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'I Don't Need a Goal': Attitudes and Practices in Fitness Tracking beyond WEIRD User Groups

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ABSTRACT

Fitness trackers have the potential for fostering sustained change and increasing well-being. However, the research community is yet to understand what design features and values need to be embodied in a fitness tracker for long-term engagement. While past work mainly focused on WEIRD (Western, Educated, Industrialised, Rich, Democratic) fitness trackers usersin North America and Western Europe, this paper investigates another perspective on fitness tracking. We conducted interviews with $N = 37$ fitness tracker users in the US, Europe and Egypt to identify the similarities and differences in attitudes and practices in fitness tracking. We found that fitness tracking involved a deeper social context in Egyptian communities and our findings suggest that Arabic users focused on physiological measurement, while non-Arab Western users appear to bewere more interested in goal achievement. We contribute design dimensions that can help build more inclusive tracker experiences. Our work highlights how future fitness trackers should support a customisable spectrum of design values to offer engaging experiences to a diverse and global audience.

CCS CONCEPTS

• **Human-centered computing** → **Empirical studies in HCI**.

KEYWORDS

well-being; personal informatics; health; fitness tracker; diverse users; inclusive tracking experience; WEIRD

1 INTRODUCTION

Wearable devices that enable activity tracking have become ubiquitous. With over 50 billion dollars of fitness tracker sales per year in the US, wearable activity tracking is becoming a technology with significant impact on everyday experience [52]. The Human-Computer Interaction (HCI) field has attempted to address the shortcomings of current trackers by, amongst other things, building models of personal informatics [23, 26, 44] or experimenting with feedback modalities [62]. Previous work has striven to understand current attitudes and practices around fitness tracking to design more effective interactions for activity tracking. However, personal informatics studies primarily focused on individual users [22] and HCI research in general mainly used Western WEIRD (Western, Educated, Industrialised, Rich, Democratic) participant samples [45]. Notably, a recent review of personal informatics literature did not consider the geographical distribution background of participants [22]. Hence, there is a need to validate our understanding of personal informatics with non-Western participants

and, possibly, expand it to accommodate more diverse users. Following Linxen et al. [45]'s call to diversify participant samples and authorship in HCI research, our study focuses on a geographically distributed group of fitness tracker users with a diverse geographical background. This work aims to make diverse users part of the personal informatics discourse.

As wearable technology becomes increasingly available on the consumer market, it enters new geographical spaces. While fitness trackers were initially commonplace only in highly industrialised societies, users in other countries have recently begun to use them. Since different countries and cultures differ considerably regarding their rhythms of daily routines [7], this creates new opportunities for research into how to build better trackers. That is why we study users beyond the US and Western Europe (in contrast to past HCI research) to gain new insights into how to build more engaging tracker experiences.

First, we aim to examine if our current understanding of fitness trackers is applicable to more geographical areas than those previously examined. Second, through comparing how users with different backgrounds use fitness trackers, we identify new elements of the tracker experience and, consequently, determine how to manipulate them to deliver more engaging fitness tracker experiences that appeal to wider groups of users. This knowledge can help build highly customisable, engaging trackers that cater to the ethnically diverse global population. For instance, past work has shown that fitness trackers offered limited benefits for individuals suffering from chronic illness [12, 56]. Furthermore, Spiel et al. [61] remarked that the design of fitness trackers embraced the idea of a white, healthy, already fit and mentally stable user. Previous work indicated that fitness trackers were mainly designed for homogeneous WEIRD users. Hence, user groups beyond that population such as people with chronic diseases, people with disabilities or user groups with diverse cultural background are often not considered in the design of fitness-tracking technologies. Thus, designing inclusive tracking experiences emerges as a challenge for research. Our work aims to answer this need by considering users who have been mostly overlooked in the past, such as groups other than US-based and European users. In our study, we include a group of Egyptian users who own fitness trackers. Egyptian users are particularly interesting to study as the Egyptian society has a different value system than the societies in which WEIRD users live. For instance, Egyptians typically value comfort and friendship while putting less emphasis on pleasure and self-respect [20]. Including Western users and Egyptians in our work enables identifying ways to design tracker experiences that cater to diverse users.

In this work, we report on a qualitative study of fitness tracker practices where we contrast the most commonly studied group (physically active participants form the US and Western Europe) with fitness tracker users that received less attention. We included participants from Europe, the US and Egypt. We interviewed 37 active fitness tracker users about their relationship with and the everyday usage of their tracker. We recorded, transcribed and analysed the interviews to build an understanding of the differences and similarities between the two user groups. Using thematic analysis, we clustered our findings into five themes: INDEPENDENCE, ENGAGEMENT, GOAL BEHAVIOUR, MOTIVATION and THE SOCIAL. Based on

the themes, we discuss four inclusive dimensions of the fitness tracker design space.

This paper contributes the following: (1) a qualitative description of differences and similarities in practices around wearable fitness trackers in non-Arab Western and Arab Egyptian user groups; (2) four dimensions of the fitness tracker design space that help build more customisable tracking experiences and (3) insights for the design of future fitness trackers that offer engaging tracking for diverse user groups.

We first review related work on past models and concepts in understanding and improving the experience of fitness tracking. We also discuss past studies that looked at diverse groups in HCI that inspired our work. This is followed by details of the methodology applied in our study, specifying the two distinct user group samples. We then present the findings of our data analysis, which we later interpret to derive a set of four dimensions that can stimulate the design of inclusive fitness tracking experiences.

2 RELATED WORK

We first report on past work in physical activity and personal informatics that inspired the research presented in this paper. We then revisit studies of diverse user groups in HCI to showcase past works that have inspired our research and offer new perspectives through contrasting users from different cultural backgrounds.

2.1 Physical Activity Tracking

Building technologies that encourage physical activity is a well-established pursuit in the HCI field. Consolvo et al. [16] presented guidelines for such technologies based on a pilot study of a mobile application for fitness. Their work emphasised reward systems, considering practicalities, building awareness and taking into account the social environment of the user as key success factors in technologies that foster physical activity.

Later work examined the social dimension in more detail and several works concluded that technologies could use existing social support systems to foster increased activity or improve the experience of being physically active. Wozniak et al. [64] illustrate that facilitating communication during physical activity strengthened social bonds between runners and supporters. In a similar vein, Park et al. [51] analysed fitness-related sharing on Twitter. They observed that involving long-term friends in physical activity through social media promoted sustained engagement. Chen et al. [13] studied the differences between chronically ill and healthy adults to investigate how to foster social support through fitness applications. They found, inter alia, that comparison and competition was effective only for some users and its effectiveness was bound by many constraints. In addition to social aspects connected to physical activity tracking the application of game principals has been explored. One postulated idea, was to utilise game mechanics [11] to increase physical activity.

