

Psychosocial Drivers of Technology Engagement among Cybersensitives

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Introduction

Psychosocial Drivers of Technology Engagement among Cybersensitives draws upon the ethnographic observation and psychosocial interviews conducted during Phase I of the *Cybernetic Research across California: Documenting Technological Adoption and Behavior Change across Diverse Geographies and Populations to Inform Energy Efficiency Program Design* (Cybernetic Fieldwork) project. Our primary goal with Task 3 was to show that cybersensitives are identifiable because they interact with technology in their everyday lives with more intensity and engagement than do others in their demographic cohort.

In this report, we discuss the method used in the analysis of interviews in detail. We also present the ethnographic data from in-home observations, and discuss how it fits with the interview data to form a picture of what or who a cybersensitive person is. In this paper, we show how individuals persistently clustered into groups of 'cybersensitives,' 'cyberawares,' 'mainstreams,' and 'nulls' in our analysis. These clusters appeared when we sorted by frequency of codes in the interviews, and they were present across both cohorts. Our analysis focused on three major themes of the interviews, psychological factors, energy consumption attitudes and behaviors, and device purchase and usage. The more cybersensitive someone is, the more they spoke on one or more of these topics; this holds true despite the fact they were all asked the same set of questions, and there were two ethnographers conducting the interviews in separate parts of the state¹. This clustering was strongly visible in the data from the in-home interviews (code frequencies) and in the in-home observations made by ethnographers. It was weakly visible in the survey answers. Planned future work (already underway) will more stringently correlate selected sets of interview answers with survey answers via cross-tabulations in SPSS.

Our other main goal with this Task was to name the specific psychosocial drivers of cybersensitive behavior. Cybersensitives have several things in common: they tend to be meticulous, planner-types. They care a great deal about their homes and overall lifestyle. They are busy people with multiple revenue streams, multiple hobbies, and a taste for lifelong learning.

Background

The Cybernetic Fieldwork project, examines how people use technology in their everyday lives and what this means for our future energy consumption. 'Cybernetic' refers to the appearance of feedback loops, either positive or negative, that influence or intensify the behavior of people in response to their environment. We believe that cybersensitives and cyberawares are people who show a greater responsiveness to information about their energy consumption and usage patterns, when delivered via a device such as a smartphone, tablet, laptop, desktop computer, in-home device, thermostat, or even security system. It is our hypothesis that this group of people can be identified by the shared attitudes and behaviors towards the technology in their lives, that sets them apart from their demographic peers (organized by age, class, or geography).

To prove the validity of this hypothesis we, a team of cultural anthropologists and research analysts, have been exploring the world of cybersensitives and cyberawares. These are people we

¹ We address the potential for researcher bias in a later section.

believe have a greater emotional connection to their phones, tablets, and other personal technology such as ‘wearables’ (think Fitbit).

At the outset of this research, based on research we had conducted for the ACEEE publication, *Recent Results From Real-time Feedback* (Foster and Mazur-Stommen, 2012). In that paper, we conducted a meta-review of studies that looked at energy savings in conjunction with devices providing real-time feedback, often referred to as In-home Displays (IHD). We argued that there was evidence across this variety of studies showing that certain types of individuals registered much higher than average savings, and that there was an ‘x’ factor at work, which we termed ‘cybersensitivity.’

From the data in that paper, as well as other literature on the subject, we had estimated that about 10% of the population might be cybersensitive, while another 10% could fall into the cyberaware category—people who also have a higher than average affinity for technology, just not as high as cybersensitives. In the case of *cybersensitives*, there is a recurrent pattern of individuals returning greater than average energy savings, e.g., 8.1% versus a control group result of 0.8% (Grønhoj and Thøgersen, 2011). However, the means, mode, distribution, and precise frequency of these *cybersensitive* individuals are open to question, as are other factors such as the presence or absence of a technology in the home (Carroll, Lyons, and Denny, 2013). Allcott discussed a similar effect in his 2011 paper writing that, “...effects are heterogeneous: households in the highest decile of pre-treatment consumption decrease usage by 6.3%, while consumption by the lowest decile decreases by only 0.3%” (Allcott, 2011)

However, at this stage in the research, we now believe the entire group may make up as much as 30% of the population. As we discuss below in our findings, we found that the group of both cybersensitives and cyberawares made up 30% of the Southern California cohort, and 35% of the Northern California cohort. As outlined in the *Preliminary Ethnographic Report on Cybersensitives and Technology Detailing the Fieldwork and Early Findings* (Mazur-Stommen et al., 2016), our recruitment strategy for conducting in-depth interviews, or IDIs produced a set of respondents who are demographically representative for their region.

Literature

This report dissects the data collected during the Phase I interviews. We conducted in-home interviews to understand device purchase and usage, energy consumption, interaction with the utility and energy data, and psychosocial attributes. From this data, we aimed to find characteristics that were representative of the cybersensitive mindset, in such a manner distinguishable from their peers and neighbors based on their attitudes and behaviors.

Psychosocial and psychoanalytical research focuses on the thoughts, feelings, and behaviors mutually present both in the unconscious and conscious minds. This research draws on psychodynamic/psychoanalytic theory to analyze forces both from social and cultural perspectives especially as they affect the development of the ego, understand outside influences that affect individuals, and look at perceived responses from external stimuli as they affect the ego (Robinson, 2012).

Psychosocial method and practice is in its infancy, so there is not a large literature dealing with the types of questions we have been interested in exploring. The closest literature we could find had to

do with applying the theory to investigate media exposure (exposure to multiple media forms, such as television, internet, newspapers, social media) and technology use. Roberts and Foehr (2008) reviewed several studies evaluating psychosocial predictors of media exposure to understand the linkages between media use, academic performance, and personal adjustment. Fitton et al. (2013) conducted interviews with 128 youth to uncover how the students perceived the impact of information technology (IT) use on their development.

Methodology

Ethnography starts with observation, and it always includes direct interaction with members of the studied group. From that interaction, and interviewees' answers to our questions, we formulate hypotheses. Our hypotheses are thus highly empirical, based upon actual observed behavior rather than assumptions, models, or speculation. This method is excellent for offering useful, valid insights into the range of behavior possible in any given situation. This method also helps us capture outliers: activities that may not rise to the surface using another form of data collection.

Many people argue the value of qualitative vs. quantitative data, but in the end this argument carries very little weight because, as we will show, "all qualitative data can be coded quantitatively."² This type of analysis is referred to as 'mixed methods'³ and is one we practice in this paper.

