

Momentary Pleasure or Lasting Meaning? Distinguishing Eudaimonic and Hedonic User Experiences

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ABSTRACT

User experience (UX) research has expanded our notion of what makes interactive technology good, often putting hedonic aspects of use such as fun, affect, and stimulation at the center. Outside of UX, the hedonic is often contrasted to the eudaimonic, the notion of striving towards one's personal best. It remains unclear, however, what this distinction offers to UX research conceptually and empirically. We investigate a possible role for eudaimonia in UX research by empirically examining 266 reports of positive experiences with technology and analyzing its relation to established UX concepts. Compared to hedonic experiences, eudaimonic experiences were about striving towards and accomplishing personal goals through technology use. They were also characterized by increased need fulfillment, positive affect, meaning, and long-term importance. Taken together, our findings suggest that while hedonic UX is about momentary pleasures directly derived from technology use, eudaimonic UX is about meaning from need fulfillment.

Author Keywords

User experience; meaning; eudaimonia; hedonic.

ACM Classification Keywords

H.5.m. Information Interfaces and Presentation (e.g. HCI):
Miscellaneous

INTRODUCTION

In the last decade, HCI research has expanded from a focus on utility and usability towards a holistic view of user experience (UX) that includes hedonic aspects of use. The notion of the hedonic has a long tradition both in history and in UX research [1, 10]: The Greek philosopher Aristippus taught that the goal of life is to experience the maximum amount of pleasure, and that happiness is the totality of one's hedonic moments. Hobbes argued that happiness lies in the successful pursuit of human appetites, and de Sade believed that the pursuit of sensation and pleasure is the ultimate goal in life.

Within UX, Desmet and Hassenzahl [7] argued that the hedonic “implies the design of products that are direct sources of pleasure by creating or mediating pleasurable experiences rooted in human values and evidently pleasurable activities” (p. 10).

In contrast, Aristotle considered the hedonic to be a vulgar ideal, making humans slavish followers of desires. In the *Nicomachean Ethics* he posited that true happiness is found in the expression of virtue – that is, in doing what is worth doing. Philosophy and positive psychology have long contrasted the hedonic with eudaimonia (“living the good and virtuous life”). According to Desmet and Hassenzahl [7], the eudaimonic signifies design for the “good life”, that is, for “meaningful, but maybe non-obvious goals and help people attain those goals” (p. 10). Aristotle argued that in pursuing the good life an individual is continuously engaged in reflection and deliberation about his or her actions and aims. A reflective life thus facilitates the development of human excellence and is, as the psychologists Ryan and Deci have argued, an end in itself [32].

The notion of eudaimonia (and its distinction from hedonia) has much to offer UX research. First, while the notion of the hedonic has significantly contributed to our understanding of user experience (see [10] for an overview), it may not cover all possible positive experiences involving interactive technology. For instance, ongoing discussions about embarrassing interactions [9], uncomfortable interactions [3], and designing for the self [40] are to a large extent about meaning; they are rarely about purely hedonic aspects of use. Second, it could clear up our current understanding of hedonic quality, which Diefenbach et al. [10] argued has several empirical and conceptual problems. Third, besides offering a complementary approach to studying the characteristics of positive UX, the notion of eudaimonia may deepen our understanding of how technology use may contribute to people's well-being in different ways [8, 30]. Fourth and finally, it could inspire design by showing a range of meaningful experiences with interactive technology.

Unfortunately, the distinction between eudaimonia and hedonia is less than clearcut for UX. So far, the notion of the eudaimonic has been used only in two works-in-progress [22, 27], both of which have been inconclusive. As of now, it is unclear (1) whether eudaimonia actually manifests in users' experiences involving interactive technology, and (2) what characterizes eudaimonia versus hedonia in such experiences.

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CHI '16, May 07-12, 2016, San Jose, CA, USA.
© 2016 ACM ISBN 978-1-4503-3362-7/16/05...\$15.00.
DOI: <http://dx.doi.org/10.1145/2858036.2858225>

Drawing upon work in positive psychology, the present study therefore explored whether – and if so, in what ways hedonic and eudaimonic user experiences differ. We do so by first outlining the theoretical content and promise of eudaimonia in UX research. We then provide empirical evidence that eudaimonic experiences differ from hedonic ones in terms of ratings and content, introducing eudaimonia and its correlates – meaning and future importance, – as promising complementary concepts to the hedonic. Finally, we showcase how the distinction between eudaimonia and hedonia is also reflected in participants’ ratings of established UX concepts, such as needs, affect, attribution, and product quality.

RELATED WORK

Happiness is an ambiguous term. It can be understood as a transient emotion (synonymous with joy), an experience of fulfillment and accomplishment (thus prominently characterized by a cognitive evaluation), or a long-term process of meaning making and identity development through actualization of potentials and pursuit of personally relevant goals [6, 19]. The predominant view among hedonic psychologists is that happiness concerns the subjective experience of pleasure versus displeasure [21], a notion that has commonly been termed hedonism or hedonia [19]. The hedonic experience is thus typically characterized by the presence of positive affect, as well as the absence of negative affect [4, 19].

In the last decade, the hedonic has become focal in UX research and several authors have argued that UX design may contribute to people’s well-being by affording pleasure and positive affect [8, 15]. According to Hassenzahl’s conceptualization, the hedonic emphasizes the individual’s well-being through non-instrumental, self-oriented product attributes [13]. He argues that “the functions and the attributes it [the hedonic] subsumes are strong potentials for pleasure” (p. 35). A recent literature review by Diefenbach et al. [10] showed that the notion of the hedonic is well established within UX (see also [1]) and has been used in over 100 publications. However, it also revealed that the concept is often used in differing and sometimes even contradictory ways. Similarly, a study by Hassenzahl et al. [17] suggested that current measures of hedonic product quality might not adequately take experience components such as meaning–self-actualization into account. Diefenbach et al. [10] thus called for a clearer conceptualization of the hedonic, and stressed the need for more research into *related phenomena*.

