Jonathan Grudin
"Jonathan the Psychologist"

Roles: Researcher, psychologist, use analyst

Goals: Understand the adoption, use, and effects of technologies and design methods

Objectives: Collect quantitative and qualitative data; find patterns, particularly around problems and solutions; communicate the results to people who are most likely to find them useful

Classic quote:

"Today's teenagers are the people who matter in the long run"

Jonathan Grudin has worked as a developer and researcher in industry and as an academic at several universities, but throughout quite different jobs he has focused for the past twenty years on two related topics: (i) the dynamics of groups and organizations, especially those engaged in software development; and (ii) tools to support groups and organizations more broadly. As a senior researcher at Microsoft he has worked on ways to enhance streaming media, uses of multiple displays, uses of IM and weblogs, as well as understanding persona use in design.

In 1989 he left the consortium MCC in Austin, Texas to spend two years at Aarhus University in Denmark, intrigued by the Scandinavian participatory cooperative design approach and interested in how it might be applied to the development of commercial products. Despite being a fiction writer who had studied method acting, the idea of resorting to fictional stand-ins for the user-partners of participatory design did not occur to him, but when he encountered it a decade later at Microsoft he was motivated and positioned to delve into the mechanisms by which personas work, with a Ph.D. in experimental psychology and broad experience with contextual design and other design and development approaches.

At home Jonathan has to compete for computer time with his wife and two daughters. He is never without his USB keydisk, maintains a couple work-related blogs, and has a large screen TV connected only to a DVD player. He can be reached via his Web site, research.microsoft.com/~jgrudin.

12

WHY PERSONAS WORK: THE PSYCHOLOGICAL EVIDENCE

Jonathan Grudin, *Microsoft Corporation*

INTRODUCTION

The power of personas to engage and inform team members was described in the introduction to this book. But why does engagement lead to better design? How do detailed pictures of fictional people contribute? How detailed should they be—are stereotypes enough? This chapter addresses the psychological foundations of persona use. It describes theories and findings that explain their effectiveness. We can use personas without understanding the underlying psychology. Alan Cooper has remarked on their "surprising" power without exploring the source of their effectiveness. But by understanding how they work we can design better personas, select appropriate complementary methods, and embed personas in effective processes.

A designer who envisions the way people will respond to a design is drawing on a universal skill: anticipating how another person will behave in a new situation. We exercise this skill every day when we anticipate how others will react to what we are about to do or say. The argument tying this to persona use has three assertions: (1) We find it natural to create and use models of other people. If we did not, persona construction would not make sense. (2) Our ability to engage with models of real people transfers to models of fictional people (in this case, personas). (3) Our models of other people have a certain degree of complexity and detail. If people routinely use sophisticated models to anticipate behavior, sophisticated models of potential users could better

help us anticipate their reactions to designs. If the models we use are simple, expending resources on detailed or complex construction efforts might not be worthwhile.

We naturally model other people

Communication is not just attaching words and expressions to a thought. Our choices of words and intonations are guided by our sense of our audience. We explain something in different ways to a child and to an adult, to a friend and to a stranger, to a manager and to our spouse. We use context to decide whether to be frank or indirect, and whether to convey a message by e-mail, the phone, or face to face. We can better anticipate someone's responses by building an internal model of the person. The model may be detailed or sketchy. It may be accurate or inaccurate. It may be consciously accessible or something we cannot verbalize—we can think consciously about how people will react, but usually we do not.

We are social animals whose hominid ancestors lived in groups for millions of years, evolving skills that evolved to enable us to interact efficiently. In the next section, we review the origins of our fundamental ability to model other people's knowledge and mental states. Evidence points to its emergence 250,000 to 500,000 years ago, probably concurrent with larger brains, language, and complex tool construction. This indicates that the capability is deeply embedded in us, more deeply than recently acquired abilities such as reading and writing.

Models of fictional people can be as engaging as models of real people

If human interaction depended critically on pheromones or direct observation, our natural facility with people would not transfer to personas, which have no odor and cannot be observed. Fortunately, that is not the case. We project human characteristics onto people we have never met. We identify intensely with fictional characters in soap operas, *Star Trek*, or the Harry Potter series. We even project human characteristics onto pets, Furbys, tamagotchis, ink blots, and constellations of stars. When an action by a fictional character seems "out of character," we have created a predictive model of that fictional person. When we argue about what characters did after the action in a book or movie ends, we have internalized and animated the characters, just as we would like designers and team members to internalize and animate personas as a step in anticipating the behaviors of future users.

Our models are often detailed and complex

This important assumption is difficult to prove. Much of this chapter explores the psychological evidence for it. Experimental psychology takes us part of the way there, providing insight into some risks of simple personas. For less quantifiable but equally important psychological evidence, we turn to the design and production of stories, plays, and films. In her chapter, Whitney Quesenbery outlines lessons from storytelling for creating realistic and engaging personas. In contrast, I look at the arts from a different angle, seeking psychological insights into how these representations work.