Phased Approach

We designed and conducted our ethnographic research plan as two phases. We had two teams, an 'Ethnography' team focused on Phase 1, and a 'CSU' team focused on Phase II. In Phase I, two senior anthropologists, and the principal investigator deployed a survey and conducted ethnographic interviews. As described in our Task 2 Deliverable, the *Preliminary Ethnographic Report on Cybersensitives and Technology Detailing the Fieldwork and Early Findings* (Mazur-Stommen et al., 2016), the survey and interviews focused on questions around device purchase and usage, energy consumption, interaction with the utility and energy data, and psychosocial attributes.

In Phase I, we surveyed 400 people, drawn from across the country, and interviewed⁴ 51 residents of California in depth. Phase I was 'formalized,' meaning that there was a common interview guide we used, and a consistent process defined in advance by team members for conducting the interviews. There was a shared process for data collection, transfer, and storage. Field notes, recordings, photographs, and transcription were all processed in a systematic manner. Phase I, while overall one of the longest stages in calendar time, we describe as 'shorter' because it refers to the amount of time the anthropologist spent with the participants, usually ranging from two to four hours at most.

Student energy observers drawn from across the California State University system are staffing Phase 2, which began in August 2016 and will wrap up in August 2017. The diverse cohort stands for college campuses scattered across California. We recruited rising seniors and early graduate

² <http://www.socialresearchmethods.net/kb/qualdeb.php> Accessed 2/22/17

³ <https://researchrundowns.com/mixed/mixed-methods-research-designs/> Accessed 2/22/17

⁴ Interview guide is available in the *Preliminary Ethnographic Report on Cybersensitives and Technology Detailing the Fieldwork and Early Findings*, Appendix A, <http://indiciaconsulting.com/downloads/Report-on-Cybersensitives-and-Technology.pdf>

students from the disciplines that train and practice in ethnographic methods. Primarily, these were anthropology and sociology students, but we were also open to psychology and behavioral science majors. Students provided us with faculty recommendations and completed university coursework in qualitative methods prior to acceptance into the program.

Each student created their own research proposal that included participant-observation over longer periods of time. We created an online course in qualitative methods and the goals of this project, and students took the course using an online module hosted by San Diego State University's Language Acquisition Resource Center. These student researchers are 'embedded' within California communities of their choosing. In contrast to Phase I, their fieldwork processes are more naturalistic, immersive, and of longer duration. Student projects included an examination of fitness culture and wearable technologies, a comparison of solar panel owners vs. lessors, and an ethnography of a group of Southeast Asian refugees who temporarily lacked water and power in their Fresno apartment complex. Student biographies are online at <http://www.indiciaconsulting.com/students>.

Progress to date

We conducted fieldwork in both Northern and Southern California between October 2015 and December 2016, primarily in the territories of Marin Clean Energy, Pacific Gas & Electric, and Southern California Edison. Northern California fieldwork ran from October 2015 through April 2016. Southern California fieldwork began in April 2016 and concluded in January 2017. Time in the field totaled eighteen months.

In Northern California, we focused on the San Francisco Bay Area, specifically targeting the territory of one of our partners, Marin Clean Energy, in Marin and Richmond counties. As of November 21, 2016, we had completed 23 ethnographic interviews. We found that the sample choice process (discussed in our Task 2 report: link in the introduction) yielded a set of interviewees whose median age and income of matched that of the general Marin population (Marin pop. 45 years & ~\$91K). Following the completion of the Northern California fieldwork, we fully transcribed and coded the interviews using the software program Atlas.ti. We will discuss this process in more detail below.

Lacking a utility partner in Southern California, we were less constrained geographically. However, at the same time we were more dependent on 'snowball sampling⁵' as opposed to recruiting using lists given by a utility partner. The nature of snowball sampling depends on social networks, and therefore introduced some geographic constraints (e.g., Long Beach) as well as personal ones (e.g., the gender of the ethnographer). We also pursued the same recruitment techniques outlined in our earlier report (social media, emails, non-utility partner lists) as an attempt to mitigate any skewing introduced by these circumstances.

This report focuses on the analysis of the Phase I data. This includes the responses made by our interviewees to both the questions on the web survey, and during the in-depth interviews (IDIs) held in people's homes. We used the survey to recruit people to take part in the research, and as a preliminary means of stratifying them in terms of cybersensitivity. A total of 446 people took the

⁵ Snowball sampling is a non-probability sampling technique where existing study subjects recruit future subjects from among their acquaintances. Snowball sampling uses a small pool of initial informants to nominate, through their social networks, other participants who meet the eligibility criteria and could potentially contribute to a specific study.

survey between October 2015 and November 2016. From that sample, we interviewed 51 people in their homes (for details see the Task 2 Report, link is in the introduction).

Survey vs. Interview

One of our analysis methods was to review the survey answers given by our participants and look to see if patterns would emerge with respect to their cybersensitivity (or lack thereof). When we administered the survey, the senior anthropologists did the initial stratification of potential interviewees. They coded respondents to the survey green for potential cybersensitive, yellow for potential cyberawares, and red for no obvious cyberawareness or cybersensitivity, just as we would later do for the codes from interviews. Having separate color coding based on the results of the source allowed us to combine the two and review how well the survey functioned in terms of predicting cybersensitivity

The survey did *not* do a good job of predicting cybersensitivity. There are several reasons for this, including the fact that people answer surveys differently from interviews⁶. However, the main issue is that, as the first ‘temperature-taking’ device for this project, our conceptions around what would form the observable characteristics of cybersensitivity were still nascent. Half of the questions on our survey asked about device ownership and usage, with the other half probed attitudinal factors. The senior anthropologists focused primarily on the presence or absence of specific devices (e.g., smartphones, laptops) in making their initial assessments. However, as one of them later observed after conducting the in-home observations:

“Don’t get hung up on the device itself or the number of devices they own. Devices are just proxies. Focus instead on their feelings about the device, what it represents in the respondent’s mind, and their attitudes/behavior towards the device. Look to what motivations it invokes and whether they are detail-oriented with their usage.”

Process

Interviewing is the primary technique used in ethnography. Interviewing can mean applying a set questionnaire (closed-ended interviewing), free-ranging questions and discussion (open-ended interviewing), or anything in-between. We used a semi-structured interview style, whereby the anthropologists study the interview guide thoroughly before the interview and then apply it in an improvisational manner. The anthropologist does not allow the interview to end without getting all the questions answered, but allows some free play to happen, so the interviewee can get clear about meanings, discuss points, and clear up any ambiguities arising during the process.

Each interview followed a similar process, outlined in detail in Appendix A in the “Preliminary Ethnographic Report on Cybersensitives and Technology Detailing the Fieldwork and Early

⁶ One might think people would be more likely to be honest on surveys where they are anonymous, and lie to people who are asking them face to face, but our experience suggests the reverse is the case. Ethnographers work to establish rapport and trust with participants. Many participants even report feeling as though the interview experience is ‘therapeutic’. The more open-ended nature of IDIs encourages participants to take the lead in the discussion, and allows them to answer on their own terms, something that promotes candor.