While many early efforts focused on developing systems for fostering physical activity, e.g. [55], later work turned to fostering reflection [6, 8] and meaningfully analysing one's own data. The need for meaningful reflection on fitness tracking data was confirmed by studies which investigated step counting campaigns. Gorm and Shklovski [29, 30] found that such campaigns were unlikely to

have a lasting impact and generated social concerns. Concurrently, Chung et al. [14] studied a step counting campaign to conclude that it was too detached from health benefits to make a profound contribution to increase the users' well-being. Finally, both Epstein et al. [21] and Knaving et al. [42] found that the values that users attached to systems that support physical activity played a key role in the success of the interactive artefacts. They found that value tensions were key in the understanding of the social aspects of physical activity, most notably sharing activity data.

While a significant amount of research effort has already been devoted to understanding activity tracking, past work shows that further work is needed to build trackers that offer an engaging long-term experience. It was also shown that a deeper understanding of the social behaviours and values around fitness tracking can offer more insights [21, 42], investigating social behaviours and values. Consequently, we aim to explore attitudes and (social) practices of geographically distributedfitness tracker users with a diverse geographical background. We believe that this approach can foster a more in-depth understanding of attitudes and (social) practices in fitness tracking and design more inclusive tracking experiences.

2.2 Understanding the Experience of Personal Informatics

Considerable research effort has been invested in building models of how users experience personal informatics over time. An initial effort by Li et al. [44] identified five stages of personal tracking. They concluded that a sequence of events was required for tracking to lead to effective change. Users first need to plan and prepare for tracking, then collect data, integrate and reflect upon it to reach meaningful conclusions that can lead to action. In a recent literature review Epstein et al. [22] analysed more than 500 publications on personal informatics. Among other aspects, their results highlighted a focus on the collection and reflection stage of Li et al.'s model. Li et al.'s model was later extended by Epstein et al. [26] in their 'lived informatics model'. This model also included lapses in tracking and emphasised understanding the motivation behind starting to track and selecting the right means of tracking. Recently, HCI research has investigated how these principles apply to areas beyond physical activity, e.g. menstrual tracking [25]. Understanding the issue of lapsing or abandoning fitness tracking altogether emerged as another relevant research topic. Clawson et al. [15] studied craigslist advertisements to chart the motivations for disposing of fitness trackers. They found that health, social and technical factors influenced the decision to stop tracking. For instance, one participant explained that they underwent surgery and now they cannot wear the tracker anymore without being in pain. Clawson et al. [15] also discussed social factors that led to abandonment such as the need to compete with friends who used a different platform. Abandoned trackers that were still in the possession of users were seen as design opportunities for further intervention [24]. Epstein et al. suggested that appropriate framing and social comparison could be used to support users resuming their tracking. Tang et al. [63] developed methods to deal with gaps in data caused by lapses. They emphasised the importance of establishing suitable adherence definitions and measures of step data ranging from more than zero steps that were collected to more than

10 hours of step data that was collected. Their work stressed the importance of analysing the impact of the adherence measure (e.g. how many data points were excluded) and presenting the results of the adherence measures together with the findings of the data analysis.

These examples show that the HCI field has built a considerable understanding of the practical, personal and social constraints that affect one's experience with personal informatics. However, all of the studies above used participants from the US or non-Arab Europe. Our work is inspired by past models of personal informatics and aspires to build a deeper understanding of the factors contributing to successful fitness tracking through contrasting existing findings with fitness tracking practices in non-Arab Western areas.

2.3 Studies of Diverse User Groups

Past studies that investigated similarities and differences between user groups influenced our work. In particular, we were inspired by a number of research efforts that contrasted users from different cultures, either on the meta-level [4, 43] or in a specific study context [17, 40]. Research examined the effect of culture in the adoption and use of different social computing technologies and interface design [43]. Several studies were conducted in order to investigate cultural differences in different context involving proxemics and personal space [4, 40] and disclosure of mental illness [17].

Kyriakoullis and Zaphiris [43] conducted a literature review focusing on cultural studies in HCI. They analysed 69 papers and found that many studies based their work on Hofstede's cultural dimensions [36]. Further, they emphasised the importance of considering cultural aspects when designing interactive technologies. Baldassare and Feller [4] critically reflected on Hall's framework ([34] cited by [4]) and related research on the cultural determination of personal space. For instance, they criticised the claim that some proxemic behaviour is biologically based and not based in cultural differences. Also, they questioned the ecological validity of some studies (e.g. a study by Little [46], but praised the same study for their cross-cultural sample consisting of American, Southern European (e.g. Greek) and Nothern European (e.g. Swedish) participants. Baldassare and Feller conclude by highlighting the importance of considering cultural, social and contextual factors when studying proxemics. On a similar note, Joosse et al. [40] discussed proxemics in the context of cross-cultural Human-Robot Interaction (HRI). They introduced a mixed-method approach to study cultural differences in HRI. They suggested including two countries (Spain and the Netherlands) as the starting point of their study and then extend their experiment to others countries in the following step. On another note, De Choudhury et al. [17] inquired, amongst other things, how cultural differences affect mental health disclosure on social media. They compared 'western countries' (US, UK) and 'majority world countries' (India, South Africa). All of these works use cultural differences as a starting point for an inquiry that eventually results in a better understanding of user behaviours in a particular domain. Our work is inspired by these efforts and aims to shed new light on understanding fitness tracking through contrasting users with a diverse geographical background.

More recently, members of the CHI community advocated for HCI research to investigate designing for users beyond the typical

middle-class educated Western user. Spiel et al. [61] showed how fitness trackers catered primarily to already fit and healthy users. Further, Carrington et al. [12] illustrated frustrations caused by fitness trackers to users on wheelchairs. These works inspired us to study fitness tracker usage beyond previously studied groups. Past work investigated primarily US-based participants (e.g. [23, 26, 44, 58]) or users from the European Union (e.g. [29–31, 49, 57]). In contrast, we studied participants from Northern Africa.

These past works show that customising interactive artefacts to account for diversity can have tangible benefits for the user. This fact led us to investigate views and experiences of geographically distributedfitness tracker users in two distinct geographical settings. We conducted an analysis which endeavoured to identify customisable dimensions in the design of fitness trackers that could offer a more inclusive experience.