In positive psychology, the hedonic is often contrasted with eudaimonia. Many definitions and operationalizations have been suggested for eudaimonia (for an overview refer to [19]). For example, the classical philosophical understanding of eudaimonia did not refer to a subjective experiential state, but rather to what was worth pursuing in life [19]. In psychology, Ryan et al. equate eudaimonia with self-determination and a way of living focused on what is intrinsically worthwhile to human beings [33]. Yet many activities (e.g., playing video games) could be argued to be intrinsically motivating, but not forcibly eudaimonic. Waterman et al. [38] differentiated hedonic enjoyment and ‘personal expressiveness’ (i.e., eudaimonia). They further argued that personal expres-

siveness constitutes a sufficient, albeit not necessary, condition for hedonic enjoyment. Finally, Huta and Ryan [18] defined eudaimonia as a motivational orientation, rather than an experience per se. That is, eudaimonia denotes striving to learn new skills, work towards and achieve personally relevant goals, as well as realize one’s personal potential.

Several psychologists have posited that there is a distinctive set of subjective experiences that accompany the pursuit of eudaimonia, and that they are distinguishable from hedonic experiences (see also [19]). One such experiential aspect that most researchers agree on is *meaning* (e.g., [2, 18, 19, 26, 31]). According to Peterson et al. [31], pleasure and meaning both contribute independently to wellbeing. Given that eudaimonia involves efforts to align one’s actions with one’s values, it may foster a sense that those actions have meaning. Indeed, Huta and Ryan found meaning to be strongly related to eudaimonia [18].

The notion of eudaimonia recently also garnered interest from HCI researchers. Desmet and Hassenzahl [7], for instance, took up the psychological distinction between eudaimonia and hedonia to discuss several examples and opportunities for possibility-driven design. Hassenzahl et al. [15] argued that experience design should strive to create technologies that afford both pleasure and meaning, while Desmet and Pohlmeier [8] outlined that positive design may improve people’s well-being by not only providing pleasure, but also supporting personally significant goals and/or facilitating virtuous behaviour. Most recently, Kamp and Desmet [22] stressed that not only is the question of *how to design* for eudaimonia of relevance, but also *how to assess* a product’s potential to afford such experiences. Expanding upon Hassenzahl’s notion of hedonic and pragmatic quality [12], they developed a questionnaire that captures eudaimonic product qualities. The authors further argued that “hedonics” cover pleasurable qualities, whereas “eudaimonics” constitute meaningful product qualities. Kamp and Desmet provided several examples of products exhibiting such qualities, but acknowledge that these only serve illustration purposes, suggesting the need for an empirical basis.

So far, only little empirical research has been conducted on the nature of eudaimonic user experiences. To our knowledge, only the work-in-progress study by Müller et al. [27] attempted to identify hedonic and eudaimonic user experiences. They asked participants to either report an enjoyable (i.e., hedonic) or a meaningful (i.e., eudaimonic) experience with technology. However, they found few differences and concluded that hedonic and eudaimonic experiences possibly occur simultaneously – and that there might be no such thing as a ‘purely’ eudaimonic or hedonic user experience. Unfortunately, it is not clear whether participants actually considered ‘enjoyable’ versus ‘meaningful’ user experiences as distinct, – and while this has been found to hold true under certain circumstances [2], it is not always the case [26]. To further complicate matters, Müller et al. employed a scale based on Waterman et al.’s conceptualization of eudaimonia and hedonia [38]: While Waterman et al. define eudaimonia and hedonia as two distinct experiential states, they also

emphasize that the two are not independent constructs – as reflected in the very high intercorrelation ($r = .82$) in the study of Müller et al. [27]. That is, when individuals engage in eudaimonic activities with some degree of success (i.e., realizing their personal potential), then both hedonic enjoyment and eudaimonia will be experienced. Taken together, these findings suggest that it is challenging to empirically assess and delimit eudaimonia and hedonia in UX. As of now, it remains unclear whether there is such a thing as a eudaimonic user experience, and if so, whether it may be actually differentiated from a hedonic user experience.

METHOD

As summarized above, positive psychology suggests that eudaimonia is distinct from hedonia, as it describes a different motivational orientation accompanied by specific experiential correlates; so far, empirical work in UX on hedonia has been inconclusive. The aim of the empirical study in the present paper is therefore to collect data on experiences with interactive technology and attempt to identify hedonic and eudaimonic components of such experiences.

The critical incident method was deemed a suitable approach to exploring eudaimonia and hedonia in user experiences involving interactive technology. First, the method has successfully been used in several studies on the characteristics and contents of positive (and negative) user experiences [14, 17, 27, 29, 37], as it allows collecting and combining qualitative and quantitative data. Second, it focuses on what users themselves consider positive and meaningful, rather than imposing some arbitrary use situation. Third, as participants were asked to think of a past experience, it was assumed that meaning-making had already taken place to a certain degree, whereas this may have been less pronounced if the experience were captured at the precise moment it happened, as meaning has been argued to develop over time [2, 18, 24].

Measures

Huta and Ryan [18] conceptualize hedonia and eudaimonia not as experiences per se, but as motivational orientations (i.e., motives), such as approaching an experience with the intent of *seeking enjoyment* as an example of a hedonic motive, and *seeking to do what you believe in* as a eudaimonic motive. To assess hedonia and eudaimonia, we therefore employed their hedonic and eudaimonic motives for activities (HEMA) scale (7-point Likert scale, 1 = not at all, 7 = very much; see Table 1 for all items). Table 2 provides an overview of all measures employed.

However, Huta and Ryan further argue that the successful pursuit of these motives typically affords specific experiential patterns and well-being indices [18]. For instance, realization of hedonic motives is usually accompanied by the experience of positive affect and absence of negative affect. In contrast, realization of eudaimonic motives leads to experiences characterized by feelings of meaning, often considered a key component of eudaimonia [18, 19]. The experience of meaning (7-point Likert scale, 1 = not at all, 7 = very much) was thus measured with the scale developed and validated by

To what degree did you approach this experience with each of the following intentions?

Eudaimonia

- Seeking to do what you believe in?
- Seeking to pursue excellence or a personal ideal?
- Seeking to use the best in yourself?
- Seeking to develop a skill, learn, or gain insight into something?