This chapter is organized as follows. First, studies of human evolution and primate behavior are considered in order to shed light on the crucial question of how deeply engrained our models of other people actually are. This leads to a discussion of the conscious and unconscious models we form. Articulated, conscious representations are more easily studied, and the results of such studies are reviewed. Then I turn to our often shadowy, unconscious understandings of other people—the experimental and descriptive evidence covering such psychological constructs as stereotypes, traits, goals, plans, expectancies, scripts, specific knowledge, and holistic images. This picture is extended with psychological observations and practices of writers and actors—professionals dedicated to reproducing realistic human behavior. Implications for persona design, scenario construction, and the use of stereotypes, task analysis, ethnography, contextual design, and participatory design are considered.

UNDERSTANDING OTHER MINDS: WHERE DID THIS CAPACITY COME FROM?

Several expressions are used for our representations of other people's mental states: "theory of mind," "concept of mind," "folk psychology," and "understanding other minds." Are these representations a deeply ingrained aspect of our psychology, operating automatically below conscious awareness? Or are they an application of our general reasoning skill, operating mainly consciously, similar to scientific theories and models? One approach to answering such questions is to consider the behavior of other primates and our ancestors, drawing upon anthropological and archaeological records.

Experimental studies of theory of mind began with chimpanzees [Premack and Woodruff 1978]. Chimpanzees observe subtle cues and can predict behavior well. But do they have a model of what is in a person's or another chimp's head? This is difficult to determine. They react differently to different people, and respond appropriately to others' moods, such as good humor or anger. But this could be accomplished by combining memory of past interactions with observations of someone's current appearance and behavior. Efforts to show that primates take the additional step of creating a model of another individual's moods or knowledge and use that model generatively to anticipate future responses have been inconclusive. This stands in sharp contrast to young children, who focus intensely on the knowledge and emotional states of those around them [Repacholi and Gopnick 1997]. Morris et al. [1998] contend: "Starting at a surprising early age, children seem to instantly interpret observed action in terms of what an agent is thinking, wanting, and planning… . This penchant for making sense of others as individuals with particular beliefs, desires, goals, and traits is essential to how we navigate our social environment."

As with language, where primate competence is also debated, human abilities are either unique or of a markedly different order. We are born either with the capacity and drive to create and use models of other people or with building blocks that develop this capability

through normal social interaction. We use partial knowledge of others to draw inferences, make predictions, and form expectations. When we say or do something, we anticipate others' reactions. Sometimes we think it through; often we do it effortlessly. Sometimes we miscalculate, and we learn from experience.

In an elegant essay, Mithen [2000] argues that theory of mind arose 250,000 to 500,000 years ago, coincident with the second and last increase in brain size that distanced us from other primates. This also coincided with sophisticated tool production—the manufacture of complex axes required mentoring, wherein instructor and novice had to understand one another's thinking—and language. This makes sense: Complex discourse requires an implicit model of other speakers. Children acquire language at the rate they do by grasping the goals and intentions of others. Theory of mind is logically a prerequisite for complex discourse.

Modern human beings emerged more recently, perhaps 50,000 years ago, coincident with the early cave paintings. But Mithen argues from the archaeological record that our ability to reason in sophisticated ways about the behavior of other people has been a part of our nature for much longer. Therefore, we should expect behavior that is partly unconscious, powerful, and difficult to detect.

CONSCIOUS MODELS AND UNCONSCIOUS MODELS: WHY DOES IT MATTER?

Conscious models or theories include concepts, beliefs, attributions, or explanations for the behavior of other people that can be articulated (expressed verbally). Unconscious processes can also help us anticipate reactions and choose effective words and actions. Take my Sicilian friend Sabine, for example. My saying, "Sabine is trustworthy," reveals a conscious model that could explain why I delegated a task to her. A model that is unconscious is revealed when I talk to her. I automatically slow down and simplify my vocabulary because she is not a native English speaker. I don't weigh each word consciously—my speech just shifts gears based on an internal sense that she will understand some words and not others.

If someone says, "Internet vendors can't be trusted," this consciously held stereotype may affect how they react to a sales pitch. However, conscious models can mislead. Actions don't always match words. In practice people may make frequent exceptions that reveal a more complex underlying model. People who claim not to trust Internet vendors with personal information can be observed freely supplying credit card numbers to purchase online. Conversely, behavior can reveal a bias that a person denies having and may not be aware of. Conscious and unconscious representations are not always easily distinguishable.