3 METHOD

To understand attitudes and practices around fitness tracking, we conducted a series of semi-structured interviews with active globally distributedfitness tracker users with a diverse geographical background. We decided to interview two samples of users in two distinct geographical settings. Our research network enabled us to conduct face-to-face interviews in Egypt and Europe. The five interviews with participants based in the USA where conducted via video call using Skype.

Our study contrasts participants living in Egypt with those residing within in the US and the European Union. Research indicates that Egypt can be seen as representative of the Arab world. Gupta et al. [33] collected and classified data on cultural values and beliefs. They identified 10 cultural clusters. Based on their model, Egypt was identified as part of the **Arab Cultures**. Hofstede included Egypt in the Middle East region [36]. Our work inquires participants from Egypt and participants from Western Europe and the USA as a vantage point for inquiry. In the remainder of this paper, we call the two user groups *non-Arab Western or WEIRD* and *Arab Egyptian*.

3.1 Interviews

We recruited 37 participants. Participants were asked for consent for recording before the interviews. The semi-structured interviews lasted an average of 30.96 minutes ($MIN = 18 – MAX = 65, total = 629$). Each of the interviews was a one-on-one session with a single researcher. Interviews were only conducted with participants who identified as active users of fitness trackers with an experience of three months or more.

3.2 Participants

We used a different recruitment strategy for each group that reflected the availability of tracker technologies in the respective location. Consequently, we present the two participant groups separately. Overall, we recruited $N = 37$ participants aged from 18–62 ($M = 30.44, SD = 9.71$), with 24 being male and 13 female.

3.2.1 Non-ArabWestern Users. For the non-Arab Western sample, $n = 18$ participants were recruited through snowball sampling starting with social media posts. The participants were aged 18–41 ($M = 26.67, SD = 5.42$); nine male and nine female. All participants

were natives of their country of residence (with the exception of W8—a UK-based Irishman). While the only inclusion criterion for the study was using a fitness tracker for three months or more, we found that the participants in the non-Arab Western group largely reflected the stereotype users as discussed by Spiel et al. [61] , namely white, healthy and already fit. These aspects were assessed at the beginning of the interview with the means of the demographic survey. We did not inquire about the mental health status of our participants during the interview. This suggest that this group can be used as representative of the fitness tracker user studies in past research and offer a meaningful comparison to the Arab Egyptian group. Table 1 provides an overview of the participants.

3.2.2 Arab Users.

3.2.2 Arab Users. Our Egyptian sample consisted of $n = 19$ participants, recruited through directly contacting a local running group and distributing a call for participants through a university mailing list. All participants were natives of their country of residence and identified as ethnically and culturally Egyptian. The participants were aged 20–62 ($M = 33.32, SD = 11.75$). As shown in Table 2, the sample included 4 female participants.

3.3 Interview Protocol

In the interview, we first obtained demographic data and information about the participants' daily usage of the tracker and the goals set. We then inquired if the way they used their tracker may have been connected to a history of lapses (which significantly affects one's tracker experience as shown by Epstein et al. [23]). In the next part of the interview, we investigated if and how users looked at and reflected upon their tracker data. Next, we explored whether users were sharing their data. The final part of the interview addressed the social dynamics of fitness tracking and the users' perception of privacy with regard to tracker measurements.

3.4 Analysis

All audio recordings were translated to English when necessary, transcribed and imported into the Atlas.ti analysis software. We hired a single expert to perform the translation to ensure uniform translation, as the Egyptian participants used code switching [5] between English and Arabic language. We use thematic analysis with open coding [9]. This approach allowed us to look for commonalities and contrasts in the data. The six phases of thematic analysis in line with Braun and Clarke [10], contextualised for HCI by Blandford et al. [9] encompass the familiarisation with the data, generating initial codes, gathering codes into themes, reviewing themes, naming themes and reporting the results. These steps ensure an in-depth engagement with the qualitative data. Two researchers open coded a representative sample of 15% of the material (i.e. familiarisation with the data). Next, a coding tree was established through iterative discussion (i.e. generating initial codes). The remaining transcripts were split between the two researchers and coded individually (i.e. generating initial codes). A final discussion session was conducted to finalise the coding tree after the material was coded (i.e. generating initial codes). The two researchers then identified emerging themes in the material (i.e. an iterative process including the steps gathering codes into themes, reviewing themes, naming themes):

Table 1: An overview of the interview participants in the non-Arab Western group. All participants were active tracker users. The duration reported is the time since the participants started tracking and, in some cases, includes lapses. Participant IDs are used throughout the paper to indicate interview quotes. Participants resided in the USA, United Kingdom, Poland, Denmark; France and Germany. We label this group W.

ID	Age	Sex	Profession	Tracking Time	Primary goal	Device used	Country
W1	29	M	IT specialist	2 yrs.	Steps	Fitbit	Poland
W2	30	F	Teacher	2 yrs.	Steps	Fitbit	Poland
W3	21	M	Student	3 m.	Steps	Xiaomi	Germany
W4	18	M	Student	2 yrs.	Steps	Polar	Germany
W5	29	F	Researcher	2 yrs.	Body mass	Xiaomi	Germany
W6	22	M	Engineer	8 m.	Active hrs.	Garmin	Poland
W7	29	F	Researcher	1 yr.	Steps	Xiaomi	USA
W8	26	M	Engineer	5 yrs.	Steps	Fitbit	UK
W9	29	M	Programmer	6 m.	Exercise sessions	Apple Watch	Germany
W10	35	F	Researcher	2 yrs.	Calories	Apple Watch	France
W11	28	M	Unemployed	9 m.	Exercise sessions	Apple Watch	USA
W12	27	F	IT specialist	1 yr.	Steps	Xiaomi	Germany
W13	29	F	Data specialist	6 yrs.	Steps	Fitbit	Poland
W14	32	M	Car mechanic	1 yr.	Exercise sessions	Pebble	USA
W15	41	F	Researcher	6 m.	Steps	Fitbit	Denmark
W16	20	M	Student	2 yrs.	Steps	Xiaomi	Germany
W17	27	F	Unemployed	4 yrs.	Steps	Fitbit	USA
W18	26	F	Student	6 yrs.	Steps	Fitbit	USA

Table 2: An overview of the interview participants in the Arab Egyptian group. We label this group A. All participants were living in Egypt at the time of the study.

