Personas and Decision Making in the Design Process: An Ethnographic Case Study

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ABSTRACT

Personas have become a well-lauded method to aid designers in keeping the needs of the intended user population at the forefront of the design process. However, few studies have ethnographically observed design teams that use personas, and fewer studies have looked specifically at how designers linguistically invoke personas in their decision-making sessions. This discourse analysis of the decision-making sessions of designers at a top tier design firm reveals that although the designers dedicate much time researching, developing, and refining personas, personas themselves make relatively few appearances in the designers' language during decision-making sessions. This study shows that, for persuasive ends, these designers, who are advocates of personas, routinely use other less precise and more designer-centric linguistic mechanisms in lieu of personas. Despite the scarcity of personas in the decision-making sessions, this ethnographic case study also explores the value of personas for this team even when the personas are not explicitly linguistically invoked.

Author Keywords

Personas; user-centered design; discourse analysis; ethnography; design decision-making.

ACM Classification Keywords

H.5.2 [Information Interfaces and Presentation]: User Interfaces - Theory and methods, User-centered design;

INTRODUCTION

Since the advent of user-centered design (UCD) in the early 1980s, designers have struggled with how, exactly, to have "an early focus upon the characteristics and needs of the intended user population" [1]. One way designers in recent years have opted to keep the "characteristics" and "needs" of potential users at the forefront of the design process is through the use of personas. According to Alan Cooper, who popularized the term in *The Inmates are Running the*

Asylum, personas "are not real people" but "hypothetical archetypes of actual users" that, while imaginary, "are defined with significant rigor and precision" [2]. Since Cooper's publication of *Inmates* over a decade ago, the use of personas in the design process has increased in popularity [3]. Most discussions of personas in the intervening years have offered prescriptions for designers on how personas ought to be created and implemented in design processes, as well as the purported benefits of using personas in product development. However, despite the rise in acceptance and overall popularity of personas, few studies have empirically investigated how personas are actually used by designers in practice.

The aim of this case study is to turn an ethnographic eye to the designers themselves in order to understand how personas fit into the design decision-making process. This reflexive move enables a descriptive assessment of how designers themselves actually use personas, not just how designers think they use personas or how designers think personas should be used. More specifically, I explore how personas are used linguistically during the decision-making sessions of designers. Are personas used as persuasive mechanisms to support or deny a decision, are they used as a focusing mechanism to narrow the scope of a decision, are personas used to facilitate communication, or are they functioning in some other way entirely? To answer these questions, I observed the decision-making sessions of a design team within a highly respected design firm that routinely uses personas. Using discourse analysis techniques, I investigated how and when personas were invoked during those decision-making sessions and evaluated how this usage falls in line with previous discussions of persona usage.

A CLOSER LOOK AT PERSONAS

Personas were originally conceived as a design process methodology by Cooper, who vaguely defines a persona as a representation of a group of individuals with common characteristics—a "hypothetical archetype" that is used by designers to understand, focus, and clarify user goals and needs [2]. While the general concept of personas was appealing to many designers, Grudin and Pruitt, among others, noted that Cooper did "not describe in detail how personas are created" [4]. Subsequent discussions of personas, including some by Cooper, have explored more

deeply how personas should be constructed and applied to the design process. While some variation in the application and creation of personas exists, some attributes, such as a name, a photo, a set of goals, and "a narrative that covers mental model, environment, skills, frustrations, attitudes, typical tasks, and any other factors that seem critical to understanding the behavior pattern," are consistent across most persona theories [5].

While these rather concrete elements of personas are consistent across most persona theories, the process of creating a persona is not. Originally, it appeared that Cooper's notion of personas was "based on anecdote and appeals to reason, not data," and that Cooper appeared to "exhibit […] a disdain for empiricism, including feedback on design possibilities" [4]. While some persona experts acknowledge that occasionally it is necessary due to budgetary and time constraints to develop personas based solely on designer anticipations, stakeholder expectations, and subject matter expert opinions, most persona experts recommend doing empirical fieldwork in the form of end-user interviews or observations to create data-driven personas [5, 6]. Data-driven personas often involve a large researcher workforce and large investments of time (with 1-4 months being an approximate timeframe for many firms) to create [7, 8, 9].