Findings.”⁷ Each interview was of similar duration: most interviews lasted 90 minutes, with a few lasting up to 120 minutes, and included a walkthrough of the respondent’s home. The length of the interview depended on how engaged the respondent was with the questions, and how much they decided to share. The interviews followed the same protocol: introductions, signing consent forms, house tour, and finally the in-depth interview. We took photos during both the house tour (appliances, larger items such as televisions, thermostats with settings) and the IDI (phones, tablets, laptops). We recorded audio from all interviews. Post interview, the anthropologists produced field notes of any specific impressions they wanted to capture, such as environmental surroundings, house descriptions, personalities. We used these post-interview write-ups to form the basis for our section on in-home observations.

We refer to the entire set of data collected during the IDI process as ‘fieldwork data.’ We stored fieldwork data in a secure Dropbox to which only the senior anthropologists and program management have access. Senior anthropologists systematically ‘checked out’ data files to the analyst supporting them, and then checked them back in again. All personnel have also signed contracts stipulating their willing adherence to best practices in data privacy and security.

Analysis

Transcripts

We completely transcribed each interview. A complete transcription was necessary to analyze them using the Atlas.ti software. Atlas.ti is the project’s qualitative data analysis software tool. Such tools allow researchers to transcribe, analyze, code, map and annotate interviews. They offer quantitative reports showing data aspects such as frequency of codes. These outputs and our interpretation thereof form the backbone of this report.

The team developed codes to reflect and capture the topics, themes, and patterns in each interview. These codes were a collaborative effort among the senior anthropologists and the principal investigator. Each code stands for a topic or theme in the conversation. Coding the interviews allows us to more easily find and document details, such as the number of times a topic or theme recurs, and the distribution of topics and themes across various participants. We can then extract quantitative information from the fieldwork data, and make direct comparisons across question types, participant types (cybersensitive or not) and collection instrument (survey vs IDI).

Codes

The IDIs drive the definition of the codes. We do not develop codes ahead of the interviews. We take turns reviewing the interview data, whether in audio format or post-transcription, multiple times. For consistency, we held a discussion about what we saw in the interview data, and how we might want to code the topics and themes.

⁷ Interview guide is available in the *Preliminary Ethnographic Report on Cybersensitives and Technology Detailing the Fieldwork and Early Findings*, Appendix A, <http://indiciaconsulting.com/downloads/Report-on-Cybersensitives-and-Technology.pdf>

“Mostly, though, researchers who consider themselves part of the qualitative tradition in social science induce themes from texts. This is what grounded theorists call open coding, and what classic content analysts call qualitative analysis (Berleson 1952) or latent coding (Shapiro and Markoff 1997).”
(Ryan and Bernard, 2003)

For example, here is an excerpt from a transcript:

And then I turn my phone off when I go to bed unless I need it for the alarm which is very rare, and (my husband) does not turn his off but he does not like look at it in bed so I know some people check email in bed and we don't do that so we cut it off and then we turn the power strip with the internet off at night just to not be consuming that electricity.

We reviewed this transcript and highlighted the section discussing a specific energy saving behavior. Later, when another anthropologist reviews the transcription data, she may come across another instance when the interviewee referred to this behavior. This is something the interviewee wanted to get across, so it is a salient topic. We can code the transcript for ‘energy saving behavior’ and in Atlas.ti it ends up looking like this:

P 1: HG XXXXXXXX Transcript - 03Dec2015.docx - 1:2 [We have these typically all of..] (60:60)
(Super)
Codes: [Energy saving behavior]
No memos

We have these typically all of our electronics on power strips and we turn them off at night or when we are not using them so we turn our internet off at night. And I think that (my husband) wakes up and he turns on the power strip which then powers up the internet

Our goal with these interviews is to elicit conversations about technology usage, the emotions it elicits, and any relevant energy behavior. Regular touchstones in the conversations become codes⁸ because they show up independently of any one participant. Once we transcribe and code a set of interviews, it becomes possible to output various reports and to analyze the interview data in aggregate using Atlas.ti. The data can be sorted by all interviews, verbatim, broken into coded segments, by either code type or ordered by transcript. We then organized the codes into three larger families: ‘device’ codes, ‘energy’ codes, and ‘psych’ codes, to represent the main themes, or cultural domains (more on this below), under discussion.

Frequency counts

In addition to the reports mentioned above, Atlas.ti provides frequency counts of codes, organized by interviewee, which are export to Excel documents. Frequency counts are a common method in cognitive anthropology:

⁸ A complete list of all codes entered into Atlas.ti is offered in Appendix A. A list of the Psych codes and their definitions is available in Appendix B.

Words that occur a lot are often seen as being salient in the minds of respondents. D'Andrade notes that "perhaps the simplest and most direct indication of schematic organization in naturalistic discourse is the repetition of associative linkages" (1991:294). He observes that "indeed, anyone who has listened to long stretches of talk, whether generated by a friend, spouse, workmate, informant, or patient, knows how frequently people circle through the same network of ideas" (1991:287). (Ryan and Bernard, 2003)

With the frequency counts of codes in Excel spreadsheets, we sorted by interviewee, to see who was speaking on which topics during the interviews, and how salient said topics were for them. Sorting in this manner showed “clusters” of the same people at the top or bottom of the three categories (Device, Energy, Psych). The clusters show a patterned relationship among responses.

As mentioned above, we ask everyone the same base set of questions. Despite this, we see codes differentiating by frequency. As we discuss in more detail below, the same people consistently clustered in the top of the ranking regardless of topic. A few outliers changed places on one or another topic, but in general, the same people had the most codes or conversely the least codes, regardless of category.