ID	Age	Sex	Profession	Tracking Time	Primary goal	Device used
A1	36	M	Lecturer	2 yrs.	No goal	Samsung Gear
A2	25	M	Manager	6 m.	Steps	Fitbit
A3	21	M	Student	2.5 yrs.	Body mass	Razor
A4	22	M	Student	6 m.	No goal	Xiaomi
A5	32	F	Trainer	6 m.	Calories	TomTom
A6	55	F	Engineer	1.5 yrs.	Steps	Samsung Gear
A7	25	M	Teacher	3 yrs.	Steps	Fitbit
A8	35	M	Engineer	3 m.	Exercise sessions	Garmin
A9	20	M	Student	1 yr.	Calories	Nike
A10	21	M	Student	1 yr.	No goal	Samsung Gear
A11	30	M	Engineer	4 yrs.	Exercise sessions	TomTom
A12	25	M	Accountant	4 m.	Calories	Fitbit
A13	62	F	Professor	6 yrs.	Calories	Apple Watch
A14	25	M	Researcher	2 yrs.	Steps	Fitbit
A15	35	M	Engineer	4 yrs.	Exercise sessions	Garmin
A16	25	F	Medical Rep.	5 yrs.	Calories	Apple Watch
A17	50	M	Engineer	6 m.	Steps	Xiaomi
A18	35	M	Engineer	4 yrs.	Body mass	Garmin
A19	45	M	Engineer	4 m.	Steps	Xiaomi

INDEPENDENCE, ENGAGEMENT, GOAL BEHAVIOUR, MOTIVATION and THE SOCIAL.

4 FINDINGS

Here, we provide a detailed description of the themes and illustrate them with excerpts from the interview data.

4.1 Independence

The first theme that emerged in the coding process is independence. The importance of being independent and self-reliant throughout their tracking experience was mainly underlined by the Arabic Egyptian user group. However, some non-Arab Western users described the phenomenon as well. A participant of the non-Arab Western user group emphasised the personal, motivational process to prove something to herself and not to anyone else:

> And then the numbers are (...) self pushing. I think it is a personal thing. I don't get pushed if someone said 'let's do this'. And no one sees it, I don't want to prove anything to anyone, I just want to prove it to myself, that I can actually do it. (W5)

The importance of staying independent and self-reliant in the decision making process is also highlighted by this statement by an Egyptian participant:

> I only complete the suggestions or recommendations from the application if it suits my day and life. I am the one in control. (A13)

The conscious decision to interact with the tracker when it is compatible with one's schedule was mentioned by many Arab Egyptian tracker users. Another participant from the Arab Egyptian sample described a similar phenomenon, where the tracker was forgotten or not reviewed regularly in busy times:

> When (...) there is not a lot going on at college, then I am focused on the tracker. But at times when I am busy with projects, I may forget to wear it on a day, or don't check it out as often. So this really depends on the mood and how my day is going. (A9)

Further, participants in the Arab Egyptian group often emphasised that they ignored the notifications they received from their device. They needed to be in control and maintaining their autonomy was frequently mentioned in this context. One non-Arab Western user also reflected about finding a way to relax and be less stressed:

> During my master exams I was stressed and I didn't know what to do with myself and I wondered what could I do to just relieve myself from the surroundings and (...) I just started walking with my dog. It was then that I had a slower pace so I could chill out and think about different things. (W16)

The importance of cultivating one's own ideas and abilities was further represented as being aware of one's pursuit for happiness and well-being:

> It is about getting a feeling for what is healthy for oneself. You should figure out what makes you happy and what makes you good. (W17)

Reviewing data and planning one's activities was a recurrent topic. The reflection process, usually conducted in the evening, encouraged planning future activities. One participant attributed particular importance to the evening review:

> Probably my evening review is the most common, I just summarise the things from the whole day, thinking of the next one, take a peek at my activities from time to time. It also happens when I plan a new activity to

schedule, for example the day when I do not regularly do sports or I want to exchange one activity to another. For example in spring I do more outdoor activities, in winter I am more eager to go play squash. (W4)

4.2 Engagement

This theme describes the excitement, novelty and challenge connected with fitness tracking as perceived by the participants in our study. The Egyptian user group as well as the non-Arab Western participants mentioned engagement as an important aspect of their tracking experience. However, the theme was more predominant in the data of the non-Arab Western user group.

Many non-Arab Western users expressed excitement about their tracker device. They showed interest in the functionalities and, more specifically, wondered how the device conducted measurements. One non-Arab Western user expressed surprise at the accuracy of the sleep tracking feature:

> I had to tap the device to put it to sleep. But this one recognises it. I don't know how it does it. (...) probably because I don't move when I sleep. But I think it does kind of a good job. (W17)

In contrast, one Egyptian participant was fascinated by the accurate calculation of calorie intake. They were also proud to own an accurate fitness tracker:

> It's an art and science, and how you calculate your intake of calories, and these calories are composed of protein and so on. It's quite sophisticated. Especially that I got it from abroad, so it is not very common in Egypt. I enjoy when someone asks me about the tracker.(A9)

Further, non-Arab Western participants reflected that it was fun to interact with and explore a new technology. The joy of discovering what a new tool can do and, on the other hand, the need to possess something fashionable was evident in non-Arab Western tracker users:

> I really like playing around with technology and I also wanted to get a little more active. And I knew that the Flex or the Fuel reminded me to go on my run. (W13)

Some of the non-Arab Western users identified fitness trackers as fashionable gadgets. One participant openly declared that their initial interest in a fitness tracker was a result of a fashion trend:

> I think it was the hipster level. I think it was just having these smart gadgets. (...) Because I wasn't doing sports in 2012. That was probably the main reason. Also, because I started doing real software development, I wanted to see if I could somehow extract data from it, but I never did this. It was only for being hipster. (W8)

4.3 Goal Behaviour

This theme describes the ways users choose, set and relate to fitness goals in their tracking experience. In general, users in the non-Arab Western group commented more extensively about goal setting and achievement. One participant remarked that goal setting lay at the core of their tracking practice:

> When I do engage in some kind of sports activity, I do plan my goals. For example, I use a training plan for

> running. I sign up for races, the goal has a different
> form but it is also present. I plan my goals so that they
> are possible to scale reliably. (W7)

Daily goals also had a more profound impact on fitness behaviours for non-Arab Western users. The desire to complete goals and challenges was discussed extensively and present throughout the tracking experiences. Many users reported that they made practical decisions every day that enabled them to organise their activities in a way that would result in better performance in terms of a tracker goals. This was illustrated by one participant reflecting on his dog-walking routine:

> Before I got (the tracker), I didn't measure steps. So, I
> was walking my dog just for 5 minutes and then coming
> back. Now when the tracker tells me, for example, that
> I have 8k steps and I need 2k more to reach my goal, I
> am going for a long walk with my dog. (...) It changed
> my typical day a bit. (W8)

Further, choosing new goals and planning for new goals as a sign of success was addressed solely by participants in the non-Arab Western group. These participants not only thought about reaching their current goals, but they also considered a wider perspective of future goals. Non-Arab Western tracker users were not only goal-driven, but they also saw fitness goals as steps in gradual and constant progress. One participant commented on the perceived sequential nature of goals:

> I think that, probably, when I accomplish it (tracker
> goal), I feel it is not only a feeling of comfort and ac-
> complishment, but I also feel that I am able to move on
> to the next goal. (W13)

In contrast, participants in the Arab Egyptian group were using fitness goals infrequently. The majority of them were not using the goal actively and some did not even set a goal, see Table 2. When asked about the reasons for not using a goal, participants responded that their days often differed, with different levels of activity. Thus, there were reluctant to apply a uniform goal to differently organised days. Participants expressed the opinion that goals may have been mismatched to some days:

> I don't need a goal to remind me. I know very well on
> which days I'm active and on which days I'm not active
> and I'm not denying that (laughter). (A5)

Yet some of the Arab Egyptian users did set a goal. Their usage of the goal feature differed from the non-Arab group as the users would change the goal more often. All Arab Egyptian users who used a fitness goal reported on tweaking the goal settings. In contrast to the non-Arab Western user group, a constant goal was often perceived as a sign of an established fitness routine and a desired ultimate circumstance:

> Initially, my target setting was not constant; I used
> to change it whenever I find my progress has become
> constant. Now since I have a training program, it will
> be constant. (A14)

A general trend that emerged from the data was that Arab Egyptian participants perceived the fitness tracker more as a monitoring or measurement device. The non-Arab Western group desired a tracker that would facilitate motivation and provide challenges. In

other words, trackers were perceived more as tools that require active usage and skill in the Arab Egyptian world. In contrast, non-Arab Western users wanted the tracker to be proactive and serve as a companion for daily activities and contextualised advice. The following statement illustrates the Arab Egyptian mindset towards trackers as monitoring tools, where the user comments on actively obtaining measurements, interpreting them and acting based on data:

> It is more about monitoring the behaviour. For instance,
> if I know that my weight increased because I haven't
> eaten properly on a day, then I try to compensate it the
> next day. If I find that I have high blood pressure, then
> I wouldn't drink coffee that day. If there's an exercise
> that helps me with burning calories (...) and I have fun
> doing it, then I continue doing it. (A11)

These examples show how the users in our study collected and interpreted tracking metrics with different means and purposes. While tracker goals could have been only a way of verifying if their day was progressing without problems, others saw goals as a source of motivation.

4.4 Motivation

Another recurrent theme in the collected data described the dynamics and sources of motivation connected to fitness tracking. Participants reported on a diverse set of motivational strategies and how their fitness tracking supported those practices. The more goal-driven non-Arab Western group often identified the sole fact of completing a goal as a source of motivation. They also appreciated intermediate feedback on daily progress towards a goal. The goal completion notification was a source of joy and satisfaction:

> I have to admit that the vibration after achieving it is
> very motivational for the next days and when I couldn't
> reach 10k I got upset so I changed the goal to 8k to not
> feel that bad. (W3)

The Arab Egyptian group, however, exhibited a preference towards not receiving goal feedback as this created a feeling of being more in control. Thus, the feeling of being in charge of one's physical activity and the state of one's body was a source of motivation. One participant reflected that motivational messages from a tracker application had no effect on them:

> My new phone has an application that does that (provide
> motivational notifications). It keeps telling me 'You are
> almost there', 'Try to move around', for example. I do
> not act on these. I feel that I want to be more in control.
> (A4)

A similar difference was evident with regard to how participants used the quantitative aspect of data to motivate themselves to increase physical activity. We observed that non-Arab Western participants used numbers prominently, often increasing activity levels by the smallest of margins to build a sense of achievement:

> I scroll and I see that I didn't want to jump to 15 (thou-
> sand steps) so I set it to 12.5. But then, when I reached
> 13, I would be like 'okay 13, so let's push it to 15'. (...)
> And I can actually do it. (W12)

In contrast, Arab Egyptian users most often expressed disinterest a lack of interest in objective numbers as they struggled to relate the numbers to their health and well-being. Numbers were interpreted primarily as a means to 'sanity check' tracker monitoring. Consequently, increases in quantitative measures were ineffective in fostering motivation for them. For instance, step counts were perceived to offer little meaning.

> *The steps are easy to me, but it's not really the metric for measuring if I am healthier or not. (A8)*

Some users even de-emphasised the role of the measures provided by the tracker altogether in motivation. One user attributed an increased will to progress in fitness (i.e. in their case, an increase in physical activity and a more healthy diet) to the mere presence of a fitness-oriented digital artefact:

> *It is easier to not follow the diet when I don't have it on, but it is very encouraging when I have it on. (A2)*

Another participant designed their tracker experience to be only about dedicated fitness-related activity. She would remove the tracker during parts of the day when she did not exercise to not track other daily routines. This way, using the tracker became an explicit expression of willingness to be physically active and the possibility of using the tracker in the household was a source of motivation.

> *When I was doing these activities without the tracker, I didn't understand or measure it. (...) I originally used to calculate it by multiplying the number of laps by the length of the walking track in the club. (...) This possibility of measurement makes me motivated. I take it off at home to not collect measurements which are not truthful to reflect the actual (dedicated) walking activities. (A15)*

Similar remarks were also present in the non-Arab Western group. While all the non-Arab Western participants wore the tracker almost all day, the tracker still functioned as a physical artefact that signalled the importance of physical activity. The tracker's continuous presence provided motivation in the form of a reminder about one's well-being:

> *It is a reminder to always remain active, since I like to be active. It is like a tattoo around your wrist reminding you of what you thought you wanted to stick to (W11)*

4.5 The Social

The last theme in our findings describes the social practices around fitness tracking in the two user groups. Participants in the non-Arab Western group were mostly uninterested in sharing fitness tracker measurements on social media. Excessive sharing was perceived as a possible concern:

> *I'm not this kind of person who would share this like 'Oh! I took x number of steps', but when I tell it to myself like 'Okay I did 10 km and now I can do 15 km without even feeling tired.', I feel like 'Huh, bravo me'. (W5)*