If representations of others are deeply ingrained, why not just study behavior? Is asking people what they think and writing down what they say a case of looking under the lamppost

because the light is better? Perhaps, but people do think about their own behavior, and a consciously held model can exert influence. Once I decide that Sabine is trustworthy, I may delegate more important tasks to her. True, closer observation may reveal that I trust her with certain work tasks, but not to remember to repay small loans. I trust her to keep a secret, but not to take care of my kids. We may not work out the details consciously. Sometimes inquiry can get at them. Other times we only discover what we feel about someone when we find ourselves in an unexpected situation. Nevertheless, conscious models have been studied extensively, so it is worth considering that evidence.

STUDIES OF ARTICULATED CONSCIOUS MODELS

Most experimental studies of theory of mind focus on simple demonstrations. People are asked to provide explanations for actions or are presented with a hypothetical scenario and asked how a character would act. A common scenario involves two people, A and B, and an object. A and B hide the object in location L1. Then A leaves the room, after which B moves the object to hiding place L2. Then A returns to the room. Experimental subjects are asked, "Where will A look for the object?" The subject knows it is in L2, but also knows that A did not see it moved from L1. Pointing to L1 reveals a correct theory or model of A's state of knowledge.

Children typically do not get this right until about age 4, suggesting that a verbally accessible theory of mind develops at that age. However, far younger infants show that they sometimes know what adults know, even though they can't express it. A complication in interpreting such studies is that they presuppose that children interpret the question literally as, "Where *will* A look," rather than as the more logical question, "Where *should* A look?" Perhaps children are guided by a theory of the adult mind that includes the notion that adults ask sensible questions, not tricky questions. To summarize, the developmental literature focuses on relatively sophisticated, verbally accessible, conscious understanding.

Studies of this type reveal cultural differences [Vinden and Astington 2000]. In some cultures, people rarely discuss why others act as they do. Cultures prizing conformity may be less likely to attribute individual behavior to internal factors. Instead, they may invoke external influences such as spirits, demons, or gods, as Western cultures once did. Exorcism is rare today, but responding to a sneeze with "bless you" is a legacy of the belief that spirits act within us. The cross-cultural studies reveal a risk in relying on verbal accounts. People with sophisticated, complex social conventions, such as the Japanese, may rarely articulate explanatory models for individual behavior. Complex rules and carefully assembled knowledge guide their behavior, but the internal models may not be consciously considered.

Studies based on verbal reports also reveal individual differences. Autistic people do not express explanations for the activity of other people [Baron-Cohen et al. 2000]. Recognizing this may

help in treating disorders, but leaves open whether these people have no underlying models or whether they just have no verbal access to them. People's verbal explanations for their *own* behavior often prove inaccurate in experimental studies of normal behavior, behavior under post-hypnotic suggestion, psychiatric defense mechanisms, and confabulation accompanying brain injuries.

If our underlying models go no deeper than our sketchy, inaccurate conscious models, how much time should be spent modeling potential users to shape team member understanding? If conscious models are all that we use to guide behavior, we should focus on influencing conscious models. But as outlined in the following, the evidence is to the contrary: deeper, more accurate, representations exist. They can be more difficult to understand and work with, but they are exploited by psychologists, writers, actors, and persona developers.

STUDIES OF UNCONSCIOUS MODELS

If asked to explain my behavior and that of my friends when we were 18, I would give a very different response today than I would have at the time. My explanation for past behavior changed repeatedly. I was never at a loss for models, but their accuracy was questionable. Yet at the time some internal set of representations existed and guided me to interact in reasonably appropriate, consistent ways. Inappropriate behaviors or unexpected reactions stand out in memory, but this in itself shows that I made predictions and had expectations.

Our use of deep models of people is necessary but not sufficient to motivate using them in design. Logically it might be impossible or prohibitively expensive to shape team members' models. Efforts could be counterproductive. A persona that promoted incorrect predictions could be worse than none. However, as noted in the stories from the field, personas often can contribute and the effort can pay off. Understanding of the underlying psychology should improve the odds of succeeding.

The psychological literature identifies a range of representations we form of other people that affect our behavior. Our use of them can be evident or so subtle that it goes unnoticed. Some representations are simple and static, easy to communicate, remember, and use. Some are more dynamic or complex. Is it worth the additional effort to create and communicate complex representations? The questions we face in life—how much effort should we spend getting to know other people, and what are good ways to go about it? — we also encounter in design. Let's see what psychology has learned. How do we interpret or predict another person's behavior? Possibilities, from the simplest to the most detailed, include:

- Group stereotypes
- A fixed set of traits we believe define a person
- A set of traits that can change over time

- Goals, plans, and expectancies that govern a person's behavior
- Scripts that govern behavior in specific situations, such as turn-taking in meetings or ordering food in a restaurant
- Specific knowledge that people have, their levels of sophistication, sense of formality, and so on
- A complex holistic image of a person.

The following sections cover each of these in more detail.