Designers then assess the data to identify commonalities and patterns in the data, and develop a single persona with a reasonable name, a realistic photo, a set of goals, and a narrative that accurately presents critical aspects of the persona in a memorable way [5, 6, 10]. Therefore, personas are fictional creations—entities that are both amalgams of and representations of a certain set of potential users. As Goodwin states, "each persona serves as a surrogate for the thousands or millions of potential users who have similar characteristics and goals" [5].

Some designers resist personas because they are fictional, because they "lead to a false sense of understanding" [11], and because it is "difficult or impossible to verify that personas are accurate" [12], thereby making it too easy to create a persona that matches the designers' idea for a product rather than a persona that informs the development of a product independent of the designer.

However, personas are steadily becoming a standard user-centered method, and persona method advocates claim that personas have benefits that simple data aggregation does not have. First, "personas engender interest and empathy toward users" [6]. By putting a human face on the generic user, personas can introduce empathy into the design process, which can improve the functionality of the product for the user [13]. Second, "personas allow [designers] to focus on and design for a small set of specific users" [6]. Rather than facing a multitude of users, each with their own stories, priorities, and struggles, personas "encapsulate […] and explain […] the most critical behavioral data" in a manageable number of memorable models [5]. Designing for a "small set of specific users… [helps designers] make better decisions" [6] and can "focus designer decisions in a way that just referring to 'users' as a generic group may not" [14].

Perhaps the most cited benefit of personas is their ability to facilitate communication [9]. Personas can "help…focus stakeholders on relevant issues" [10], "diffuse conflict or disagreement among team members when discussing possible design solutions" [14], establish "a common language with which to talk about users meaningfully" [6], and are "excellent tools for summarizing…research data because they let stakeholders 'meet' the interviewers by proxy" [5].

PREVIOUS EMPIRCAL RESEARCH ON PERSONAS

While persona methodology has the purported benefits of establishing empathy for users, enabling more focused designing through a small number of memorable models, and facilitating communication, few studies have empirically investigated the effectiveness of personas on design outcomes or on design processes [12]. Two studies that have focused on design outcome when using persona methodology have relied on student groups who have been given already defined personas (i.e., the students were not involved in the development of the personas). One study found that business students who were given highly empathetic personas created better designs than students in the control group, and students who were given lowly empathetic personas created worse designs than the control group [13]. The second study, also involving students given pre-defined personas, found that "students using personas produced designs with better usability attributes than the students that did not use the personas" [15]. I include this second study here because there are so few empirical studies focusing on persona outcomes and because it has been highly cited in the design blogosphere as proof that personas lead to better product design (ColumnTwo, The Cooper Journal, IXDA.org, the Human Centred-Design Institute, among others). While I admire this attempt at empirical assessment of personas given the dearth of empirical studies on personas currently in the UCD landscape, the results of this particular study should be tempered given that there are several problematic methodological issues in the study, including: no description of who judged the design outcomes; no discussion as to whether the author was the instructor; no discussion of blinding the judge(s) to the condition of the groups, which could affect confirmation bias, particularly if the judge was the author; and no discussion of inter-coder reliability throughout the study, including in determining whether Nielsen's usability heuristic is an appropriate tool to assess design work.

In addition to these studies of design outcomes, a few studies have empirically investigated how personas are actually used by designers in the designing process. Blomquist and Arvola conducted a longitudinal

observational study of a design team that explores "what really goes on in a design team when they implement personas in their process" [16]. This group, which involved many members being introduced to personas for the first time, "did not trust the personas" and invoked "the user" or "you" instead of their personas. While the designers had positive remarks about using personas as a tool, "they were unsatisfied with how they worked during project meetings." Ultimately, "personas never became an integrated part of the design process, due to the lack of know-how and the fact that the team members never felt at home with personas." An additional study that explored how personas function in three separate sites found that organizational contexts "limited the utility of the personas technique," with one site marginalizing personas, another using personas for political buy-in, and the third questioning whether personas were more valuable than direct data from end-users [17].

My study continues in the footsteps of these personas-in-design processes studies by conducting an observational study of a group of professional designers to investigate how they use personas in their actual design practice. However, instead of looking at how personas are generally used by the group or at how persona usage affects product outcome, I look specifically at the language used by the designers when they invoke the personas during their decision-making sessions. By linguistically analyzing the designers' use of personas, descriptive data on the discursive function and persuasive abilities of personas can be ascertained.