The need to effectively manage privacy and select audiences across multiple social networks was also perceived as a deterrent from engaging with fitness tracker data on a social level. One non-Arab Western participant found himself in a state of 'social media saturation' and thus preferred to keep fitness data private:

> *I track my own data and nobody else can see it. I don't use it as social factor, like Facebook for example, where you have an account, you socialise with people. (...) I'm not using this (fitness data sharing), because the problem is that I have 10,000 social networks and that's making things complicated. (W5)*

Comparing data with others was not a common practice among non-Arab Western users. They preferred to focus on one's training goals and the goals provided by the tracker. Some participants felt that sharing with other users would mean relying on their knowledge about training which may have been insufficient:

> *I don't compare. Sometimes, I talk about the experience (...) we compare the devices, but I don't think we discuss our performance in daily activities. (...) We do not have enough knowledge and experience to properly analyse the activity because of how measure something using the tracker. We can't say 'Hey, change your lifestyle!'. (W11)*

Attitudes towards the social elements of fitness tracking in the Arab Egyptian group were strikingly different than those in the non-Arab Western group. For many participants, the decision to consider acquiring a tracker was motivated by social circumstances. Family members would often introduce each other to tracking:

> *I sort of relied on my brother's opinion and judgement in this matter. I saw it with him and liked it. So, I decided to get it. (A9)*

All Arab Egyptian participants mentioned sharing data and most shared with other tracker owners. They often spoke of small groups that would develop informal practices around fitness tracking to support their members. Similarly to non-Arab Western participants they were reluctant to share fitness information on social media:

> *I have my own group of people, I share it with them, and I don't share it on social media, so I have no privacy concerns. (A5)*

Some Arab Egyptian users shared their data with small groups, other participants from the Arab Egyptian sample focused on one person to discuss and compare their tracker data with. One participant reflected about sharing and comparing tracker data with a friend. The user described how the comparison offered a point of orientation for his own endeavour to maintain a healthy lifestyle:

> *He is a person who is capable of maintaining a busy lifestyle, while being healthy. So, I check what he is doing and compare our life styles, it is like an imitation game. (A1)*

One participant reported how their initial friendship with another tracker user developed into a deeper relationship. This resulted developing a certain emotional attachment to the tracker and embedding the tracking deeply in its social context. As a consequence, the participant was also concerned about the physical state of the device and its parts:

> *After we became more than friends, it became both fitness and social goals, especially that it's a gift. It*

> means a lot to me. But I read about it, and found that
> this torn part was the most likely to be torn. (A3)

Family also played an important role in the fitness tracking experience in the Arab Egyptian sample. Many participants reported discussing data with their families and receiving social support from family members. One participant developed a daily fitness support relationship with her mother:

> It is more of encouragement. And Apple sends me notifications saying '(Participant's mother's name) finished her rings, congratulate her', so I send her an applause, an emoji, or 'Way to go!' and she does the same. It's fun! And we're cute! (A16)

The findings in the last two themes are perhaps best described by an unsolicited comment from one of the participants who explicitly reflected on how Arab Egyptian users of fitness trackers were less interested in the qualitative quantitative aspect of tracking and preferred to focus on the social opportunities afforded by fitness trackers:

> Maybe Europeans and Americans are more concerned with the steps and mileage. Egyptians would be more into following their fitness idols, taking pictures, posting them on Facebook and Instagram, and how many calories were burnt. They'd be more interested in the social aspect of fitness tracking rather than the actual fitness aspect. (A14)

5 DISCUSSION

In our qualitative interview study, we found an array of differences and similarities in fitness tracker usage between the Arab Egyptian and the non-Arab Western user groups. The findings show that the Arab Egyptian user group put more emphasis on their independence from the tracking device than the non-Arab Western user group. This is, inter alia, highlighted through statements in the theme INDEPENDENCE, where Egyptian users stressed that they did not necessarily follow the recommendations of their device, because it was important for them to retain control while interacting with the tracker. This may suggest that Arab Egyptian users may be more receptive to technologies that support reflection rather than providing prescriptive measures such as those discussed by Gulotta et al. [32] and conceptualised by Bentvelzen et al. [8].

In contrast, the non-Arab Western user group focused more on goal setting and goal pursuit, which was reflected in the theme GOAL BEHAVIOUR. Differences were also evident in the various MOTIVATIONS for tracking. Arab Egyptian users enjoyed keeping track of their data and showed a tendency to use the fitness tracker more as a monitoring device, whereas non-Arab Western users mainly discussed goal-oriented behaviour. This multitude of approaches and motivations to track reflects past findings by Epstein et al. [26]. Our analysis suggests that some of the variability in motivations can be explained by cultural factors. Further, the entire experience of long-term personal informatics may be significantly shaped by one's cultural background.

We also observed a strong emphasis on SOCIAL features of a tracker in the Arab Egyptian user group and a strong interest in stimulating features in the non-Arab Western user group. We hypothesise that these findings are connected and are an expression of the same underlying need—the need for engagement. Hassenzahl et al. [35] previously identified engagement as a basic psychological need that is also relevant for the design of interactive systems. Our work shows that, in terms of fitness trackers, engagement can either be satisfied through stimulating features within the individual tracker or through social interactions included in tracking practices. Consequently, future trackers should support both ways of providing engagement and enable the users to choose their own strategies in that respect. This resonates with past findings on sharing in the context of physical activity which highlighted a need for fine-tuning social preferences and audiences [65].

The two user groups prioritised two different metrics. Statements in GOAL BEHAVIOUR outline the primary focus on steps and step goals in the non-Arab Western user group. This contrasted with prioritising calorie intake or alternative metrics such as race performance in the Arab Egyptian user group. These findings imply that future trackers should consider a wider array of metrics spanning different time periods to offer engaging experiences to more users.

Combined, the differences and similarities that we observed in our study show that there is an emergent design space for fitness trackers that better fit the particular user in terms of practices that vary across users and locations. We hope that we managed to use the geographically diverse composition of the two groups to identify different aspects of what fitness tracker experiences can constitute for an individual. However, the contrasts we highlighted here are just a means to further investigate how users experience trackers. In a globalised world, many users have mixed background and it is highly likely that a personalised tracker style preferred by one of the participants from our Arab Egyptian user group would also be required in Western Europe. Consequently, we do not think that this paper can attribute certain desired qualities of a tracker experience to cultures or location. Instead, we suggest that future trackers should offer a greater degree of flexibility to offer a more inclusive experience. In order to stimulate developing and help in designing such devices, we identified four dimensions of tracking based on our findings.