Hedonia

- Seeking relaxation?
 - Seeking enjoyment?
 - Seeking to take it easy?
 - Seeking pleasure?
 - Seeking fun?
-

Table 1. Items of the HEMA scale

Huta and Ryan [18]. Example items include “This experience felt precious”, “meaningful”, or “full of significance”.

Next we wanted to follow and potentially replicate earlier work on positive user experience descriptions [14, 17, 27, 29, 37] by collecting measures of need fulfilment [34], positive and negative affect [39], and technology perception [12].

Affect was measured with the 20-item version of the Positive and Negative Affect Scale (PANAS; [39]). A test trial of the survey ($n = 60$) revealed that while hedonic and eudaimonic experiences did not differ in terms of overall positive affect, individual items (see [14]) did differ significantly (e.g., ‘excited’). For this reason, we additionally included the Joviality, Self-Assurance, Attentiveness, Serenity and Surprise scales from the PANAS-X [39], which allowed us to reliably measure nuances in positive affect. We only expanded on positive affect, because the pilot study yielded no significant differences for negative affect, neither as a construct, nor for individual items. Scale intercorrelation between positive and negative affect was small ($r = -.09$), whereas intercorrelations between positive affect and the other PANAS-X constructs were at times substantial (range $r = .18$ to $.79$). However, this is unsurprising, as the positive affect scale employs some of the same items as the different PANAS-X scales. Finally, as previous research has highlighted the role of reflectiveness for meaningful interactions [11, 40], the ‘meaningful affect’ scale developed and validated by Oliver and Raney [28], was also included. The meaningful affect scale includes items such as “contemplative”, and has previously been used to differentiate meaningful versus pleasurable (non-interactive) entertainment experiences [28]. To avoid confusion with Huta and Ryan’s meaning scale [18], ‘meaningful affect’ will hereafter be referred to as ‘contemplativeness’. All affect scales were rated on a 5-point Likert scale, ranging from 1 = not at all to 5 = extremely.

As in previous studies on positive user experiences [14, 17, 30], we opted to measure need satisfaction with an abridged version of the scale developed by Sheldon et al. [34]. We assessed satisfaction of the needs for autonomy, competence, relatedness, self-actualization–meaning (hereafter referred to

Variable	Items	Cronbach's α	Source
HEMA			
Eudaimonia	4	.86	[18]
Hedonia	5	.89	[18]
Affect			
Positive Affect	10	.87	[39]
Joviality	8	.92	[39]
Self-Assurance	6	.77	[39]
Attentiveness	4	.80	[39]
Serenity	3	.85	[39]
Surprise	3	.77	[39]
Contemplativeness	3	.63	[28]
Negative Affect	10	.87	[39]
Needs			
Competence	2	.84	[17, 34]
Popularity	2	.83	[17, 34]
Relatedness	2	.89	[17, 34]
Security	2	.74	[17, 34]
Self-Actualization	2	.85	[17, 34]
Stimulation	2	.77	[17, 34]
Other			
HQ Identification	7	.77	[12]
HQ Stimulation	7	.74	[12]
Pragmatic Quality	7	.72	[12]
Meaning	9	.95	[18]
Attribution	1	–	[14]
Importance	1	–	[24]

Table 2. Overview of the measures employed.

as self-actualization only, to avoid confusion with the experience of meaning outlined above), stimulation, security, and popularity with 2 items each (5-point Likert scale, 1 = not at all, 5 = very much). However, a principal component analysis found the factor structure unsatisfactory, with high crossloadings between autonomy and self-actualization. Hence, we decided to discard the autonomy items, incidentally matching the structure of Hassenzahl et al.'s abridged need satisfaction questionnaire [14, 17]. Intercorrelations between the need scales ranged from $r = .24$ to $.66$.

The original 23-item version of the AttrakDiff was employed to measure product perception [12] of pragmatic quality, as well as hedonic quality identification and stimulation. Note that intercorrelations were strong for hedonic quality identification and stimulation ($r = .62$), as well as hedonic quality identification and pragmatic quality ($r = .66$). While significant, the intercorrelation between pragmatic quality and hedonic quality stimulation was less pronounced ($r = .28$). Echoing previous similar studies, we also asked participants to rate “the extent to which they felt that the interactive technology caused their experience” (i.e., attribution).

Lastly, eudaimonic pursuits may not be inherently or immediately pleasurable, but only contribute more to a person's subjective well-being in the long term by lending meaning and purpose [2, 18, 24]. Therefore, based on the study of Kim et al. [24], who found that meaning (versus pleasure) is favoured in the distant future, we included a single question

capturing respondents time-dependent attitude towards their experience: “If you consider your life one year from now, how important will you find this experience?” (7-point Likert scale, 1 = not important at all, 7 = extremely important). They were also asked to explain in a few words why they would (not) deem the experience important one year from now.

Participants

Participants were recruited at Amazon Mechanical Turk through the intermediary company Crowdfunder, and received 0.8 US dollars for completing the survey. A total of 273 US participants completed the survey. Seven responses were discarded because they were either exact duplicates of other responses, or copy-pastes of the study instructions. The remaining 266 answers were all of acceptable quality. Participants were between 15 and 80 years old ($M = 38.60$, $SD = 13.05$), 168 were women, 97 men, and 1 person chose not to answer.

Procedure

The online survey consisted of both qualitative, open-ended questions, as well as quantitative scales. The open-ended questions followed previous similar studies [14, 17, 27, 29, 37]. After providing consent, participants were asked to “bring to mind a single positive experience that involved interactive technology”. They were informed to “think of positive in whatever way makes sense to you” and that interactive technology could encompass “a smartphone, a specific computer software or mobile application, a digital game, a website, etc.”. After describing their experience, participants were asked to describe when and where the experience had occurred; who was present during the experience; and what the experience meant to them. Then, they rated the experience in terms of hedonic and eudaimonic orientation, affect, need fulfilment, meaning, as well as product quality and attribution. Finally, they were asked to rate and elaborate on their experience's importance one year from now.