DATA COLLECTION

In order to determine how personas are used by a design group *in situ*, I observed and recorded the decision-making sessions of a group of professional designers at a top tier design firm based in the United States. Aside from a few conversational tangents, the meetings were dedicated to determining appropriate design solutions for a client's proprietary interactive medical device. This group of designers was highly dedicated to the notion of personas. I embedded with these design team members for one week. In that time I observed and audio-recorded all of their interactions. The core group consisted of four members, ranging in age from mid-twenties to mid-forties. This core group included designers who had been at the firm for upwards of a decade as well as a new member who had joined the team the previous week. Occasionally, other members of the firm would join in the discussions. These other members (who were part of the "expanded" team) often had a highly particular skill set and would work on multiple projects at one time. The design firm was highly diverse, though everyone on the core team spoke English natively. The expanded team had a native speaker of a European language and a native speaker of an Asian language.

The members of the group would work individually on their project (which I did not record) and then would have a decision-making meeting (which I did record) in which they would discuss what they had done, possible solutions to the problem, and a way forward. Occasionally, these meetings would include conference calls with their client to ascertain the client's opinion before moving forward with the design. At the end of the week, I had observed close to 40 hours of work and interactions (including individual work and quick, face-to-face questions, comments, and critiques on the work) and had recorded a total of 17 hours of discussion over 9 meetings.

I personally observed and recorded the entirety of the interactions. All members signed letters of informed consent prior to my recording of the discussions. The recordings were then transcribed, and I used discourse analysis techniques to identify the group's use of personas. For the purposes of anonymity, all names, third-parties, and specific references to the abilities of the device have been replaced with appropriate placeholders. Additionally, qualities of the personas that do not affect this investigation (names, location, ages, etc) have been changed for anonymity purposes. Additionally, the transcription was broken down into conversational turns, which begin "when one speaker starts to speak, and ends when he or she stops speaking" [18]. A turn might consist of a single word ("OK," "Great," "Yes," "No," etc), or it could contain several ideas and go on for several minutes (with the longest single turn in the data set being 7 minutes and 22 seconds). In the 17 hours of recordings, there were 4985 conversational turns.

USE OF PERSONAS IN DECISION-MAKING SESSIONS

Prior to iterating the design and shortly before my observation, two of the four core designers spent several weeks in the field interviewing users, discussing expectations with stakeholders, and developing eight highly refined personas of users who would likely interact with the device they were designing. These designers then created and delivered to their clients a 20-page, full color, highly refined document that described what personas are in general, explained how the designers would use the personas in their development of the product, and introduced the clients to all the fully developed and embodied personas. Due to the proprietary nature of these personas, I will not describe each persona in detail; however, each persona was given an appropriate name, image, a defining quote, an occupation, and a short but thorough narrative, along with their occupational goals (both related and unrelated to the device), their responsibilities, and how often they would likely use the device. Upon completion of the transcription, I identified all the personas used by the group during their decision-making sessions.

Type of Persona	Number of Invocations	Number of Turns
Directly Named (Georgia, Dr. Samuels)	96	72
Indirectly Named (He, She, They)	87	64
Total	183	106

Table 1. Breakdown of Persona Usage in Decision-Making Sessions

How Often Were Personas Used?
Personas were invoked 183 times in 106 conversational turns, or in about 2% of the conversational turns during their decision-making meetings (see Table 1). When conversational turns unrelated to the decision-making session (typically related to what the group is going to do for lunch and the destruction of a building across the street) are omitted, about 3% of the remaining conversational turns invoke a persona. Personas were invoked directly by name (i.e., "We should have Georgia press the screen") 96 times in 72 conversational turns. Personas were invoked indirectly through the use of pronouns (i.e., "She could look at the events log and maybe reset to this") 87 times in 64 conversational turns. (Some conversational turns invoked personas both directly and indirectly, therefore the number of total times the persona was invoked increased, but the total number of conversational turns that invoked personas did not.)