Stereotypes and cultural differences

A group stereotype is a fixed set of characteristics assumed to be shared by members of the group. I might acknowledge stereotyping other people, or I might stereotype without realizing it. "Stereotype" has a negative ring. "Cultural differences" is a more acceptable way to describe perceived group behaviors. We would like to know: When and how do people form stereotypes or perceptions of cultural differences and use them to predict behavior? Once formed, does a stereotype evolve to be more complex or more accurate? What happens when a stereotype is inaccurate? What are the benefits and risks of using stereotypes in design?

Bødker [2000] identifies advantages of using caricatures or stereotypes in design scenarios. Stereotypes are easier than more complex personas to create, communicate, and engage with. Cooper notes that a persona that violates a widely held stereotype (teenage computer users are nerds, nurses are women) may be less believable to team members. Djajadiningrat et al. [2000] argue that extreme or shocking caricatures are particularly effective in capturing the attention of team members. Stereotypes undoubtedly have these advantages, which is precisely why they are heavily used in films. One glimpse of the Wicked Witch of the West on her broomstick and we can confidently predict her behavior.

A surprising finding emerged from studies of prejudice and bias: stereotype formation is a natural consequence of the way human memory works. We form and maintain new stereotypes even when they have no factual basis [Stroessner and Plaks 1998]. The mechanism is simple: we remember unusual events better than typical events. This leads to illusory correlations. For example, let's say that 10 reports of spamming are reported: nine from major countries and one from Fredonia. "Fredonia?" you ask. It is memorable, in that you rarely see stories about Fredonia. Months later, after many ordinary cases of spamming, another story of a spammer from Fredonia appears. You remember the first one, and conclude that people from Fredonia are likely to be spammers. Even if no more examples emerge, the next time someone mentions Fredonia you say, "Oh, yes, the spam country." An illusory correlation has formed.

Once a stereotype is in place, evidence that contradicts it does not dislodge the stereotype from memory. Spam reports from elsewhere, or a Fredonian who is not a spammer, will not

Handy Detail

SCIENTIFIC METHOD

In the early seventeenth century, Francis Bacon identified sources of error in human reason, leading to his empirical approach, which contributed to scientific method and the scientific revolution. One error that Bacon [1625] emphasized was belief that persisted in the face of contrary evidence.

> The human understanding when it has once adopted an opinion (either as being the received opinion or as being agreeable to itself) draws all things else to support and agree with it. And though there be a greater number and weight of instances to be found on the other side, yet these it either neglects and despises, or else by some distinction sets aside and rejects; in order that by this great and pernicious predetermination the authority of its former conclusions may remain inviolate. And therefore it was a good answer that was made by one who when they showed him hanging in a temple a picture of those who had paid their vows as having escaped shipwreck, and would have him say whether he did not now acknowledge the power of the gods, "Aye," asked he again, "but where are they painted that were drowned, after their vows?" And such is the way of all superstition, whether in astrology, dreams, omens, divine judgments, or the like; wherein men, having a delight in such vanities, mark the events where they are fulfilled, but where they fail, though this happen much oftener, neglect and pass them by. But with far more subtlety does this mischief insinuate itself into philosophy and the sciences; in which the first conclusion colours and brings into conformity with itself all that come after, though far sounder and better. Besides, independently of that delight and vanity which I have described, it is the peculiar and perpetual error of human intellect to be more moved and excited by affirmatives than by negatives; whereas it ought properly to hold itself indifferently disposed towards both alike. Indeed in the establishment of any true axiom, the negative instance is the more forcible of the two.

change our perception that Fredonians are spammers. People tend to notice confirming evidence. They overlook disconfirming evidence. An individual who contradicts a stereotype may be considered an exception, while the stereotype persists. "You're a Fredonian who isn't a spammer like those we read about! I like you." For more on the phenomenon called "confirmation bias," see the Handy Detail above on the origin of the scientific method or the engaging book *How We Know What Isn't So* [Gilovich 1991].

These findings point to a risk in using stereotypes in design. Yes, a stereotype quickly identifies a persona that differs from development team members, which is good. It may give rise to empathy. But once in place, a stereotype could lead team members to ignore inconsistent evidence about real use. Stereotypes can lead to systematic, irradicable errors in

predicting behavior. If the errors are small and the time available for persona development short, a stereotype may be a cost-effective compromise.

The same trade-off is evident in fiction when time is a consideration. Contrast a film and a television series. Films make heavy use of stereotyped, easily understood heroes, villians, and supporting roles to quickly introduce characters and engage viewers. A television series has more time to develop characters. A predictable, stereotyped character in a series will over time seem unreal and boring, and cease to engage the audience. Characters in successful ongoing dramas and situation comedies are (or become) more complex, more real. Archie Bunker and J. R. Ewing developed sympathetic sides. Soap opera characters are often given a dual nature, which results in less predictability, somewhat more realism, and greater engagement.

Cooper [1999] uses stereotypes if he feels it will provide more credibility. A short-lived design project or a single standalone scenario might benefit from a stereotype, but to engage team members over a longer time it seems advisable to go beyond stereotyping.