Thematic analysis of experience contents

Previous research examining user-generated descriptions of experiences (e.g., [14, 30]) has paid scant attention to the actual content of the experience accounts (but refer to [29, 37] for notable exceptions). Yet positive psychologist Delle Fave and colleagues [6] stressed the importance of also incorporating qualitative data analysis to explore *what* people find meaningful themselves. Following the thematic analysis protocol outlined by Braun and Clarke [5], the first author therefore manually coded the experience accounts in terms of reported activity (e.g., wayfinding technology, social media and instant messaging services, playing video games), and identified themes of personal meaning (e.g., keeping in touch with friends and family, relaxation, accomplishment), as well as reasons for the (lack of) future importance of the experience.

RESULTS

Overall, participants scored slightly higher on hedonia ($M = 4.60$, $SD = 1.58$) than eudaimonia ($M = 4.14$, $SD = 1.64$), but individual participants' ratings of eudaimonia and hedonia ranged from 1 to 7 (variance hedonia = 2.48; variance

eudaimonia = 2.68), indicating that the reported experiences differed considerably in terms of eudaimonic and hedonic orientation. Also, while eudaimonia and hedonia correlated significantly, the effect was rather small ($r = .22$), similar to the studies of Huta and Ryan [18]. In contrast to the correlations reported by Müller et al. ($r = .82$) [27], this suggests that eudaimonia and hedonia were relatively independent in our study.

Correlates of Eudaimonia and Hedonia

To explore whether eudaimonia and hedonia exhibit differing experiential patterns in terms of needs and affect, we calculated a series of partial correlations. Note that Huta and Ryan calculated bivariate correlations in their study [18]. However, partial correlation allows for controlling the (small, $r = .22$) shared variance between eudaimonia and hedonia. Additionally, we report paired-correlation t-tests comparing the magnitudes of correlations for eudaimonia versus hedonia. As shown in Table 3, eudaimonia was more strongly correlated with positive affect than hedonia. Specifically, eudaimonia was associated with feelings of self-assurance, attentiveness and contemplativeness. Thus, when users engaged with interactive technology striving for eudaimonia, they felt confident, determined and focused, but also more introspective.

	Variable	Eudaimonia	Hedonia	t-value
	Meaning	.41**	.19*	2.61*
	Importance	.41**	-.03	4.88**
Affect	Positive Affect	.50**	.22**	3.61**
	Joviality	.27**	.43**	2.08*
	Self-Assurance	.49**	.20*	3.60**
	Attentiveness	.37**	-.01	4.21**
	Serenity	.09	.35**	2.99**
	Surprise	.24**	.29**	.03
	Contemplativeness	.46**	.06	4.79**
	Negative Affect	.05	-.18*	2.37*
Needs	Competence	.58**	-.12	8.63**
	Popularity	.45**	.15*	4.68**
	Relatedness	.22**	.06	1.73
	Security	.43**	.13*	3.56**
	Self-Actualization	.47**	.20*	3.33**
	Stimulation	.42**	.38*	.55
	Product	Attribution	.04	.23**
HQ Identification		.32**	.13*	2.16*
HQ Stimulation		.30**	.26**	.49
Pragmatic Quality		.21**	.02	1.88

Table 3. Partial correlations for eudaimonia (controlled for hedonia) and hedonia (controlled for eudaimonia). T-values indicate whether the correlations for eudaimonia versus hedonia were significantly different. * Significant at $p < .05$. ** Significant at $p < .001$.

Eudaimonia was also significantly more strongly related to the fulfilment of needs, except stimulation and relatedness. In particular, eudaimonia correlated substantially with competence, followed by self-actualization, popularity, and security. Since eudaimonia is about seeking to use one’s best [19],

this may suggest that positive ‘eudaimonic’ user experiences are about progressing towards or even achieving this goal, thereby affording increased feelings of competence and security, as well as a sense of becoming more like one’s ideal self (i.e., self-actualization) and being of guidance to others (i.e., popularity).

Moreover, while eudaimonia and hedonia were correlated with hedonic quality stimulation to similar degrees, eudaimonia was significantly more strongly correlated with hedonic quality identification. In addition, only eudaimonia was correlated to pragmatic quality, suggesting that the interactive technology helped users to successfully strive towards their personal goals by being practical and manageable to use.

Overall, hedonia was less strongly associated with positive affect than eudaimonia. However, hedonia was accompanied by greater feelings of joviality and serenity, as well as lower negative affect. In terms of needs, hedonia was most strongly correlated with stimulation ($r = .38$), although to similar degrees as eudaimonia ($r = .42$). Hedonia was also correlated with self-actualization, security and popularity, but significantly less so than eudaimonia. The lack of significant correlations with competence or relatedness suggests that these needs do not play a prominent role for hedonically motivated experiences. Interestingly, in contrast to eudaimonia, hedonia was also correlated with attribution, suggesting that for positive ‘hedonic’ experiences, the interactive technology was more likely credited as the direct source of the positive experience.

Finally, eudaimonia was significantly more strongly correlated with the experience of meaning ($r = .41$) and ratings of future importance ($r = .41$) than hedonia ($r = .19$ resp. $-.03$). In fact, hedonia was not significantly correlated with future importance, indicating that hedonically motivated experiences are not perceived as important in the long-term. In contrast, eudaimonically motivated participants rated their experience as more personally meaningful and were more likely to deem it important one year later. This, together with the strong correlation with positive affect, suggests that eudaimonically motivated experiences in general are perceived as more positive than hedonically oriented experiences.

Contents of eudaimonic and hedonic user experiences

Next, we wished to explore the contents of eudaimonic and hedonic user experiences. However, eudaimonic and hedonic motives need not be mutually exclusive [18]. Thus, we followed the approach outlined by Huta and Ryan [18] and applied median splits to both HEMA constructs (median eudaimonia = 4.25; median hedonia = 4.80). Experiences were thus categorized into one of four possible groups: Predominantly eudaimonic user experiences (above the median on eudaimonia, but below the median on hedonia, $N = 46$; hereafter referred to as ‘eudaimonic experiences’), predominantly hedonic user experiences (above the median on hedonia, but below the median on eudaimonia, $N = 55$; hereafter referred to as ‘hedonic experiences’), those that were both eudaimonic and hedonic (above the median on both eudaimonia and hedonia, $N = 72$), and those that were neither (below the median on both eudaimonia and hedonia, N

= 72). Experiences that scored directly on the median of eudaimonia and/or hedonia were discarded, leaving a total of 245 experiences (see also Table 4). To assess whether the four groups differed significantly in terms of needs and affect, we then calculated a series of ANOVAs and Post-Hoc Scheffe tests. All results of the ANOVA and Post-Hoc Scheffe tests are listed in the supplementary material available at <http://dx.doi.org/10.1145/2858036.2858225>.