Creating a 'heat map'

We wanted to show intensity of response in terms of frequency across categories, so we assigned colors to different groups where the responses followed certain patterns (described in detail below). This allowed us to build a 'heat map' delineating the respective ranks and relationships among groups. The colors assigned reflect the intensity of the cumulative response within a category as compared to their peers.⁹

Conditions/Rules

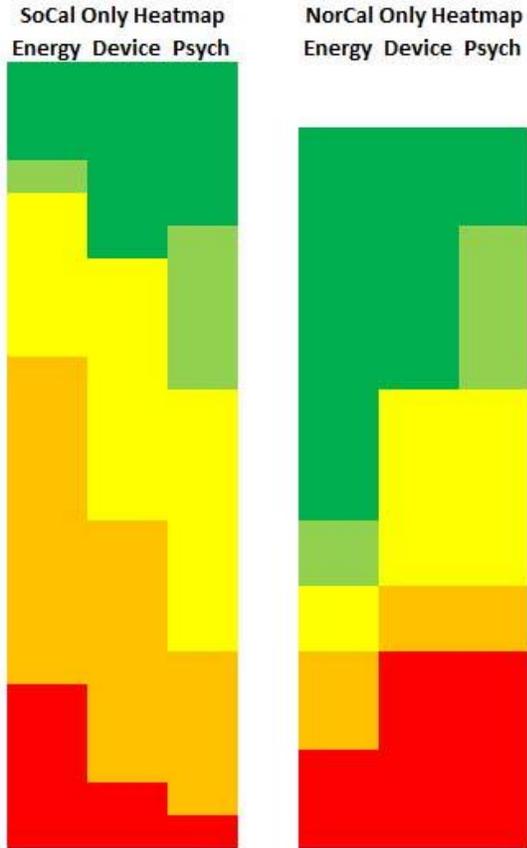
We could have imposed an arbitrary cutoff (e.g., top five, bottom ten) to stand for ranks in each category. Instead, we looked at what conditions, or rules, underlay the pattern of responses. Extrapolating the rules that generate the patterns allowed us to re-run them and make predictive, testable, statements about human behavior. Think of these as being like the rules¹⁰ in programming logic, i.e. “if this, then that” statements. Understanding these would allow us to incorporate these conditions into our future Ethnographic Decision Tree Model, which we are building out in a later Task on this project. It also preserves the relationships both within categories, as well as across them.

Heat map vs rank

Color coding respondents illustrates the intensity of response and the gradients of intensity, much like isobars and isotherms on a weather map.

⁹ One concern the team had was that the respondents who were particularly interested in energy would skew the results. While they did register as 'deep green' on the energy questions, the presence of the other two categories meant that in aggregate they were assigned the appropriately nuanced rank.

¹⁰ The rules are not final, and should not be construed as absolutes. They are tools for understanding the conditions that underlay a pattern, and for generating future models.



"Isobars and isotherms are lines on weather maps which represent patterns of pressure and temperature, respectively. They show how temperature and pressure are changing over space and so help describe the large-scale weather patterns across a region in the map...Isobars and isotherms make it easier to read and analyze weather maps. By looking at patterns of temperature and pressure, you can determine weather conditions in the next few days ahead." (NC State University, 2010)

So too, our heat map shows patterns of intensity and engagement with the category (Psych, energy, device) under discussion, and thus make it easier to read and interpret the findings.

So why did we not simply rank respondents in terms of the total number of responses? Each category stands for a different cultural domain¹¹. Ranking people in terms of responses within a given cultural domain makes sense, in that it shows a level of interest or engagement with the topic as compared to others in a cohort. However, comparing ranks across different cultural domains

¹¹ We go into the nature of cultural domains extensively in the first edition of the ACEEE Field Guide to Utility-run Behavior Programs (Mazur-Stommen and Farley, 2013). There are several ways to define a cultural domain but a good starting point is: a set of items that are of the same type. For example, "animals" is a domain. The members of the domain of animals are all the animals people are aware of, such as dogs, cats, horses, lions, tigers, etc. Implicit in the notion, however, is also the idea that membership in the domain is not solely determined by the individual respondent, but that it exists "out there" either in the language, in the culture or in reality. Language is a guide to social reality, because the 'real world' is built upon language habits.

does not result in anything useful. With such a small sample in each cohort, the ranks do not tell us very much, nor do they align across divergent cultural domains.

The rules that we used to define membership in a ranking are applicable within similar domains but also across regional cohorts. In both cohorts, for example, we show that certain individuals gravitate towards the top or bottom rankings in terms of intensity and engagement with the cultural domain topics. This is supportive of the idea that these individuals experience different emotional registers irrespective of topic. The in-home observations offered evidence that these distinct emotional registers manifest themselves in distinct lifeways and behaviors with respect to the home and self, behaviors that have impact on energy profiles for the household.

Psych category

We had 21 codes in the category of 'psych' that we looked at for the purposes of this task. The frequency of code totals in this category ran from zero (CK, JJ) to 42 (HG). If a respondent gave 20 or more responses in this category we considered them to be Cybersensitive (deep green) for this category only¹². Cyberaware (light green), is defined by multiple codes having more than one response. Mainstream (yellow) requires a minimum of five responses. Those people who gave a maximum of two responses across a set of 21 codes we considered to be Null (red) with respect to cybersensitivity.

Energy category

There are nine 'energy' oriented codes. The frequency of response totals in this category ran from three (JJ) to 27 (HG). At the cybersensitive end of the spectrum, the interview data was yielding up to three responses apiece across all nine codes. In terms of category totals across the entire group, *energy savings* had the most codes, a total of 47, followed by *energy tracking* with 29. *Saving money* generated the fewest codes, a grand total of two out of 217. It suggests that saving money is not a driving factor to our group of interviewees with respect to energy.

Cybersensitives (deep green) were people with four to five codes in individual categories and/or a total of at least 10 codes. Cyberawares (light green) were those people who had threes in some categories, with a minimum of eight responses. People who gave more than one code per category with six minimum we saw as Mainstream (yellow). Those people who gave a maximum of three or four codes across all nine categories we considered to be Null (red) with respect to cybersensitivity.

Device category

There are 10 device codes. The fewest number of codes was three (AM) and the most was 21 (DMC). This category was a bit trickier to analyze, because someone could have an overall higher score by being extremely passionate about ONE area, thus appearing to be more 'into' devices than they really are (in general). A good example would be CK, who had five codes for 'older tech' but zero in seven of the nine other categories. Cybersensitives (deep green) were people with least one code in six different categories. People with codes in a minimum of five categories we saw as Mainstream (yellow). Those people who had codes in three or fewer categories we considered to be Null (red) with respect to cybersensitivity.

¹² We discuss how we combined the category level results to assess overall cybersensitivity in the Results section.

