarding value prioritisation, but they are derived from a small sample of able-bodied adults. Future work should apply the bracket-style format with distinct user groups to explore how values may differ for different user groups. This will help designers to understand where their understanding of value importance may differ from their prospective user base and inform more inclusive behaviour change technologies.

6. CONCLUSIONS

Values play a key role in the design of human-centred technologies, especially in the context of behaviour change where continued user engagement is crucial. There are a range of methods for uncovering and exploring values, but little research exists into the relative importance of values and why certain values may be chosen over others. As part of a workshop looking at technology values, we conducted an adversarial bracket-based discussion where values were paired, debated and a more desirable 'winner' chosen. Our participants typically used two frames of thought to choose more important values: looking at what they desired from the technology, and also at what they felt they could achieve as effectively themselves – and therefore did not require the technology to support as strongly. Our work uncovers initial themes of why certain value prioritisation may take place, which could enrich value-sensitive methods by helping designers to understand the rationale within value conflicts and lead to more effective resolutions for personal exercise systems.

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