Eudaimonic User Experiences

In line with the notion of eudaimonia as the striving towards pursuing personal ideals and developing one's skills, more than half (27 of 46, 59%) of the *eudaimonic experiences* described participants employing interactive technology for learning purposes and/or working towards a personal goal: "I recently came across the Unity3d development platform after looking for a way to write some software but not from scratch code. The amount of value I received from both using the platform and using that to learn a new language has really helped me achieve a major goal I have had". Other experiences were about achieving an accomplishment, often the successful installation of a device, which was also reflected in the correlation between eudaimonia and pragmatic quality: "My positive experience was obtaining a new (for me) iphone from my son who had bought a more up to date one. I was worried I would not be able to use it as it seemed to me to be very complicated. However, it was fairly idiot proof and I am managing to use it and make use of all its functions."

Another relatively frequent theme was helping friends and family (n = 10), for instance, by earning money online or documenting an accident with the smartphone. Four participants also noted that interactive technology gave them more independence: "I got out my phone, pulled up my bitcoin wallet and scanned the QR code. Waited a second and the transaction was complete. I was in control of my funds, not having to rely on some third party".

Eudaimonic experiences were usually deemed to remain important in the future, reflecting the substantial correlation ($r = .41$) between eudaimonia and ratings of future importance. For instance, as in the case of the pedometer app supporting the accomplishment of long-term health goals: "A year from now I hope to be at a more ideal weight and perhaps maybe at five or six miles a day. This will mean I will be much healthier and able to do a lot more without experiencing the aches and pains of an inactive body."

Besides supporting personal goals, eudaimonic experiences were often considered meaningful, because they were a source of confidence, as was also reflected in the competence and self-assurance ratings. Note that participants rarely mentioned the interactive technology itself. For example, after reporting an experience of getting their first smartphone and figuring out how to use it, one participant explained: "It will stay with me that I can manage to do things I didn't always think I could do. That is a good thing to remember next time I put off doing something for a long time. We can sometimes be capable of much more than we originally thought we were capable of doing".

Hedonic User Experiences

The significant correlations between hedonia, joviality and stimulation were also reflected in the majority of *hedonic experiences*: Thirty-three (of 55, 60%) were about entertainment experiences involving digital games or video sharing platforms. Supporting the relation between hedonia and serenity, 11 (20%) participants explicitly mentioned that gaming allowed them to unwind and relax: "[...] playing the video game Skyrim the other day for a few hours, away from my hectic and busy work. Just the enjoyable feeling of being able to escape to a fantasy world, where my actions have no consequences and I have no responsibilities". Moreover, 11 (20%) participants described experiences where they engaged in entertainment activities with friends and family: "I enjoy making memes on my smartphone. The experience is very fun and I like that I can use technology to make people laugh and to interact with my friends in a current way".

In line with the significantly lower ratings on future importance (Post-Hoc Scheffe test versus predominantly eudaimonic group: $p = .023$; versus eudaimonic/hedonic group: $p < .001$), many participants noted that hedonic experiences had little personal impact: "It was just a brief moment of enjoyment that does not matter in the long run. Meaningless fun which has no bearing on the future. It was just for the now, and not the later.". Or "While this experience was nice at the time, it will not matter much in the future. This experience will not help me achieve whatever it is that I would like to get out of life". Several participants also mentioned that while the interactive technology itself was the source of their positive experience, – in line with the significant correlation between hedonia and attribution ($r = .23$), – it would eventually be replaced by another similar product: "It's just a game. Something simple to clear my mind during stressful times at work. In a year I'll probably have moved onto another game".

Experiences that were both Eudaimonic and Hedonic

Experiences that scored high on both eudaimonia and hedonia were characterized by even more pronounced positive affect, need satisfaction, and significantly outranked all other groups in terms of meaning (Post-Hoc Scheffe test versus hedonic group: $p < .001$; versus eudaimonic group: $p = .025$; versus non-hedonic/non-eudaimonic group: $p < .001$), indicating that experiences motivated by both eudaimonia and hedonia are perceived as particularly positive, both in terms of affect and meaning. Of the 72 experiences in this group, 7 (10%) were about earning or saving money, 21 (29%) were about learning and accomplishing things, but another 14 (19%) were also about entertainment experiences. Notably, 19 participants (26%) described more generic experiences, which emphasized how convenient and versatile a particular interactive technology was. Put differently, these devices were valued for serving both eudaimonic and hedonic concerns: "I have access to my e-mail, both work and personal, on the go, and access to instant messaging my friends. Also, it takes great pictures that I can share online with others. It's convenient for watching movies or listening to music in bed on the weekends or at night. [...] I'm no longer constrained to having to sit in front of my desktop or stay late at work to

	High Eudaimonia (N = 46)	High Hedonia (N = 55)	High Eudaimonia / Hedonia (N = 72)	Low Eudaimonia / Hedonia (N = 72)
	M (SD)	M (SD)	M (SD)	M (SD)
Eudaimonia	5.37 (.69)	2.78 (.81)	5.73 (.68)	2.72 (1.06)
Hedonia	3.34 (1.08)	5.93 (.57)	5.92 (.63)	3.09 (1.09)
Positive Affect	4.17 (1.01)	3.74 (1.11)	4.68 (1.20)	3.18 (.97)
Need Fulfilment	2.89 (.65)	2.39 (.77)	3.46 (.85)	2.35 (.78)
Meaning	4.54 (1.37)	4.18 (1.6)	5.42 (1.13)	3.79 (1.79)
Importance	4.67 (1.78)	3.56 (1.88)	5.21 (1.6)	3.82 (1.89)
Attribution	4.09 (1.01)	4.42 (.83)	4.49 (.67)	3.86 (1.03)

Table 4. Descriptive statistics for the four median split groups. Note that total N = 245, because 21 experiences scored directly on the median and were therefore excluded.

accomplish what I want. [...] Overall, the tablet meets every need I could possibly have”.