Results

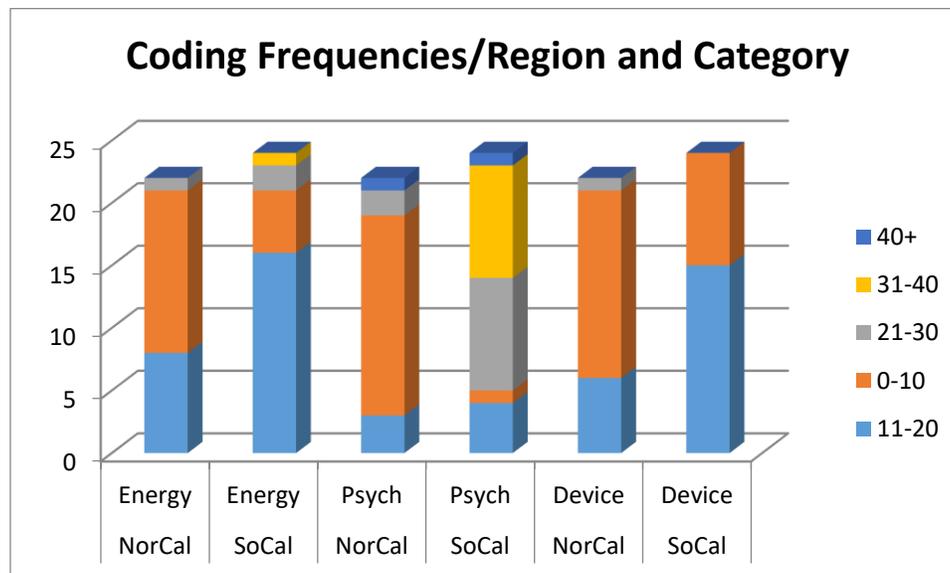
We used the data from in-home observations and Atlas.ti coding to explore how interviewees interact with technology in their everyday lives and to figure out the psychological drivers behind that usage. The findings from in home observation agree well with the results from Atlas.ti coding and sorting results.

Atlas.ti

In this section, we examine the results from coding interviews in Atlas.ti, counting the frequencies with which codes appeared, and what we feel these counts stand for. In terms of ranking cybersensitivity across all three categories, we gave more weight to the psych category, as our definition of cybersensitivity primarily rests upon the existence of a strong and potentially measurable emotional/psychological relationship with technology.

Difficulties comparing Northern and Southern California

Southern California had slightly more interviews total, and a few of those had multiple respondents, so the codes collected were for the household. Overall, the Southern California cohort had more codes per interview in absolute terms. For example, our Southern California cybersensitives had more responses than did the Northern California ones -- in the Southern California set there were ten respondents with over 30 responses in the psych category, whereas Northern California only had one such respondent. Similarly, our Southern California nulls had more responses than the Northern California nulls; a 'null' thus was someone with less than 10 responses, though some nulls truly had zero responses in some categories.



The staggered sequence of fieldwork means that Southern California interviews occurred with insights that we had gleaned from Northern California already in hand. Further, two separate anthropologists, each with their own sets of skills and strengths, conducted the cohort interviews. The effect was that Southern California cohort was *perhaps* probed more deeply, elicited more thoroughly, than was the Northern California cohort. The anthropologist entering Southern California data into Atlas.ti also saw the need for additional codes in order to comprehensively

document the IDIs she conducted. The addition of codes meant that more nuanced qualitative analysis is possible, but made strict comparison of frequency counts problematic. For example, as mentioned above, there were more codes in the same categories for Southern California than for Northern California. However, specifically there were many more codes recorded for the 'pragmatic' category in Southern California than for Northern.

Bias?

Ethnography is a phenomenological practice, where data is collected by embodied practitioners, each with their own personalities, worldviews, and experiences. We had to ask ourselves: did one anthropologist probe more, while the other delivered the script more strictly? Was one anthropologist 'looking' for cybersensitivity more so than the other? And, if so, how would these effects show up in the data and what could we do about it?

Our first step for this stage of the analysis was to reduce the Southern California codes to match those for Northern California. We then used the same rules on the categories (Psych, Energy, Device) as we had named for Northern California. We ran our analysis two ways: once including the 'pragmatic' code in the Psych category, and once including it. Both outcomes (with and without pragmatic) came up with same names/rankings. We also reviewed the simple rankings as well as rules outcomes to make our final assessment as to who qualified as cybersensitive, cyberaware, mainstream, or null.

Treating both data sets with the same set of rules reduced any bias due to ethnographer practice. We know this because despite the super-abundance of coded responses for Southern California (particularly in the 'pragmatic' code) our analysis revealed that there was a lower percentage of cybersensitives in the Southern California sample than in the Northern California sample:

12.5% to 22.7%.

Conversely, there were slightly MORE cyberawares in the Southern California cohort than in the Northern California cohort:

16.7% to 12.5%

In both cohorts, the joint set (cybersensitives plus cyberawares) as a percentage of the whole was close, but there were still slightly fewer in Southern California than in Northern California:

Southern California 30.2%

Northern California 35.2%

This outcome contradicts the idea that the Southern California anthropologist introduced bias into the interview process by looking for cybersensitives. Had a bias been introduced, we should see at least matching percentages across the cohorts, if not greater percentages in Southern California.

Cybersensitives

Based on the coding and analysis described above, we found five cybersensitives in Northern California and three in Southern California. Deep green in Psych category was considered to be the strongest indicator of cybersensitivity. People who were deep green across the board, or two deep greens and one light green were automatically considered to be cybersensitive.

The strongest cybersensitive we spoke to across both cohorts is HG. She ranked number one in psych codes with 42 instances. She ranked second in energy codes with 27 instances. Finally, she ranked number two with respect to device codes, with 20 instances – only beaten out for the top spot by one other participant. HG was deep green across the board. ANV was the strongest SoCal cybersensitive, with two deep green and one light green. She ranked first in Device category, fourth in Energy, and Fifth in Psych.

Cyberawares

We found four cyberawares in Southern California and three in Northern California. Cyberawares had to have at least one deep green or two light green categories. They did not rank as cybersensitive due to the presence of an orange or red category. For example, NZ would be a cybersensitive, with two deep greens, but she scored red on devices. ZP also would be a cybersensitive, with a deep green and a light green, except for a red in energy.

JC's survey answers suggested he might be cyberaware. The codes also ranked him as solidly light green in psych codes (ranked fifth) and light green in terms of energy codes. He scored low in terms of device codes (rank eighteenth), which was surprising to us considering that he works as a hardware engineer. We discuss the role of technical training and our belief in how it affected responses below.

Nulls

At the **other** end of the scale, we have a cluster of individuals who we feel showed NO inclinations toward cyber-awareness or cybersensitivity. We termed these individuals 'Nulls' as they show little or no propensity towards cybersensitivity in terms of their code frequencies.

We made our conclusions regarding rank primarily based on the coding and sorting of Atlas.ti codes. Nulls have at least one or more red categories, leavened potentially by an orange¹³. They scored below ten in terms of psych category responses, sometimes nothing. As an example, JJ was deep red in all three categories. He was last place in the energy category with three responses (compare with HG's 27). He was fourth from the bottom in terms of device codes, with six responses. Similarly, CK tied for last place in psych codes with zero responses. Despite his career in an energy-related profession he only ranked in the middle of the pack (eight) for energy codes. CK's low rank for devices was also interesting, considering his work is technical in nature.