Who Invoked Personas?
In the course of my recordings, all four of the core team members invoked personas, one member of the expanded team invoked personas, and no clients invoked personas (see Table 2). The member of the expanded team invoked three personas in one turn and all the remaining personas were invoked by members of the core team. The vast majority of the invocations by the core team came from the two team members who had conducted the field work and who had developed the personas. These two team members

Team Member	Percent of Total Invocations	Percent of Total Turns
Stanley	49.2%	45.3%
Edna	36.1%	36.8%
Derek	6.6%	6.6%
Sloane	6.6%	10.4%
Noah	1.5%	0.9%

Table 2. Use of Personas by Team Member

(Edna and Stanley) were responsible for 82.1% of all the

Persona	Percent of Total Invocations	Percent of Total Turns
Dr. Samuels	42.6%	41.9%
Michael	33.3%	31.6%
Georgia	21.9%	23.5%
William	1.1%	1.5%
Tara	0.5%	0.7%
Mary	0.5%	0.7%
Lila	0%	0%
Dr. Paul	0%	0%

Table 3. Frequency of Each Persona

turns that invoked personas and for 85.3% of all the personas invoked during the decision-making process.

Which Personas Were Invoked?
Eight personas were defined by the group. While six personas were invoked at least once (see Table 3), three personas represented 97.8% of the total invocations and were in 97.0% of the turns in which personas were used. These three personas were:

1) Dr. Samuels, who interacts with the device on occasion but who mostly uses the data collected from the device for diagnosis.

2) Michael, an inexperienced nurse who is still learning the basics of his job and must interact with the device on a regular basis.

3) Georgia, a nurse who is experienced with the device and trains others on how to use it.

Less invoked personas included a doctor who oversees the ward that uses the device, but who does not use the device often himself (Dr. Paul), a paramedic who uses the device while transferring patients in an ambulance (Tara), an engineer in charge of machine maintenance (William), and two nurses, one of whom only uses the device in surgical settings (Lila), and an inexperienced recovery nurse who only interacts with the device during emergencies (Mary). Of the three most-invoked personas, invocations of Michael and Dr. Samuels constituted 75.9% of the all the invocations and were represented in 73.5% of all the turns in which personas were used. Looking at it another way, although there were eight defined personas, two personas (Michael and Dr. Samuels) constituted 75% of the invoked personas, with Dr. Samuels represented about 10% more often than Michael.

Function of Persona	Definition	Examples from Decision-Making Sessions	% of Personas
Role-playing	The persona is "put on" by the designers and the designers make decisions while "wearing" that persona.	"So, Dr. Samuels, she would probably not do that. She checks her timing, looks at the screen, and the makes the diagnosis." "So, the screen comes into the sterile field, and Dr. Samuels touches it, like, with her glove." "Without having to think or do anything else, Michael just takes the [button] and goes with that."	47.5%
Focusing	The persona is used to eliminate other issues and to focus the designers on the needs of a particular end user as established through the persona.	"Well, that might be ideal for Georgia, but for now we need to close in how autopilot can make this thing foolproof for Michael." "We totally need to talk about both those things, but let's just use Michael now to focus in on the [arrangement of the items on the screen]." "The most important thing right now is to figure out [what] Georgia does in an emergency, not what she does when she has all the time in the world."	33.9%
Meeting Maintenance	The persona is used to move a meeting along or to correct a colleague who has used the wrong persona.	"I know that we are in a time crunch, but before [moving on], we need to flush out detail on Michael a little more." "Let's explore Dr. Samuels' response some more."	10.9%
Empathy	The persona is used to engender empathy and to make the end user personable and relatable.	"Michael's not an expert at this, so we should expect him to face some challenges." "That might be a nice feature because then Michael he doesn't ever have to see this thing which he may find frightening."	3.3%
Clarification	The persona is used to clarify a position and to make certain that an action assumed by the designer is the correct one.	"Kinda, but Michael's a lot more into these details, while the doctor is much more interested in the high level interaction with the machine." [After being asked a question regarding the doctor's capabilities by a teammate] "Oh, yes, Dr. Samuels has access to the events log so she'll be able to see what's happened."	2.7%
Approximation	The persona is used as an approximation of the end user. While the design may invoke the persona, the persona is secondary to the end user.	"If we get the other functions that somebody like Michael will touch out there, then they're just going to close it."	1.6%

Table 4. Functions of Personas in Decision-Making Meetings

When Were Personas Invoked?