Even though ratings of future importance were rather pronounced, relatively few people explicitly described their experience as important. Possibly even if the experience per se was not deemed important in the long term, the potential of the interactive technology was still valued: *“I plan to still have my fire tablet a year from now so that I may enjoy reading and doing all of the technical things I do everyday to keep myself entertained and current with the latest technology”* or *“I will probably still be doing this in a year and it won’t seem as amazing unless I stop to think about it”.*

Experiences that were neither Eudaimonic nor Hedonic

Experiences that scored low on eudaimonia and hedonia covered a variety of activities also present in the other groups. For instance, earning money was a common theme (10 of 72, 14%), but with less emphasis on working towards personal goals or helping family. These experiences were typically not considered important and were often described as *“everyday experience, not something that would have profound impact or memories in one year’s time”.*

Curiously, keeping in touch using social media and instant messaging services was the most common theme (n = 18, 25%) in the group that scored low on both eudaimonia and hedonia. Seeing how research in positive psychology provides ample evidence that social relationships also add to life’s meaningfulness (e.g., [6, 31]), we were surprised by this finding. Following Hassenzahl et al. [14, 17], we thus coded all 266 experiences on whether at least one other person was present during the experience. In total, 120 experience reports were identified as ‘social’. Hence, we compared social and non-social experiences by means of an independent samples t-test. While they did not differ in terms of eudaimonia and hedonia, social experiences scored significantly higher on joviality ($t(264) = 2.43, p = .016$) and self-assurance ($t(264) = 2.18, p = .030$). In terms of need fulfilment, social experiences were characterized by significantly higher relatedness ($t(264) = 4.83, p < .001$) and popularity ($t(264) = 3.74, p < .001$), but also stimulation ($t(264) = 2.39, p = .018$) and self-actualization ($t(264) = 2.76, p = .006$). Finally, social experiences also scored significantly higher on feelings of meaningfulness ($t(264) = 2.84, p = .005$) and ratings of future impor-

tance ($t(264) = 3.74, p < .001$). This suggests that participants particularly valued these experiences, even if they were not forcibly eudaimonically and/or hedonically motivated. For instance, one participant in the low eudaimonia / low hedonia group reported an experience about *“being able to FaceTime with my 90 year old grandmother overseas. Due to her age and my lack of money, she hasn’t been back to see me and I haven’t been out to see her [...] Thanks to modern technology I’m now able to FaceTime with her once a week”.*

DISCUSSION

Our study provides empirical evidence that both eudaimonic and hedonic motives appear in user-generated experiences with interactive technology, and that they exhibit different experiential patterns. What we call eudaimonic experiences is related to need fulfilment, long-term importance, positive affect, and feelings of meaningfulness. These experiences are more about pursuing personal ideas and achievements, even in activities as seemingly trivial as setting up a new device without outside help. In contrast, hedonia is largely about “momentary pleasures”, such as unwinding and relaxing.

Our study used the same way of collecting data as several previous studies in UX research (e.g., [14, 17, 27, 29, 30, 37]). Thus, eudaimonic experiences are not new or hitherto uncharted, but probably present in those earlier studies as well. The key contribution in the present paper is to show that they can be differentiated from hedonic ones and that they have several characteristics that are important for human-computer interaction and UX research. We believe that the distinction between eudaimonia and hedonia offers an interesting complement to the distinction between pragmatic and hedonic quality, and some lessons for design. Below we discuss these, as well as some methodological questions and open ends.

The Notion of Eudaimonic User Experiences

One objection to the present study is that several of the characterizations of eudaimonia are simply inherent to the HEMA scale [18]. As the eudaimonia scale explicitly asks about the intention of “seeking to develop a skill, learn, or gain insight into something” or “seeking to use the best in yourself”, it comes to little surprise that (positive) eudaimonic experiences are associated with the fulfilment of the needs for competence

and self-actualization. However, there are several characteristics of eudaimonic experiences that do not follow from the HEMA scale.

Future importance was found to be a key differentiator. As posited by Müller et al. [27], we found eudaimonia to be more strongly related to the experience of meaning. This reflects extant research in positive psychology [18, 19], which has identified meaning as a chief correlate of eudaimonia. Meaning, in turn, has been found to be more valued in the long term compared to pleasure [2, 11, 24], explaining why eudaimonic experiences were deemed more important than hedonic ones. Note, however, that while hedonia was not associated with future importance, it was still correlated with meaning. That is, hedonic experiences were not devoid of meaning. Indeed, pleasurable events may evoke positive affect and feelings of meaningfulness, because positive affect itself may enhance the experience of meaning [25]. Nevertheless, eudaimonia was more strongly related to meaning than hedonia.

The relation of eudaimonia to need fulfilment was substantial. As mentioned earlier, this finding was especially pronounced for competence need satisfaction, and to a lesser degree self-actualization, but popularity, stimulation and security were also salient. Indeed, Ryan et al. [32, 33] largely equated eudaimonia with satisfaction of the needs for competence, autonomy and relatedness. Earlier work has also shown need fulfilment to be a key factor in both satisfying life experiences [34], as well as positive user experience with interactive technology [14, 17, 29, 30, 37].

Hedonic experiences were mainly associated with satisfaction of the need for stimulation, and not considered very meaningful nor important in the long run. Several hedonically motivated participants in our study even speculated that they would soon replace the interactive technology with another one. Concurrently, the relation between eudaimonia and future importance suggests that users are more likely to get attached to technology that supports eudaimonic motives, reflecting Diefenbach et al.'s call "to consider other needs [besides stimulation] as well, which provide potential for more sustained meaningful experience" ([10], p. 311). Need supportive design may therefore not only afford positive affect and meaning [15], but perhaps also serve to inspire and support eudaimonic motivation, as well as facilitate product attachment.

In contrast to the definitions by Ryan et al. [32, 33], however, neither hedonia nor eudaimonia as measured by the HEMA scale [18] was particularly associated with relatedness. Still, social experiences scored significantly higher on joviality, self-assurance, meaning, and future importance. While meaning is considered an important correlate of eudaimonia [18, 19], it seems not exclusive to eudaimonia. Rather, experiences of relatedness seem to be meaningful and important to people, regardless of whether they were motivated by eudaimonic and/or hedonic concerns at all. For instance, playing video games with friends (i.e., hedonia), helping strangers find their way around (i.e., eudaimonia), or simply keeping in touch with family, all constitute examples of social user experiences motivated by different concerns.