In Home Observations

Based on our observations and interpretation of the conversations during the interviews, we describe cybersensitives as 'fastidious' and 'pragmatic.' This aligns with the 'psych' category in the Atlas.ti coding where we found that the highest number of mentions were 'fastidious,' 'pragmatic' and 'passion.' These characteristics of cybersensitivity show up in multiple areas of respondents' lives. Cybersensitives value order to their lives and are more concerned about what item goes in which location. For example, CJ likes to be 'in control' of her surroundings. Homes that are

¹³ We have scored people orange in our analysis, for nuance, but in this paper they have been folded into yellow as mainstream.

extremely unorganized/unkempt are *not* likely to be cybersensitive, with MLP and CK being good examples of this.

Interviewees knew how to use technological devices and they use them intensively. Cybersensitives often have multiple computers in use in the home, and not just work computers vs. home computers, but multiple personal computers, often with multiple screen setups. When we asked about data plans, ONLY cybersensitives answered 'more than 5GB.'

Cybersensitives tend to use their devices both as intended, but they also invent ways to use their devices to extend the benefits they offer. Building 'home brew' devices is a common activity among our cybersensitives. JA builds his own computers to achieve his precise specifications.

Cybersensitives are not afraid of unconventional or imaginative ways to extend the uses of technology. We interviewed a father and daughter¹⁴, and NZ said that she would like a water bottle that beeps if she is not drinking enough water throughout the day. Meanwhile, PZ would like a watering system for his garden hooked up to a weather report and automated.

Purchasing

One thing the cybersensitives and cyberawares in our set have in common is that they are planners and implementers. As we have stressed, the characteristics of being a cybersensitive do not include being an early adopter or a lover of gadgets. We found them to be methodical in their decision-making, especially around technology adoption and usage. All cybersensitives answered affirmatively to the question, "I wait for new technologies to be somewhat widely adopted before adopting them myself."

Cybersensitives tend not to buy new devices for novelty's sake; for cybersensitives, technology solves problems or provides them with solutions rather than entertains or enhances status. These interviewees are very practical in their decision-making and articulate well thought out rationales for their purchases. RR tells us that he, "owns the devices he needs, but if he had more money, he would update a few of them."

DW has a schedule to buy new devices as soon as they "don't do what they are supposed to do." Meanwhile, KST only purchases devices that he 'needs' although there are a few devices that he likes because they are 'fun,' such as the Amazon Echo, because "it takes voice commands." CJ goes about her purchases and decision-making in a very systematic fashion: she only buys devices that she decides that her family 'needs,' and each device has a specific function within the household electronic ecosystem. In a similar vein, BH tells us that her members of her household have devices "only for their use-value, nothing extra."

In contrast, those shown via analysis as mainstream or null often just answered our questions about their purchasing decisions with, "because I liked it" or something similar.

Tracking

A cybersensitive will not only show such behavior with respect to technology, but also in the way they buy other products, select/use services, pay bills, and show meticulousness/fastidiousness in other areas as well. For instance, 'tracking' is a common theme among cybersensitives. BBL, 70, is

¹⁴ Giving us some insight into cross-generational attitudes.

an avid biker and tracker of his own health stats. He is also very meticulous about his schedule and food intake, tracking them using his device. Here he discusses some of his process with devices:



“So, I got a bike computer, a heart rate monitor, and cadence monitor, it tells you [how many revolutions you are doing per minute] and that the bike upstairs will do as well. and that is just another device, but your bike computer tracks that. So, I mean, I show you. (walks away) So, this is the bike computer, it tracks everything on it. in fact, let’s turn it on ok, so when I am riding, let’s turn the light on. So, you got speed, you got distance, how long you have been doing it, and your heart rate. And then you can upload that to a program.”

Cybersensitives have a lot going on in their personal lives, which may be the precursor to needing to track and record activities. They tend to have multiple chapters in their careers, and often have multiple simultaneous revenue streams. As with careers, most have multiple, serious, hobbies: the process and pride in completing something, and allowing the process to take the necessary amount of time, is a characteristic of cybersensitives. In response to our survey question, “I try new things all the time, but do not pursue most of them in great depth; I quickly move on to the next new thing,” cybersensitives were the most apt to strongly disagree. Cybersensitives are also likely to most strongly disagree with any characterization that they are 'lightweight.'

In response to the survey question, “When I find something useful, I explore it in as much detail as possible,” we find that cybersensitives/cyberawares tended to strongly agree. The more cybersensitive a participant was, the more likely they strongly agreed with this statement. There is a trend toward an investment in life-long learning, with ‘taking classes’ getting regular mentions in the interviews.

Energy

Cybersensitives are aware of their energy consumption. They pay attention to rebates, tax credits, efficiency ratings. They take advantage of efficiency programs and want more. BH considers herself an environmentalist, who made changes to their home so it will use less energy. Her choices included getting double pane windows, investing in solar energy, and buying an electric car.

Answering the question, “Energy consumption tracking devices, apps or services: Which of the following, if any, do you own?” Only four cybersensitives and cyberawares had them, no one in any other category (mainstreams, nulls) owned any.

Cybersensitives can be critical of offers that do not meet their needs/are not specific enough. DMC tells us, “We do get things occasionally and I’m trying to remember what their subject really is. It’s virtually always something we’ve already done.”

Unsurprisingly, everyone agrees or strongly agrees, across the various color groups with the statements, “Saving money on energy bills is important to me” and “Energy saving is important to me.”

No patterns were visible to the team – everyone either ‘agrees’ or ‘strongly agrees,’ across the various color groups. These are anodyne, non-diagnostic questions, and should be eliminated from future surveys. As mentioned, ‘saving money’ generated a whopping two mentions out of 217 codes for energy-related behaviors, i.e., it was not salient enough for people to bring it up either in response to questioning or on their own initiative.

Nulls

We have repeatedly stressed disentangling the concepts of ‘cybersensitivity’ from technical skill. A person labeled a cybersensitive is different from a ‘techie’ and neither of these are equivalents to being an early adopter. Several of the most highly skilled technical people, in terms of occupation, ranked low in terms of their ‘off duty’ interest and investment in buying devices. JJ, like JC, was highly skilled in terms of technical aptitude and knowledge – he worked in IT for UC Berkeley for several years. Yet, all his equipment was old, he did little with it, and was not using it either in his everyday life or to maximize his lifestyle.

From field notes:

“Very little emotional phrasing in terms of tech, no likes, loves, needs. In the living room where I chat is a massive television, with expensive speakers (“four of five years old,” which are not calibrated, or positioned for maximum sound enjoyment, “Eh, I would have to put them behind the couch,” JJ says wearily, “and I don’t really listen to music anymore.”