Personas were invoked in five of the nine meetings. In four of those meetings, personas were invoked 20 times in 12 turns. The majority of the personas (about 89%) were invoked in a single meeting. In this meeting, personas were invoked 163 times in 94 turns, which is about 10% of the total turns dedicated to decision-making in this meeting.

This particular meeting was dedicated to running through scenarios, which has been called a cognitive walkthrough [6]. One member of the team read aloud predefined scenarios (mentions of the particular personas when the scenario was read aloud were not included in the total count of persona invocation as it was not part of the decision-making) and the core team assessed how the personas would interact with their design solution in that particular scenario.

How Were Personas Used in Decision-Making?
When personas were used by this group as part of the decision-making sessions, they generally functioned in six different ways. These six functions of personas are described in Table 4.

Two independent coders assessed the data for categorical reliability. The coding set consisted of approximately 10% of the total conversational turns and 50% of the total uses of personas, which represents a reasonable amount of data for a coder to assess [19]. Fifty-four of the conversational turns invoked at least one persona; the remaining conversational turns were included for conversational context to aid in assessment. Approximately 80% of the conversational turns in the coding set were randomly taken from the meeting in which the majority of the personas were used; the remaining 20% of the conversational turns were taken from the 4 other meetings in which personas were used.

The coders analyzed each use of the persona (not each turn) for how that particular invocation of the persona most likely functioned in the decision-making process. The simple agreement between the coders was 94% with a Cohen's Kappa of 0.89, which, according to Landis and Koch, is excellent agreement [20].

Of these six functions of personas, they were most often used as role-playing mechanisms, which is not surprising given that the personas were most often used in the meeting in which the designers were conducting scenario-walkthroughs. Additionally, the personas that were invoked throughout the decision-making sessions often functioned as meeting maintenance or focusing mechanisms. Although empathy was cited as a benefit for the use of personas, these designers rarely displayed empathy in their linguistic choices.

DISCUSSION: PERSONAS IN DECISION-MAKING SESSIONS
Despite the fact that this group of designers spent several weeks interviewing end users, discussing expectations with stakeholders, and developing their refined personas, personas themselves make relatively few appearances in the language used in the decision-making sessions of these designers. Additionally, though it has been stated that a benefit of personas is that they provide a "common language" for designers and clients alike "to talk about users meaningfully" [6], it appears that the idea of personas

bridging across developmental differences has been idealized. At no time did a client ever refer to a persona (though they did often refer to "users," "novice users," and "expert users"). Additionally, the vast majority of the personas used by the group were invoked by the two designers who actually created the persona. This finding may suggest that persona development enables persona use. It may be that those designers who create personas internalize the persona characteristics in ways that the designers who do not actively create personas do not, thereby making the personas a useful tool for those who create the personas, but less useful for those who are simply given preformed personas.

Additionally, though the designers had 8 personas at their disposal, three personas represented over 97% of personas used, with two representing over 75% of the personas used. Though there was granularity and differentiation built in to each of these 8 personas, the two that were most cited (Dr. Samuels and Michael) represented the most expert and the most novice persona. The third persona (Georgia) was somewhere in-between (perhaps the "most" intermediate of the other available personas). Thus despite having 8 personas, these designers gravitated to using perhaps the *alpha* and the *omega* of potential users when they discussed modifications to their designs. It appears that Adlin and Pruitt's estimation of 3-5 personas as "a good number to target" is in line with how personas are actually used [6]. Though this group of designers had other personas to pull from or to use as a walkthrough mechanism, the lack of their incorporation may mean that the designers only truly focus on about three potentially divergent needs at a time, and that the resources spent on the development and refinement of the remaining personas was ultimately not needed for the decision-making sessions.