Traits

One of the major scientific approaches to personality [Idson and Mischel 2001] considers traits to be the basic units: broad dispositions that predict or explain much of people's behavior.

We often characterize people in terms of traits, such as introverted or extroverted, forward or shy, friendly or unfriendly, aggressive or timid, honest or untrustworthy. Because a set of traits is like an "individual stereotype," a quick description of someone, it raises the same questions. How accurate is it to describe a person as a set of traits? How does thinking of someone this way affect our ability to predict their behavior, and how malleable is our perception of an individual's traits? And finally, deep down, is this how we actually perceive other people?

We do readily characterize other people in terms of traits, and there is evidence that some people are born with a disposition toward shyness. On the whole, though, psychologists have shown that much social behavior is situational. Behavior can be quite easily manipulated by peers [Asch 1951], authority figures [Milgram 1963], or circumstances [Haney et al. 1973]. (Readers not familiar with the surprising social conformity studies of Solomon Asch, the shocking obedience-to-authority studies of Stanley Milgram, or the stunning Zimbardo prison study can easily learn about them on the Web.) Thus, the use of traits to characterize personas has the pros and cons of stereotypes. It is a quick way of creating an image but is likely to mislead. Team members may anticipate behavior consistent with a trait and underestimate the effects of context.

Some people regard traits as fixed; others consider traits to be dynamic or susceptible to change over time. Plaks et al. [2001] showed that people who view traits as fixed tend to ignore data that is inconsistent with an assumed trait and focus on consistent data. People who see

traits as characteristics that change over time are more open to weighing evidence that is inconsistent with a trait that they assume someone has. Openness to new information is good, so if traits are used in describing personas it would be good for team members to consider traits to be dynamic. Plaks et al. have good news in that regard. In an experimental setting, they were able to manipulate people's implicit theory about traits. Encouraged to view traits as dynamic, participants responded to new information more objectively (at least for the duration of the experiment). If you use traits, educate team members to see them as dynamic, open to evolving when appropriate, rather than as describing a rigid behavior pattern.

Goals, plans, expectancies, and scripts

The second modern approach to personality focuses on situational factors (or "mediating process variables"), such as goals, plans, and expectancies. "These mediating variables are assumed to interact with each other and relevant features of situations to produce stable patterns of behavioral variability across situations" [Idson and Mischel 2001]. If we know enough about someone's goals and plans, we can anticipate their behavior in different situations.

This is a very familiar level of description for designers. Scenarios typically consist of characters with specified goals in particular situations. Cooper's formula is to create personas, give them goals, and embed them in scenarios. These personality theorists argue that if you flesh out the goals, plans, and expectancies fully you have the basic persona. "Fully" includes all life goals, not just those tied to some work tasks or technology use.

Idson and Mischel focus on conscious, verbal explanations that people give for the behavior of others. They report that when a person is more familiar we are less likely to attribute behavior to traits and more likely to mention goals, plans, and expectations. This is even more true when the other person is also important to us. We would like team members to feel that surrogate users are familiar and important, which is further support for deemphasizing stereotypes and traits and emphasizing finer-grained particulars. Whether goals, plans, and expectancies are enough is another question. These are the consciously accessible factors that people verbally report in studies. Unconscious factors may have been filtered out.

The power of situations in everyday life emerges in research on scripts that are used in many situations, often unconsciously, to guide and interpret behavior. Sets of conventions govern behavior in a formal restaurant, a fast-food restaurant, a department store, a checkout line, and so on. Scripts vary from culture to culture and evolve over time. We learn scripts through experience and may notice them only when they are violated. Scripts are particularly relevant to scenario construction. The fact that they differ according to geography, socioeconomic status, and other factors makes a case for developing personas that vary in these attributes.

Social psychology seeks explanations that capture behavioral variability. Traits are one approach; situational determinants such as scripts are another. Shoda and LeeTiernan [2002] look for greater explanatory power by merging the two, finding evidence for individual differences in patterns of behavior variation across a fixed set of situations. When closely examined, individual behavior is complex, yet in our everyday interactions we work with it naturally and easily. We are sometimes but not often surprised. This strongly suggests that our internal models are complex.

Specific knowledge of individuals: holistic images

Should we expend resources to go beyond goals, plans, tasks, and scripts to create complex characters? It requires going beyond verbal reports and most experimental evidence and offers less certainty. We have seen indications that it could be worthwhile. Our explanations for behavior are more complex for people we know and value. Abstract descriptions of people and common situations are less engaging.

As we move into the realm of our unconscious use of detailed knowledge or observation, reliable psychological data are more difficult to obtain. But there is evidence that we rely on such unconscious activity. Malle [2004] summarizes findings from conversation analysis that shows that when we converse our syntax, choice of words, and enunciation vary automatically depending on the other speakers. Subtle cues are used to infer the state of others and guide pauses, interruptions, and so on. We position ourselves depending on what we know of the others present, such as their status, friendliness, or competitiveness. We are usually unaware of these subtle influences, as noted in a recent article, "Unspoken Rules of Spoken Interaction" [Bickmore 2004].