However, JJ raises some interesting questions. He was on the older side of our respondents, and fully retired. In the past, he may have fit more closely our emerging profile of cybersensitives – he had switched careers in a major way, leaving a fifteen-year practice as a civil rights lawyer for his career at UCB (“I was the first lawyer to have a computer”). He was still interested in music: he sings in the UCB Alumni chorus, and takes extension classes for retired people at the campus. Yet throughout the interview, there was a constant elegiac theme of closing doors, shutting down, minimizing, lessening and diminution. There are several potential explanations for this, but it is beyond the scope of this project to speculate as to answers.

Meanwhile, IS’s interview is a great example of how the lack of emotional relationship to technology becomes salient in differentiating a cybersensitive from more mainstream peers. IS was a great interviewee, fun, candid, engaging. She works and/or takes part in several volunteer or non-profit initiatives (e.g. they help distribute boxes for a local CSA) while raising two teenagers with her husband. They have a lot of technology among them, and she is an early adopter, ‘snapchatting’ with her kids.

These variables match the profile we have been developing of cybersensitive behavior, however, our analysis revealed that, despite living in the heart of Silicon Valley and surrounding herself with devices, technology did not mean as much to her as they did to others in our sample (and energy not at all, despite a stated concern for the environment). With the same amount of time allotted, and the same questions asked in her interview as in others, the frequency count for codes in each category was not merely fewer for her, but several TIMES fewer (e.g., four device codes vs. HG’s 20).

Our interview with CK was similarly a great example of how the Atlas.ti findings and the ethnographer’s impressions converged. CK works in energy-related fields, and according to the ethnographer presents himself as “extra tech-forward and energy-oriented” but touring his house

and seeing his behavior with technology did not reveal any of the cybersensitive behaviors concerned with meticulous ordering and tracking, according to the ethnographer.

Demographics

Our focus on social and emotional factors developed after a review of the literature around energy savings (Foster and Mazur-Stommen, 2012) turned up a persistent group of high savers with no easily identifiable demographic affinities. It is our hypothesis that cybersensitives and cyberawares span the spectrum of demographic categories. As we discuss in Task 2, “[O]ur goal is to disentangle the qualities that distinguish cybersensitives from demographic factors—partly by showing that they exist in diverse segments, and are not merely a new synonym for a previously identified segment.”

Our survey asked about age, gender, income¹⁵: We found cybersensitives ranged in age across a fifty-year span from 25-74. One aspect of our thesis is that anyone can be a cybersensitive, regardless of age/generation. Emotional relationships with technology are not exclusively, or even primarily, the province of the young. Understanding that cybersensitivity occurs in the population at the same rate regardless of age can help us both model the potential impact across California, as well as refine messaging to this group.

Our strongest cybersensitives were female, but the overall group including cyberawares was relatively balanced in terms of gender: eleven women to seven men across both cohorts. We do not want to perpetuate stereotypes of women being ‘more emotional’ or relating to technology in an essentialized¹⁶ manner. At the same time, we want to note that ‘technology’ approaches to messaging often presume a male gendered ‘tech geek.’ In fact, our strongest ‘gadget freak’ was female! We believe that the uncritical use of either of these tropes is unwarranted when discussing how people engage with their devices; instead we see that both men and women can and do relate to the technology in their lives using emotional terms and frameworks.

Similarly, we seek to disprove any simplistic ideas that cybersensitives are merely a gloss on affluent consumers. Household income of cybersensitives in both cohorts ranged from low (\$20-49K) to high (\$200k+). This supports our thesis that cybersensitivity is not simply an overlay for ‘affluence’—but that there are truly different behaviors which can be identified and measured.

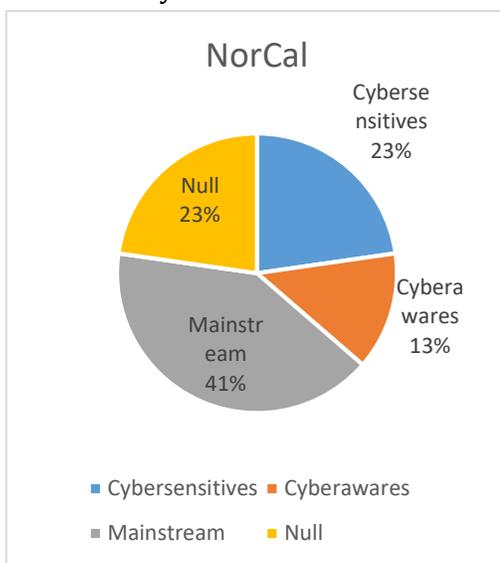
¹⁵ Also home ownership, and household size but we did not analyze those for this paper. We did not ask about race or ethnicity, education, or political affiliation.

¹⁶ “Essentializing means attributing natural, essential characteristics to members of specific culturally defined (gender, age, ethnic, “racial”, socioeconomic, linguistic...) groups. When we essentialize others, we assume that individual differences can be explained by inherent, biological, “natural” characteristics shared by members of a group. Essentializing results in thinking, speaking and acting in ways that promote stereotypical and inaccurate interpretations of individual differences. For example, feminists note that people essentialize women when they assume that girls and women are naturally emotional (versus rational), nurturant, docile, weak, vain, dependent (and so on).” (Armstrong, 2003)

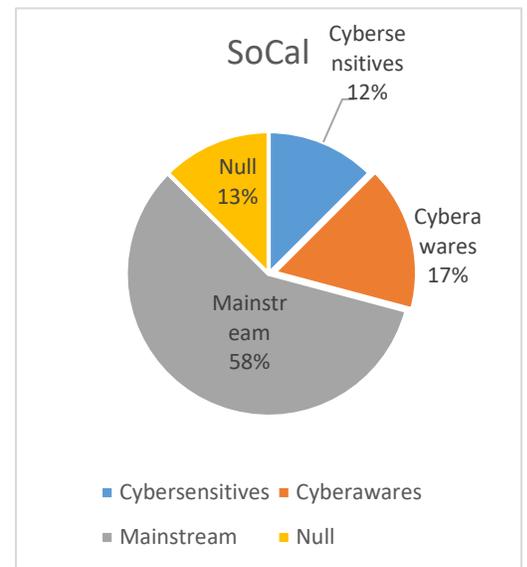
Conclusions

We have shown in this report that in-home observations by the ethnographers yielded similar results to the Atlas.ti analysis. Ethnographic observations made during fieldwork by the senior anthropologists corresponded well with the results generated separately through sorts and tallies of codes drawn from transcribing the interviews. In both methods, the same people were consistently strong cybersensitives, cyberawares, or not cybersensitive (a.k.a. nulls).