Further, it appears that personas are most used by this group when the meeting has been specifically designated to deal with personas. Although all the meetings I observed were decision-making meetings in which the designers weighed options for their product, the meeting designated as the cognitive walkthrough held the majority of the uses of personas. In their cognitive walkthrough, the designers used the personas to complete pre-defined scenarios using the product as currently developed. According to Adlin and Pruitt, using personas in cognitive walkthroughs is a natural and appropriate way to use personas [6]. At the beginning of this particular meeting, Stanley said, "Should we begin walking through to see if we are on the right track?", and then (after the group concurred), "Do you want to start with Dr. Samuels? Or Michael?" In these questions, Stanley narrows the task for the meeting: a cognitive walkthrough with the persona in mind. Therefore, it is not necessarily a surprise that the majority of the personas in this cognitive walkthrough meeting function as a role-playing mechanism, given that the purpose of the cognitive walkthrough is for the designers to "put on" a persona and determine the successes and failures of the product for that persona.

While the function of the personas isn't surprising, the general lack of invocation of personas is potentially surprising. While the cognitive walkthrough meeting has 1091 conversational turns, personas were directly or indirectly invoked 163 times in 94 turns. Given that the entire purpose of this meeting was to decide upon the future of the product through the lens of a persona, it is somewhat surprising that personas were invoked in fewer than 10% of the turns. Given this low number of invocations in a meeting that is supposedly dedicated to personas as the evidence for decision-making, it is not surprising that personas make few appearances (if any) in the meetings in which personas are not highlighted at the outset.

IF NOT PERSONAS, THEN WHAT IS USED?

It would seem that this group of designers, with their upfront investment in personas, their detailed refinement of their personas, and their ongoing, if occasional, use of personas in their meetings, would be prime candidates for linguistically utilizing personas in the discourse of their decision-making sessions. Yet, despite this group's advocation of personas and their long history of design successes, personas were simply not included regularly in the linguistic discourse of decision-making. So what are these designers using in lieu of personas, which Pruitt and Grudin claim to be "extremely powerful for communicating results and furthering…teammates' understanding of the Personas" [9]?

A previous study of language in workplace meetings investigated how designers who did not use personas invoked certain kinds of appeals to make their arguments [21]. That previous study suggests that although designers had done significant amounts of user-research and usability testing, the designers often did not use usability or user-based data to support their design solutions in their design decision-making sessions. Instead, that group of designers routinely used appeals based on their own opinions and impressions as well as appeals anchored in storytelling to persuade the others of their design beliefs. In other words, although each designer in that study had a plethora of user and usability data at his or her disposal, the designers routinely bypassed the data they had collected through numerous hours of usability and user-experience testing and used instead their own opinions or stories as linguistic mechanisms of persuasion.

A preliminary analysis of the linguistic exchanges in the decision-making sessions of the group of designers who developed and used personas seems to indicate that they, too, routinely use the two other previously identified linguistic mechanisms (designer opinion and storytelling) to persuade the other team members of their design decisions and solutions. This recurrent use of non-persona mechanisms for persuasive ends may suggest that these alternate linguistic mechanisms are, in Pruitt and Grudin's terms, more "powerful" than the personas themselves for communication and persuasive purposes.

The first alternative linguistic mechanism for the designers is to rely on their own personal opinions to persuade the other designers of a design choice. These statements generally have little or no grounding in the personas themselves or in the research that led to the development of the personas. Statements such as the following represent statements grounded in the designer's own opinion of the design and have no linguistic evidence of being based on the personas or in the research that built the personas.

- "I think this toolbar could be bigger."

- "I think the interaction of these is pretty intuitive."

- "I think the one option that stood out very strongly is the more direct manipulation."

- "Stacking those icons makes the interaction too muddled."

While a designer could have said, for example, "Stacking those icons makes the interaction too muddled *for Michael*," the persona was not linguistically invoked in the actual statement nor was there linguistic evidence in the context of these statements to suggests that these personas were any part of the decision-making process.

The second alternative linguistic mechanism used by the designers in decision-making sessions in lieu of personas is storytelling mechanisms. These storytelling mechanisms are, in many ways, more akin to personas than the statements based upon the designers' opinions. In these story-telling mechanisms, the designers take on something of a role-playing model, but they do not take on the guise of a persona; instead, they take on an ill-defined, "blank" hypothetical user. Statements such as the following represent storytelling mechanisms that do not incorporate personas.

- "So, in that case, you are more interested in what has happened over the last two hours than you are interested in what has happened in the last ten seconds."

- "The users come across this screen and they look for what they know and that might be a problem."