Designers consciously think about how personas will respond to a design, or how team members will make use of new information, but unconscious mechanisms are also likely to be at work. Testers who sit down to examine an application by using it "like Colbi" should reason about Colbi the persona's attitudes and behaviors, but they can also respond in subtle unconscious ways based on their knowledge of Colbi. We make subtle distinctions in daily interactions. Subtle details in persona development may contribute.

Experimental psychology has limitations. It can address high-level constructs such as traits that can be approached through conscious or general behavior. Methods such as conversation analysis can quantify some fine-grained details. But it is less successful at addressing the necessarily idiosyncratic, qualitative elements of a model we inevitably construct for one person in our life. This is an intrinsic part of the psychological impact of a persona. To address it we expand our inquiry to include the arts. The first step is halfway between behavioral science and art—a mental construct that is amenable to scientific study while inspiring artistic invention: dreaming.

Psychological evidence from dreams

Freud (1900) said "the interpretation of dreams is the royal road to a knowledge of the unconscious activities of the mind." Freud arguably misread some of the highway signs, but dreams are indeed pure mental productions. Experimental psychology has tended to avoid dream evidence because verbal reports of past activity violate the stimulus/response and input/output paradigms. For our purposes, though, even if dream reports are created after dreamers wake up, the details include representations of people. And these representations of people are much richer than the traits, goals, and other aspects of personality that can be explored experimentally.

Behavior in dreams is complex, detailed, and generally consistent. Dream reports are strikingly assertive about the people and places present. Consider the following excerpts from a child awakened during REM sleep on different nights [Foulkes 1999]. "There was a lady and she was on the TV show *Gilligan's Island* and in a Comet commercial… . The lady is really on *Gilligan's Island*, but in the dream she was doing a Comet commercial with the plumber Josephine." "There were some ladies walking down the hall, talking… . It looked like it was in a school." "I was in school, and the teacher was up at the board, talking and writing on the blackboard, showing us something. We have some SRA things in school, and she was telling us we had to hand in one SRA thing, and talking about how we would have to do it. It was my real teacher, and my real school."

My real teacher, my real school. The child knows that dream events are fictional. The second example described unknown people, but the teacher in the third behaved in complex ways that seemed characteristic of the actual person. The following are additional examples from Domhoff [1996].

> I have a recurring dream that my grandmother calls me at my house while my mother, sister, and I are preparing dinner. I answer the phone and she says, "Hi, it's me." I said, "Hi, Grandma." She asks, "How are you?" Then I want my mother to talk to her and she says, "No, I called you." When my mother comes to the phone, my grandmother hangs up. My mother replies, "Stop saying it's Grandma; she's not there."
>
> My father died nine years ago but I often dream that he returns, especially at times of stress in my life. He looks older than he ever got to be in real life and very wise looking. I tell him problems I am having and sometimes he just listens and I feel better but usually he gives me advice, sometimes very clear, sometimes garbled. In the instances where it is clear, it is always good advice but things I already know I should do. But just seeing him and hearing it from him makes me feel better.
>
> In this dream I was little, about 5 or 6 years old, and I was in the bathroom at my grandmother's house. She was giving me a bath in this big claw-footed tub. The old

steam radiator was turned on, making it very cozy. I knew that I was dreaming and that I was getting to see my grandmother well again. After the bath, she lifted me out onto the spiral cotton rug and dried me with a blue towel. When that was done she said she had to leave now; this seemed to mean for heaven. I said, "Good-bye, Grandma. I love you." She said, "I love you too Mary." I woke up feeling wonderful. She had been delirious in the last few months of her life, so I'd never really gotten to say good-bye.

Mental representations of other people are actively elaborated in our minds. People who become blind after the age of seven or eight retain the ability to generate visual images in dreams, and create in their dreams visual images of people they meet after becoming blind [Kerr 1993].

Dream characters do not behave stereotypically. The fact that at night we generate complex, detailed representations of other people is very strong evidence that our mental representations of other people are complex and detailed. Noting that dreams have bizarre and unrealistic aspects that could suggest random fragments, Meier [1993] examined speech and thought in dream reports, including many from bilingual speakers. Would the thought and grammar be normal or disorderly? She found conclusive evidence of "the high appropriateness of language in dreams." Dream language is influenced by "the linguistic context of dream sources… . The pragmatic competence to select the appropriate language for a given dream situation… give(s) further evidence to the integrative capacity of information processing in dreams." The information being integrated includes detailed mental representations of other people.

PSYCHOLOGICAL EVIDENCE FROM WRITING

This thing happens where the characters take over and you almost want to look behind you to see who's writing your story.