Next, the relation between hedonia, eudaimonia and affect is noteworthy and initially puzzling. Negative affect is interesting because it is negatively correlated to hedonia but not to eudaimonia. According to Kamp and Desmet [22], a product featuring mainly hedonic attributes serves the immediate fulfilment of intangible needs and/or disengagement from one's concerns. This partially also applied to our data, as predominantly hedonically motivated participants noted that they engaged with interactive technology for fun and for stress relief, which was further reflected in the correlation between hedonia, joviality and serenity. However, need fulfilment – besides stimulation – was not particularly associated with hedonia. In line with previous conceptualizations of eudaimonia and hedonia in positive psychology [32, 38], it seems that the ends of hedonic user experiences is to first and foremost experience positive affect and reduce negative affect (e.g., by relieving stress or boredom).

Positive affect was significantly more strongly associated with eudaimonia than hedonia. In fact, several psychologists have noted that positive affect is not solely related to hedonia, but that it is both a correlate and consequence of striving for eudaimonia [18, 32, 38]. Hence, it is possible that in eudaimonic experiences, positive affect is more of a beneficial side effect of (successfully) striving towards one's personal best and need fulfilment (see also [14, 17]), rather than the intended goal. Perhaps for the same reasons, Müller et al. [27] did not find any differences between "enjoyable" and "meaningful" user experiences, seeing how meaningful user experiences probably often are enjoyable [25, 38].

Notably, many user experiences scored high on both eudaimonia and hedonia. While some experiences were found to be mostly eudaimonically (e.g., learning something) or hedonically motivated (e.g., gaming), they were also mentioned in the high eudaimonia / hedonia group. This suggests that certain experiences may be motivated by both eudaimonia and hedonia, and that these motives need not be mutually exclusive [18]. Additionally, some participants provided generic descriptions of the functions they value in a particular interactive technology (e.g., a tablet), suggesting that they already value a device for providing the opportunity to account for eudaimonic and hedonic concerns. Moreover, experiences high on eudaimonia and hedonia also exhibited particularly high ratings on positive affect, need fulfilment, meaning and future importance. It seems that when interactive technology (successfully) serves both eudaimonic and hedonic concerns, it results in an even more pronounced positive experience.

Lastly, although the present study was not about design, we believe that the notion of eudaimonia might be of use to the design of interactions that serve, but also evoke and maintain eudaimonic striving. In particular, Zimmerman noted in his paper on designing for the self that "the intended outcome of this approach – making someone feel they are becoming the person they desire to be in a specific role – is a very difficult thing to measure because it is nearly impossible to control for" ([40], p. 403). Similarly, Kamp and Desmet [22] stressed the need for a way to assess the eudaimonic potential of products. The findings of the present study, as well as the HEMA

scale may thus serve as an evaluation tool, and possibly even act as a set of generative questions. For instance, whether and why users would (not) consider a technology important in the future. Much recent work also emphasized designing for reflection (i.e., contemplativeness) and personal meaning making [7, 11]. Seeing how our study found a relation between eudaimonia and contemplativeness, asking users about whether they experience contemplativeness when interacting with a given technology may prove insightful.

Relation to Product Quality and Attribution

Given the contrast of eudaimonia and hedonia, it is worth discussing what, if anything, the notion of eudaimonic experiences offers over the main related concept in current user experience research, hedonic quality. Hedonic quality has been defined as a product's perceived ability to support the achievement of 'be-goals' [13], such as need fulfilment [14]. Yet the present study suggests that hedonic quality as discussed in earlier papers [10, 13] does not clearly map to hedonia. While in our study hedonia was slightly related to need fulfilment, the effect was much more pronounced for eudaimonia.

Moreover, while hedonic quality stimulation (HQS) was related to eudaimonia and hedonia to similar degrees, hedonic quality identification (HQI) was more strongly correlated with eudaimonia. The relation between HQS and hedonia, as well as the comparably low ratings of future importance are in line with the findings of Karapanos et al. [23], who found the importance of HQS to fade over time. Yet, HQS may suggest to users that a particular technology provides a source of challenge, thereby affording opportunities for competence and self-actualization [14], as well as ultimately also serving eudaimonic purposes. The significant correlations of eudaimonia to HQI, meaningful affect and importance also support previous findings: While the impact of stimulation is of shorter duration, identification and reflections about the meaning of the interactive technology remain important [23].

The correlations between product qualities, eudaimonia, and hedonia further suggest that the AttrakDiff scale in its current form – in particular the hedonic quality subscale – accounts for both hedonic and eudaimonic aspects, at least to some extent. In fact, eudaimonia was overall more strongly associated with the individual product qualities than hedonia, which may stem from the wording of the HEMA items. For instance, "Seeking to do what you believe in" and "Seeking to pursue excellence or a personal ideal" recall HQI, as they pertain to matters of identity. Similarly, the item "Seeking to develop a skill, learn, or gain insight into something" may imply (do-)goal-oriented activities, which emphasize pragmatic qualities of technology [13]. Nevertheless, the AttrakDiff scale [12] was developed before many developments in positive psychology (such as the HEMA scale) and more recent UX conceptualizations (such as need satisfaction, [14]), and was therefore not originally intended for assessing hedonia or eudaimonia. Moreover, the notion of the hedonic as conceptualized in the AttrakDiff has its origins in consumer research [10, 13], which traditionally distinguishes hedonic versus utilitarian or instrumental aspects, rather than eudaimonia.