- "I come to this option and I can switch between things."

- "You'd touch the toolbar on the touch screen and then you touch the hardware control on the side."

- "The users see this and how do they know the measurement?"

While personas could have been invoked in these settings, they are not, nor does the context surrounding these statements suggest that personas were part of the discussion. Instead, the designers place a hypothetical story on a hypothetical "I," "you," or "user" for persuasive purposes.

Unlike personas, which have richly defined back-stories to explain why, for example, "*Dr. Samuels* is more interested in what has happened over the last two hours than what happened in the last ten seconds," these hypotheticals have no definition. From these statements and their context, it is unclear as to whom the hypothetical "users," "you," or "I" refer: any user, expert users, novice users, or some other entity entirely.

These hypotheticals are, in some ways, weak shadows of data-driven personas. While personas have specific goals, job requirements, and traits that affect how designers can posit their interactions with the product, the hypotheticals have no defining characteristics to "keep the designer honest," so to speak. The lack of defining characteristics, such as experience, goals, and requirements, makes it possible for nearly any solution posited through the linguistic invocation and presentation of a hypothetical end-user to be palatable for some abstract, ill-defined user, though not necessarily the rigorously defined personas.

While a thorough analysis of the persuasive mechanisms used by these designers in decision-making meetings is currently taking place, preliminary analyses suggest that, despite investing much time and many resources into the development and refinement of personas, even designers who are highly dedicated to the concept of personas routinely use mechanisms and tools other than personas in their linguistic exchanges during decision-making meetings. This study has shown that personas are included in about 3% of the conversational turns within these decision-making meetings. The preliminary analyses of the entirety of the decision-making meetings suggest that designer opinion is used in approximately 25% of conversational turns, while non-persona related storytelling and role-playing is used in about 21% of the conversational turns. Therefore, for this group, it appears that mechanisms other than personas are a "go-to" persuasive resource for decision-making sessions.

DISCUSSION: THE VALUE OF PERSONAS
With personas used in only about 3% of the conversational turns, it appears that the designers in this study routinely linguistically bypass personas in decision-making sessions for other, less defined mechanisms. One of the most cited benefits of personas is their ability to facilitate communication [5, 6, 9, 10, 14]. Yet, when only 3% of the communicative turns possess direct or indirect references to personas, to what degree are personas actually facilitating communication? Given the 1-4 month estimates for persona development, refinement, and deployment, personas appear to be a resource-expensive tool for design development [7, 8, 9]. Therefore, if linguistic communication facilitation is not an apparent benefit of personas, is there other value in persona development? I believe yes, there are other, perhaps subtle, benefits for the inclusion of personas in the design development process.

First, while the promise of personas is to enable communication across several team members regardless of their involvement in the creation of the personas, it appears that those who are involved in the creation of the persona have a better understanding of the personas and the user-at-large than those who are mere recipients of the personas. Of all the invocations of personas in the decision-making sessions, Edna and Stanley, the two team members who actually developed the personas, referenced personas far and away the most often. Further, those invocations revealed a more in-depth knowledge of the personas than the invocations by the other team members. The other team members would often say something akin to "But Michael's not an expert, right?" (Sloane), whereas Edna or Stanley might say, "Well, Michael isn't going to do it that way. Georgia might, but not Michael because he doesn't really know what he's doing, he hasn't done this in quite some time. He just needs to be able to turn it on and for it to work" (Stanley). Those designers who developed the personas were treated by the other team members as custodians of the personas and were the team's resource for clarifications about what a persona would or would not do. Therefore, Edna and Stanley, who developed the personas, were the team members most likely to use personas and use them in detailed and specific ways. Perhaps if others in the team had been part of the persona development process, they, too, would have felt more empowered to use the personas as part of their decision-making process.