—Joseph Wambaugh

Our mental representations of people guide our interactions with them. Dreams draw on aspects of daily life. What about fictional characters? Compelling evidence that fictional characters take on active roles comes from the creation and portrayal of characters in plays, stories, novels, television, and film. Authors and actors identify mechanisms and techniques developed over centuries.

Authors, including Flaubert, Dostoevsky, Henry James, Flannery O'Conner, and Alice Walker, have commented on the autonomy of their characters [Watkins 1990, cited in Grudin 1996]. Elmore Leonard, who has written novels for 50 years, comments:

Case Study

PSYCHOLOGICAL STUDIES AND ANECDOTAL ACCOUNTS—THE NATURE OF EVIDENCE

Some years ago, on each of my annual visits, an aunt updated me on a year's activity in her favorite soap opera. One year she said "…and the Senator was shot, but you must have seen that in the newspaper." She momentarily forgot that this was not a real senator. I am reminded of this when at lunch or dinner colleagues speak matter-of-factly about personas I know nothing about: "He was a Tanner" or "They were Austins." On one occasion a team member reported grimly that a manager did not want the team focusing on a particular category of user by saying, "Hillel wants Irene dead!" (Hillel was the manager. Irene was a persona.) When I inquired later as to how it turned out, the glum answer was, "She's gone." (This Irene was not the one found in this book.)

Such experiences, like reports from authors and actors, illuminate the power of representations. Anecdotal accounts must be approached with caution, especially given the unconscious nature of the phenomena they describe. However, authors and actors devote their professional lives to character representation. They labor to produce convincing fictional representations. Similarly, no carefully controlled laboratory studies have been conducted to prove the effectiveness of persona use. Studies would be good, but the purpose would be to demonstrate beneficial effects, not to prove that personas can be engaging. We already know that personas can engage.

> I figure out from whose point of view the scene should be seen… . Then I start to write. The characters, very often, start to give me ideas. I rely on them [Leonard 1998]. I sort of let my characters audition for me. I listen to them and let them do all the talking [Leonard 1999]. I thought he'd be a good character… . So when I got him into the book and within 20 pages he's in jeopardy, his life's at risk, another character comes along and takes over. There's nothing I can do about that. I let it happen and I'm not going to force this guy to become the main character [Leonard 2002].

Laura Brewer [2003] describes one of her fictional characters coming to life thus:

> At some point in this process you will notice a change. The character will push back. Not only will they react, but they'll initiate action… . Unfortunately it does not always work out so well. The second book was moving well until one of the characters developed this little quirk. He started chasing women. For a while I ignored his activities. I let him go off

> on his own when he wasn't "on stage" in the story. His little romantic adventures never made it into type. They didn't usually reach a conscious level in my planning and I didn't really notice the charisma he was developing. When he started paying attention to the Admiral's daughter I pulled him up short. I could see where this was heading. This time, he had gone too far! I rewrote the scene several times. I took the girl out of the scene. The scene, the whole chapter, didn't work. I set the project aside for a while in frustration. When I came back to it and read over the various versions of the chapter I realized the character had won this round. I did the only thing that I could do. I let the romance develop and married them two chapters later. It was the only way I could keep him from dominating every scene.

After characters "come alive" it becomes relatively effortless to anticipate their responses in new situations. If a character (or persona) named Elaine purchases a cell phone, the author (or designer) can infer how this affects her behavior and create scenarios around it. We draw such inferences about people all the time; we are skilled (though not perfect) at it. If the same data is conveyed as, "Market research shows that 20% of our target users have bought cell phones," it is less clear how a designer can use the information.

In Chapter 4, Christina Wodtke described how this process can also affect persona creation, when a persona team creates a persona who evolves into a "bad guy" and gets out of control, needing to be reined in. Mental representations that enable effortless anticipation of behavior are a powerful aid to design. However, as indicated in the novelists' accounts, power comes with risk. If a persona with a mind of its own ignores our eventual users' activities in favor of pursuing the Admiral's daughter, it will be less than fully effective, like the self-confirming stereotype that ignores disconfirming evidence. This argues for care in persona design and presentation.

There is no single path to inventing good characters, but the most consistent advice to writers after, "Write!" is, "Write about what you know." This enables drawing on knowledge of details to construct convincing situations and characters. Many fictional characters are based in part on real people. Writers often conduct extensive research into settings and occupations—observing, reading about, or interviewing people whose lives reflect aspects of their characters. The "back story" is detail that is often not used in the final product. It is intended to help authors anticipate the responses of fictional characters to events.

PSYCHOLOGICAL EVIDENCE FROM ACTING

Actors preparing to play fictional characters often engage in similar efforts to accumulate detailed knowledge about real people with similar occupations, histories, or attitudes. Actors also invent detail to flesh out a character. The following is from a chapter titled "Creating the Inner Character" in Easty's classic text *On Method Acting* [Easty 1981].