Using the survey as an instrument to predict cybersensitivity for recruitment efforts was not very successful. People's answers to an anonymous survey differed from what they chose to reveal to an ethnographer once they established rapport. At the same time, a focus on device ownership and usage was not helpful in naming cybersensitives. That said, the 400 responses to the survey is a trove of information about the population at large, and we will continue to incorporate it into our analyses.



Through the Atlas.ti coding and sorting effort, and the analysis that we conducted on the sorts and tallies, **we have come to believe that cybersensitive and cyberawares populations combined may make up a larger percentage of population than previously predicted (30% vs 20%)**. Using the Northern California dataset, we found the percentage of the set to be 35%, and in Southern California it was 30%.



Color-labeling interviewees' overall answers in code categories (Psych, Device, or Energy) allowed us to construct a 'heat-map' detailing the relationships among interviewees with respect to their rankings. We looked at the patterns underlying the answers given by the interviewees, and are well positioned to convert the rules governing the patterns into testable logic statements for use with the Ethnographic Decision-Tree Model (EDTM). Combining select survey answers with the heat map also enabled us to tease out several potentially diagnostic statements regarding cybersensitivity (or lack thereof) which will be useful in future analysis.

The data continues to support one of our key hypotheses: the idea that the attributes of cybersensitivity cut across a variety of demographic variables, and are not merely a 'gloss' on affluence, generational membership, or gender identity. Cybersensitives (and their opposites) can be male or female, and distribute themselves across various age and income ranges.

Another one of our assertions received support: our belief that cybersensitives are not simply another word for people with technical skill or aptitude, or for people who enjoy buying gadgets, e.g., early adopters. Our interviews and subsequent analysis showed that "techies" a.k.a. people with occupations in technology often ranked the lowest in terms of cybersensitivity, even with respect to

questions about technology and devices. One's skill or employment regarding computers or engineering does not translate into engagement with a device, or responsiveness to feedback via device (Houde et al., 2013).

Cybersensitives have several things in common: they tend to be meticulous, planner-types. They care a great deal about their homes and overall lifestyle. They are busy people with multiple revenue streams, multiple hobbies, and a taste for lifelong learning. In terms of energy consumption, they are up for more of a challenge regarding energy-efficiency programs. However, these "asks" must be framed in ways that pique their interest, and/or engage their personality type. These asks must mesh well with specific energy use in a cybersensitive home vs. a model drawn from a generic population.

Finally, we learned somethings about our population of non-cybersensitives, or nulls as well: they may superficially resemble cybersensitives at times, with interests in technology or energy, but this tends to be superficial. When asked the same set of questions, they may focus on one or two points to the exclusion of all others. They use very few emotional keywords when answering questions. They do not take the same meticulous care of their homes, nor are they as engaged with optimizing their lifestyle.

The clustering of cybersensitives, cyberawares, nulls, and the group in between, who we think of as "mainstream" was very strong and produced independently of the perceptions of the anthropologists. As we head into the second half of this project, we feel confident that we are on the right path towards understanding the motivations and attitudes of this population!

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APPENDIX A: Code Book

Code-Filter: All

HU: EPIC Fieldwork

File: [C:\Users\Disha\Documents\Scientific Software\ATLAsTi\TextBank\EPIC Fieldwork.hpr7]

Edited by: Super

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Amazon

Appliances

Banking

Billing

Communication

Computer

Connectivity

Electric Car

Energy meaning

Energy programs

Energy saving behavior

Energy tracking

Energy usage

Fitness Tracking

Friends' devices

Gaming

Kids

Kindle

Landline

Media consumption

Mobile phone

Older tech

Photography

Psych: Addiction

Psych: Aging

Psych: anxiety

Psych: Artistic

Psych: Disconnect

Psych: Environmental concerns

Psych: excitement

Psych: expensive

Psych: family

Psych: fastidious

Psych: Feelings about technology

Psych: friends

Psych: Hands-on

Psych: Hands off

Psych: Health

Psych: Indulgence

Psych: love

Psych: Minimalist

Psych: nature

Psych: negative feelings

Psych: Passion

Psych: Philanthropy

Psych: political views

Psych: positive feelings

Psych: Pragmatic

Psych: Privacy

Psych: regret

Psych: Security

Psych: work

Purchase process

Recycling old devices

Related occupations

Remodeling

Roomba

Safety concern

Same activity on multiple devices

Saving money

Social Networking

Solar

Tablet

Tracking behavior

Treating devices

APPENDIX B: Psych codes (quotations and discussion)

Psych: Minimalist

Using only what is needed, and when it's needed.

Psych: political views

Expressing actual political views and/or sharing their view on (often) the decline of a product.

Psych: Pragmatic

While using devices, as well as in other areas of their life, they value being practical.

Psych: work

Discussing devices in relationship to work.

Psych: Feelings about technology

Psych: Hands-on

Very engaged with the devices and how they interact with the items they choose to own.

Psych: Hands off

Usually uncertain how things work, does not find out, unknowing.

Psych: Privacy

Taking actions to keep their person and activities private from scams, hackers, and the government.

Psych: Security

Covers issues of security such as purchasing items to protect devices from breaking, keeping old technology in case of emergency, and

taking actions to protect themselves from the unknown effects of today's technology.

Psych: positive feelings

Psych: Artistic

Making art with and without devices.

Psych: excitement

Activities that bring joy.

Psych: Fastidious

When a person is applying tiny detailed actions in order to reach their end goal. This can be in relationship with devices but also other activities in their lives.

Psych: friends

Discussing how they interact and communicate with friends, and also discussing what friends do.

Psych: Health

Anything to do with healthcare, communication with doctors, and fitness related discussions.

Psych: Indulgence/This code has been changed to psych: connection; psych: extrinsic motivator.

When people choose devices and apps to connect with others, many times as external motivators but also to stay connected.

Psych: love

Professing a strong positive feeling about an activity, which can be devices related and not device related.

Psych: nature

Discussing spending time in nature.

Psych: Passion

An activity, device or device free, that brings lots of joy to the respondent, and which is done on a regular basis.

Psych: negative feelings

Psych: anxiety

Feelings of anxiety if they do not have access to any of their devices, but also anxiety about how to deal with their kids and devices.

Psych: Disconnect

Setting boundaries around device use, and taking charge in how connected they want to be all the time.

Psych: Environmental concerns

Discussing how behaviors and activities affect the environment.

Psych: expensive

Discussing the cost of devices and how the high cost prevents new purchases.

Psych: regret

Regretting switching brand and regretting purchases.