Though Edna and Stanley did use personas more often and more constructively than those team members who did not develop the personas, they too used linguistic mechanisms other than personas with a relatively high frequency. However, in storytelling turns that did not invoke personas, Edna and Stanley were more likely than the other team members to create a hypothetical user that seemingly adhered to the attributes of a persona than an open ended hypothetical. For example, while Sloane says, without regard to specifics of a particular user (be it a persona or a less defined "novice" or "experienced" user), "The user presses this icon and it reveals this menu and then they can select the measure they want," Edna restricts the ability of the hypothetical user in her response: "Well, yes, if it's, like, a super novice user, but not-so-newbies will want access faster and won't want to wade their way through icons and menus on a touch." This exchange comes from a meeting in which no personas were linguistically invoked. However, Edna's response clearly keeps some attributes of the unnamed personas in mind: the persona of Michael needs feedback and help from the device to properly operate it, but the persona of Georgia wants the device to not get in her way of accomplishing what she knows needs to be done. In the preliminary analysis, it appears that about 30% of the persona-lacking storytelling mechanisms invoked in the decision-making meetings actually reasonably mimic the defined descriptions of the developed

personas and nearly all of those invocations were accomplished by Edna or Stanley.

Finally, though personas are used by this group with less regularity than might be expected, the group does, on occasion, use personas to facilitate communication in ways that may not be possible without personas. For example, in one meeting (which was not the cognitive walkthrough), Sloane proposed a visual design solution. Derek, the project manager and the team member who dealt with the client most regularly and directly, used linguistic markers that indicated that he enjoyed Sloane's proposed solution ("Wow," "That's elegant," and "[the client] is gonna love that"). However, immediately following Sloane's presentation, Edna countered with the following:

Edna: I really like that. I mean, we should totally use that going forward, but, well, should we be concerned about, think about Michael and Georgia. I mean, it's totally functional, but if we remember what is driving [Michael and Georgia], then I'm not entirely sure if this is the way to go, ya know, with what they are trying to do cause…"

Derek: You're right. I hadn't thought of that. We probably don't need the flash-bang.

Edna's conversational turn was the only turn in the meeting in which personas were invoked. Though Edna's invocations of Michael and Georgia were not reciprocated by her fellow team members, her use of personas in that instant were valuable in that they quickly, subtly, and concisely redirected the attention of the team members away from the "flashiness" of the proposed solution for the device and back towards the defined needs of the personas. Therefore, while personas were only used on a limited basis, they did provide strategic advantages in critical instances.

Thus, though they are not used with high frequency by this group, personas can and do provide value to this group by enabling the designers who developed the personas to be custodians of the personas, by allowing the personas to argue from persona positions even when the personas aren't linguistically invoked, and by being a useful mechanism of persuasion and focus.

CONCLUSIONS AND FUTURE RESEARCH
In this particular case study, designers who research, develop, and refine personas do not use those personas as a primary persuasive mechanism during design decision-making meetings and rely much more prominently on their own opinions about the design and vaguely referenced hypothetical stories. Therefore, while personas, including personas such as those that are based on actual end-user research, may be a user-centered design method, it appears that, at least for this group, personas alone may not be enough to ensure that end-user needs are at the forefront of the designing process.

However, despite their limited overall use it appears that personas may continue to be a valuable method for the designers, particularly for those designers who are actively involved in the development of the personas. The designers who developed the personas were more likely to use personas in the decision-making sessions, to act as custodians of the personas, to use vague hypotheticals in a manner that mimicked the characteristics of the personas, and to use personas in ways that facilitate communication than those designers were not actively involved in the creation of the personas.

This study's major limitation lends itself to future research. As is common in case studies, this study observed only one group. Although the observations were diligent and the results accurately descriptive of the language and actions of this group, care should be taken when ascribing this group's function and use of personas to other groups. Thus, more groups (including distributed groups, multi-cultural groups, highly hierarchical groups, among others) who use personas should be studied closely to determine how personas are actually used in the designing process. Only by studying more groups can we truly learn what happens with personas in decision-making sessions and begin to develop best practices based upon observational, rather than anecdotal, research for personas as a UCD method. Additional future research may include investigating how personas are invoked in non-face-to-face settings (such as email or instant messaging), the effect of the number of team members on the frequency of persona invocation, the effect of persona development and research on persona use, and the use of alternate mechanisms of persuasion in decision-making sessions.

Ultimately, this study, which has revealed that this group of designers who advocate persona use do not necessarily use personas as their primary persuasive or communication mechanism in design decision-making meetings, identifies how personas are actually used *in situ* and is a first step in determining how personas are actually used (rather than just how personas are purported to be used) by designers in their decision-making sessions.

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