The aforementioned findings also add to the ongoing discussion about motivators and hygiene factors in UX [14, 17, 36]: Hassenzahl et al. [14] described pragmatic quality "as a 'hygiene factor', enabling the fulfilment of needs through removing barriers and, thus, dampening negative affect but not being a source of positive experience in itself" (p. 359). In our study, eudaimonia was more strongly associated with positive affect, meaning, importance, and need fulfilment, suggesting that these experiences were overall more positive than mainly hedonic experiences. Yet eudaimonic experiences also often mentioned instrumental qualities, such as being able to install some software without help due to easy controls and good usability. Moreover, only eudaimonia was correlated with pragmatic quality. This is in line with the findings of Tuch and Hornbæk [36], who found that first and foremost utility and convenience contributed to positive experiences with smartphones. Other than mere 'hygiene' factors [14] – solving problems rather than affording happiness [7], – our results suggest that such instrumental qualities may actually facilitate a positive experience for certain people under certain circumstances.

Attribution was significantly and more strongly correlated with hedonia compared to eudaimonia. That is, hedonically motivated users were more likely to credit the interactive technology as the direct source of their positive experience. In line with Desmet and Hassenzahl's notion of the hedonic as "the design of products that are direct sources of pleasure" [7], it seems that users were aware that the interactive technology (e.g., gaming, videos, etc.) itself – rather than need fulfilment – contributed to reduced negative and increased positive affect.

In contrast, the fact that eudaimonia and attribution were not correlated suggests that even if instrumental aspects did facilitate the positive experience, participants seemed not to consider these aspects the actual cause of their positive experience. From this perspective, the previous statement on "hygienes" from Hassenzahl et al. [14] holds true: In the case of the "idiot proof" smartphone, for instance, the user's feelings of competence and self-efficacy – themselves proof of successfully achieving or working towards one's "personal best", – were likely the "direct" source of the positive experience, rather than the phone itself. Future studies might consider including an additional measure of attribution, asking participants how much the positive experience was due to their own doing.

Limitations and Future Work

It need be kept in mind that the notion of 'eudaimonic experiences' is a shorthand for a set of experiences identified through median splitting. However, median splits have the disadvantage that they do not form clearly distinct groups [20]. For instance, experiences identified as predominantly eudaimonic did not score extremely low on hedonia ($M = 3.34$) in our study. Still, Huta and Ryan [18] were able to generate valuable insights on eudaimonia and hedonia through median splitting, and we believe that such an approach is valid for exploratory studies. Note also that many findings of the present study were based on correlations. While cor-

relational studies have been invaluable in advancing our understanding of UX (e.g., [14, 17, 27]), our survey does not allow for any causal inferences. A key point for future work is to test the results found by the present survey in an experimental study, explicitly asking for eudaimonic (or hedonic) experiences, instead of resorting to median splitting. The experimental approach to critical incident data collection has been successfully employed in several studies [29, 30, 37], but has proven difficult in the one study that attempted to tease apart the eudaimonia/hedonia distinction in UX [27] by asking for enjoyable versus meaningful experiences. Kamp and Desmet [22] formulated a questionnaire for assessing eudaimonic product qualities, but it awaits thorough validation. Hence, one possible approach to experimental manipulation would be to employ questions or keywords taken from the HEMA scale [18].

Similarly, it should be examined whether engaging with the same interactive technology afforded different experiences, depending on whether the user is eudaimonically and/or hedonically motivated. It is already known that the pursuit of ‘do-goals’ and ‘be-goals’ leads to different experiential outcomes [13, 16]. Taken together with the findings of the present study, it seems plausible that people experience, for instance, learning a programming language differently, depending on whether they are seeking (a) ‘mere’ fun (i.e., hedonia), (b) to develop their skill and personal potential (i.e., eudaimonia) or (c) simply because their job demands for it (i.e., for strictly instrumental purposes).

We also find it important to investigate the nature of negative user experiences and eudaimonia. Is there something such as a distinctly “negative eudaimonic experience”? That is, experiences where the user is eudaimonically motivated, but does not successfully achieve or progress towards their goals. Findings from positive psychology would suggest that people still considering such experiences important and meaningful [2], even in the absence of need fulfillment and positive affect. More importantly, these insights could point towards how to design for evoking and maintaining a eudaimonic mindset in users through interactive technology, even in the face of hardships.

Moreover, the present study asked participants to *recall* a positive experience involving technology. We deemed this a useful approach to studying eudaimonia and hedonia in user experiences, because it was expected that meaning-making had already occurred to a certain degree [2, 18, 24]. However, it would be interesting to study eudaimonia in the moment-to-moment experience. Similarly, future research may investigate how eudaimonic and hedonic motives influence the development of meaning in UX over time, which might provide further insights on product attachment [11, 23, 40].

Finally, the notions of eudaimonia and hedonia are inextricably linked to well-being [6, 18, 21, 32, 35], and it has been argued that design can contribute to well-being through different means [8]. Recently, Partala and Saari [30] included measures of well-being in their study of user-generated experience reports. Unsurprisingly, participants reported significantly higher well-being for experiences about success-

ful (versus unsuccessful) technology adoption. It remains to be seen whether and how eudaimonic and hedonic user experiences actually impact people’s well-being. Positive eudaimonic user experiences likely impact well-being through supporting people’s life goals. However, hedonic user experiences may also contribute to well-being [18, 31], as showcased by the following quote from our study: “*I would not say that the experience was particularly important as it did not have a hugely significant bearing on my life, however I don’t think it is absolutely unimportant as finding a new way in which to keep myself occupied during long journeys that may otherwise serve to lower my mood somewhat has served to put me in a better mood as I have been distracted and entertained, and the overall mood improvement, however small, may have a small impact on my general mood and sense of well-being.*”

CONCLUSION

The distinction between eudaimonia and hedonia is ancient and plays an important role in positive psychology. In HCI it has not been successfully used to characterize user experiences, despite a promise to deliver conceptual clarity about positive experiences as well as validated scales to study it empirically.

We have shown that eudaimonic and hedonic motives can be distinguished in user-generated descriptions of critical incidents with interactive technology. We have further characterized their content and their striking differences with respect to affect, need fulfillment, and long-term importance. The distinction helps further conceptualize and empirically explore seemingly different experiences, such as those giving momentary pleasures or lasting meaning. This expands our understanding of positive experience and will lead to exciting new opportunities for experience design.

ACKNOWLEDGMENTS

Special thanks to Julia Ayumi Bopp for assisting with the coding and statistical analysis. We are also very grateful to Alexandre N. Tuch and the reviewers for their comments on earlier drafts of this paper.

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