5.1 Inclusive Dimensions of Tracking

Here, we propose four dimensions that help navigate the design space of fitness tracking experiences (see Fig. 1). These dimensions take the diversity of users into account and strive to offer support in designing more engaging trackers that offer flexibility to the users. They help shape the aspects of one's personal informatics that may be user background-dependent.

Our work indicates that trackers should be flexible and adapt to the user along these dimensions. The aim of these dimensions is not to underline differences between or show how these differences are manifested in attitudes towards fitness tracking. Instead, we postulate that future trackers should be highly customisable along these dimensions and offer an experience that considers different diverse approaches to how trackers are appropriated. We hope that the dimensions can aid in designing inclusive fitness tracking experiences that answer to the needs of a diverse population, as described by Spiel et al. [61].

5.1.1 Personal—Social. Offering the opportunity to shape the tracking experience as a personal or a SOCIAL experience can support
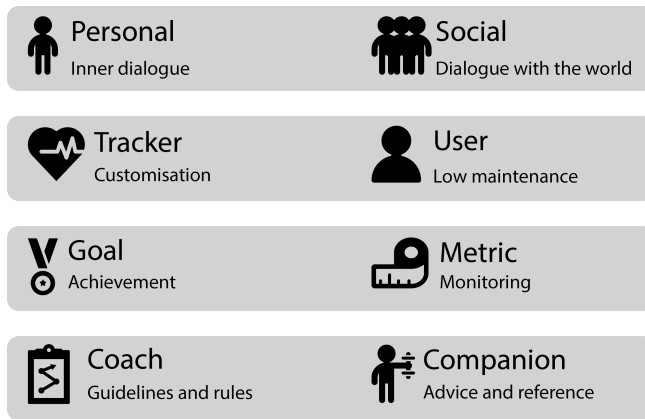
Figure 1: A summary of the four dimensions of fitness tracking evoked by the differences between users identified in our study. The dimensions serve as conceptual means to inspire designing more customisable tracker experiences.

meaningful fitness tracker interactions. Users should be empowered to make conscious decisions on how social they want to make their tracking experience from its beginning. Our work shows that users prefer different levels of social influence in fitness tracking: Some found meaning and pleasure in the social aspects; others through the moments and activities which they only shared with their tracker. Thus, a successful fitness tracking experience should enable finding one's balance between an 'inner dialogue' and a 'dialogue with the world'. This stance poses a challenge for interaction design for trackers and calls for enhancing and building new sharing features that enable users to customise content and audiences dynamically.

5.1.2   Tracker—User. Our work showcased how different users developed different material relationships with their trackers. Our participants included users who found joy, MOTIVATION and ENGAGEMENT in experimenting with tracking technology or making the tracker aesthetically pleasing. In contrast, others treated the tracker as a necessity to acquire activity metrics. Hence, the focal point of the tracking experience can be anywhere between the tracker (owning a tracker was a source of satisfaction) or the user's activity (being tracked was a source of satisfaction). The artistic activity of making one's tracker aesthetically pleasing reflects findings in previous work [3, 53]. For instance, in an analogue self-tracking context, Ayobi et al. [3] identified the potential of creative, artistic activities surrounding self-tracking activities. They emphasised the potential of alternating between different tracking styles. The user need to adapt the functionalities of the tracker is also addressed by the design of OmniTrack [41]. OmniTrack is a flexible self-tracking technology that allows for a combination of automatic and manual self-tracking. Our findings combined with previous work imply that future trackers should allow users to choose a preferred level of maintenance and/or customisation. Consequently, future fitness trackers should enable users to interactively customise notification levels and maintenance required to suit their personal profile.

Designing effective ways of controlling those features remains an open research challenge.

5.1.3   Goal—Metric. GOAL BEHAVIOUR showed varying preferences in terms of engaging with the tracker in everyday life. Our work shows that there is a continuum between focusing on goal achievement and monitoring metrics. However, both ends of this spectrum are logically intertwined. The design of future trackers should enable the user to consciously and transparently put more emphasis on one of the two dimensions in order to create a satisfying interaction with it. In other words, users should be able to make a choice on how deeply to engage with tracker goals and this choice needs to be complemented with rich and transparent metrics. As a consequence, fitness tracking experiences should empower the user to feel in full control of their metrics and decide how visible their goals should be. This is in stark contrast with current trackers, which are predominantly goal-focused [49]. Thus, future interaction design should explore alternative designs for displaying metrics and goals throughout a personal informatics experience. In an inclusive tracking experience, users should be in control of how much focus there is on achieving goals when metrics are displayed. This is in line with research which showed that displaying goals prominently could equally motivate and discourage personal informatics users [48].

5.1.4   Coach—Companion. Our study showed that users exhibited different attitudes towards notifications and suggestions provided by fitness trackers. This was strongly linked to different levels of INDEPENDENCE in thought and action. There is variety among users in terms of how they perceived prescriptive measures provided by a fitness tracker. Consequently, a differentiation between the tracker as a companion and the tracker as a coach is needed. The tracker as a companion supports its users through offering advice and a frame of reference. In contrast, the tracker as a coach provides rules, recommendations and guidelines for improvement. Building devices that support navigating the coach—companion spectrum will empower users to find their desired level of independence in fitness tracking. An emerging challenge for the HCI field is modelling how the dialogue of the system with the user can look like to embody different qualities along the coach—companion spectrum. We identified similarities and differences between the work by Lyall et al. [47] and our findings. Lyall et al. [47] introduced a differentiation of self-tracking devices as tools, toys or tutors. They define tools as systems to collect data to pursue lifestyle goals, toys focus on gamification elements and the exploration of visual data and tutors are systems that foster long-term engagement and reflection. Similarly to our findings, they showed that people constructed narratives around their tracking experience and considered the agency of their self-tracking device based on their experiential narrative. While we can identify an overlap between their consideration of agency reflected in the roles the devices take on, we also observed a key difference between our findings and their results. Lyall et al. [47] emphasised the playful elements of the 'Toy'. However, their conceptualisation of self-tracking technologies is mainly goal-driven, while the coach—companion dimension focuses on the desired level of independence of fitness tracker users in goal-setting contexts and beyond. Further, our results show that diverse users often develop fitness tracking routines that are not focused on goals.

5.2 How Non-WEIRD Users Track their Fitness and How We Can Use That for a Better Understanding of Personal Informatics

Our work shows how current conceptualisations of personal informatics used in the HCI field may not be adequate to accommodate diverse users as most conclusions are based on primarily Western participants. The extended social context in which personal informatics was enacted among our Egyptian participants suggests that a personal informatics journey is an experience that involves more actors than current models of personal informatics assume (cf. [26, 44, 49]). In order to understand and design inclusive personal informatics technology HCI should build multi-actor models that explicitly consider societal factors. This need is relevant for areas beyond tracking physical activity. Petelka et al. [54] showed a similar gap in tracking for managing mental illness.

Further, we observed that Arabic Egyptian users exhibited a higher acceptance of additional effort for customising their tracker experience for social reasons or as a conversation starter. In contrast, customising the tracking experience to improve oneself was more common in the non-Arab Western user group. Interestingly both user groups shared accounts of the tracker as an important object. This suggests that what Epstein et al. [26] called the 'selecting' phase is enacted in a variety approaches, where the goal of the selecting may not always be accurate tracking, but rather creating a cherished object [28] or a social connection. Our diverse participant group reported on a variety of meanings and goals for tracking, which suggests that there is a design space for a larger variety of metrics and tracking routines to be used in personal tracking. For instance, leniency (e.g. through 'legitimate cheating' [1]) can be used to make the tracker feel more companion-like. The new perspectives presented by the Arabic Egyptian users challenge our understanding of how users formulate qualitative goals [49] and how they relate these goals to metrics.

5.3 Generalisability

Moreover,We decided to focus our inquiry on the comparison between an Arab Egyptian user group and a group that we considered as representative of the users primarily studied in past work [45]. Past cross-cultural studies in social computing operationalised culture mainly through differentiating between different countries. For instance, Alostath et al. [2] studied participants from Egypt, Kuwait, UK and Brazil. De Choudhury et al. [17] researched US, UK, India and South Africa and Zhao et al. [66] studied participants who were born and raised in China or the US. Joosse et al. [40] accentuated that nations appeared as appropriate units of cultural analysis. Furthermore, they also discussed clusters of culture as suitable units of analysis. The four major cross–cultural research projects beyond HCI research carried out since the 1990s [37], namely the Hofstede studies [36], the GLOBE study [38], the World Values Survey [39] and the Survey of Values [60] analysed culture through clustering countries to cultural clusters.

Based on previous research, our Egyptian sample is part of the Arab [33] or the Middle Eastern [36] cluster. Thus, we hypothesise that our results are at least partially generalisable to Arab users. However, as our study is a qualitative exploration, future

quantitative research with a broader sample will need to test this assumption.

Past works show that customising interactive artefacts to account for diversity can have tangible benefits for the user. This led us to investigate whether users from different backgrounds had different views and experiences of personal informatics. We endeavoured to identify user-specific dimensions in the design of fitness trackers that could offer a more inclusive experience. Through applying this lens, we were able to identify dimensions along which tracker designs can be customised to enable an more inclusive, positive tracking experience for global users. While we do believe that our study provides starting points for more diverse research in the field of personal informatics . We focused on geographically distributed study participants. However, the our non-Arab Western sample consisted of participants from four different countries and the Arab Egyptian user group consisted of participants from one country. In her work on technologies to support people with type 1 diabetes, O'Kane [50] showed that contextual factors such as the social situation and the healthcare infrastructure impacted how people use and adopt such technologies.

Thus, future studies should also explore other important aspects such as education level, economic factors and gender distribution with regard to fitness tracking attitudes and practices in more depth.

An imbalance regarding level of education (both samples are highly educated) and a gender imbalance in the Arab Egyptian group should be noted. The discrepancies may be representative of the current user pool in Egypt, as fitness tracker users are predominantly male in most countries [27] and Fitness trackers are considered a luxury item in Egypt. To illustrate, in the context of our work, it is worth noting that many measures of culture are affected by economic factors [37] and no income implies no consumption [19]. In line with the cross-cultural consumer behaviour framework by Mooij and Hofstede [19], we recognised the relevance of economic factors and endeavoured to eliminate factors that most likely stem from economic differences between the two samples. Primarily, we ensured that no data possibly connected to economic factors contributed to the cross-cultural dimensions of tracking presented above. It can be observed that Egyptian users showed a number of caring behaviours connected to their fitness tracker and emphasised the maintenance of their tracking device. One potential reason for that could be the fact that fitness trackers are still a novelty and a token of luxury in Egypt. The selection is limited and many users stated that they had to wait quite long for their tracker to be delivered or even bought it in another country. While we believe that eliminating economically-motivated factors from our analysis enabled an enhanced focus on cultural factors, we recognise that it may have also introduced a certain bias to our process. To summarise, future work should determine if and to what extent our findings could be extended to other areas that are part of the same cultural cluster, while taking additional key variables such as gender and economic factors into account.

5.4 Limitations

While we aimed to make a contribution towards designing inclusive, meaningful tracking experiences, we can identify some limitations in our work. Firstly, we recognise that this kind of research is affected by the values of the researchers conducting the studies, which

is reflected in the topics and the questions we selected [18]. As recommended by Linxen et al. [45], we are a culturally diverse author team. However, our personal social background and geographical origin may still have affected the study.

Furthermore, we see possible theoretical developments from our study data that we decided to omit in favour of focusing on the design space for inclusive fitness trackers. For instance, a deeper analysis using cultural theories (e.g. [36, 59]) could help identify which differences the usage of a fitness tracker were potentially explained by cultural differences. In this work, however, we focused on inspiring the design of inclusive trackers that give users the freedom of choice rather than culturally profiling them.

6 CONCLUSION

This paper investigated differences in practices around fitness tracking between the US, Western Europe and Egypt. We conducted semi-structured interviews with 37 active fitness tracker users. Through thematic analysis, we identified five themes: INDEPENDENCE, ENGAGEMENT, GOAL BEHAVIOUR, MOTIVATION and SOCIAL. We observed that users in the two groups differed in their desired level of independence, preference for social interactions around tracking and how they related to goal and metrics. Furthermore, our work highlighted a need for future trackers offer more customisable experiences that take the diversity of users into account. To aid in that process, we proposed four design dimensions for fitness trackers that stem from our analysis: Personal—Social, Tracker—User, Goal—Metric and Coach—Companion.

Our work sheds new light on the research community's understanding of fitness tracking and aims to stimulate further studies in personal informatics. We wonder if and how the findings presented in this paper can be applied to areas in personal informatics beyond fitness tracking. Future work should investigate the importance of user background in shaping non-fitness tracking experiences. We hope that our results will help design inclusive tracker experiences that offer long-term engagement.

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