> As he approaches the problems and tasks concerned with finding the Inner Character, the actor can begin by a simple and direct character analysis… to accumulate information about the character which must then be regarded as fact. I say fact because this information must be gathered objectively in much the same light as a statistician or census-taker would gather them. The actor's own relationship to the Inner Character he is portraying must be subjective only in how he will play the knowledge he has found, not what he will play as the character.
>
> The actor's awareness of what is needed for the creation of Inner Character can be greatly stimulated by asking himself honestly, as the character, a series of questions pertinent to the life of the character… . For example, Who am I? What are my particular likes and dislikes? Do I have a hobby? Am I religious? Which religion do I believe in? What is my background? What did my father do for a living? What was my day like? On what street do I live? (Be able to describe the street.) What does my apartment look like? How many rooms do I have? (Give a full description of the type of living quarters that you as the character might inhabit. Give particular detail to the furnishings.) What did I do today? Who did I talk to? What is my basic relationship to the other characters in the play? What is my political outlook or my views on the world situation at the time of this play?… The actor can ask himself what kind of music a character such as this would enjoy. He can then listen at length to pieces of this music, deciding which passages the character would like best and, more important, why… .
>
> With a full character analysis will come relaxation, an easy response of the senses, and concentration.

An obituary for method acting proponent Marlon Brando began [Lyman 2004], "In preparing for his first film role, as a paraplegic veteran in *The Men* (1950), he spent weeks living at a veterans' hospital; many of the film's first audiences came away perplexed, thinking that he was an actual war casualty who had been hired to be in the movie."

Real data informs fictional people. Sound familiar? Details contribute to the representation and allow one to anticipate the posture, tone, gestures, glances, and movements of a character. Knowing the history of furnishings in a character's apartment could affect the way the character will look around the set. Another method acting exercise is improvisation: a novel situation is provided without warning and actors react to it. For example, characters are asked to use unfamiliar software! How will they behave?

Not all writers research extensively, and not all actors prepare with "The Method." Some give more weight to inspiration and instinct derived from years of training. Similarly, good design can spring from invention. On the whole, though, one builds representations of fictional people whose responses one wishes to anticipate through immersion in realistic detail.

SUMMARY: PSYCHOLOGICAL ACCURACY AND FICTIONAL PREPARATION

People shout advice to fictional characters in novels, movies, and television programs. They argue over what the characters did off-screen or after a novel ends. Successful ongoing television dramas or situation comedies require believable characters—better looking or wittier than the average person on the street perhaps, but moderately complex. Stereotypes would grow boring.

Fiction based on research can communicate useful knowledge. Watching a character succumb slowly to a dementia over several episodes of *ER*, one feels one understands the disease better. If the portrayal is based on real observation and data, it could inspire the design of technology to support sufferers.

PSYCHOLOGICAL ASSESSMENTS OF OTHER DESIGN METHODS

Most techniques used alone or in conjunction with personas stress understanding users. Some stress the communication of requirements. This section does not cover all of the methods discussed in Chapter 2. It assesses, in light of the psychological research, the methods most likely to be used in place of personas.

Scenario-based design and task analysis

A scenario is a story with a setting, agents, or actors who have goals or objectives, and a plot or sequence of actions and events [Carroll 2000]. Typically used without personas, scenarios have "actors" to whom relatively little attention is paid. Consider Carroll's example:

> An accountant wishes to open a folder on a system desktop in order to access a memo on budgets. However, the folder is covered up by a budget spreadsheet that the accountant wishes to refer to while reading the memo. The spreadsheet is so large that it nearly fills the display. The accountant pauses for several seconds, resizes the spreadsheet, moves it partially out of the display, opens the folder, opens the memo, resizes and repositions the memo and continues working.

The accountant, typical of actors or agents in scenario-based design, is not well defined—no family, hobbies, or aspirations. The accountant is not engaging. Similarly, task analysis is usually directed toward formal representations. Work is decomposed into constituent elements, with less emphasis given to high-level goals and plans. A scenario can be a good description within the boundaries established for it, but it is not generative—it provides no handle for thinking about a new situation. These weaknesses were noted by Benyon and

Macauley [2002], who recommended supplementing task analysis and scenario use with detailed character sketches.

Scenarios based on data and constructed around personas are key tools, but too often scenarios are used in place of firm data. When poorly anchored in psychological or physical reality, scenarios can be created to promote any feature or to support any position. Bødker [2000] cleverly proposes turning this lemon into lemonade by constructing both utopian and nightmarish scenarios around a proposed design, as a way of stimulating reflection and discussion. A utopian location-aware mobile computing scenario could depict wonderful efficient communication; the nightmare could describe inescapable visibility, interruption, and micromanagement. A scenario, in Bødker's view, is an argument, not a depiction of a work situation.

Stereotypes and traits

Bødker [2000] also addressed stereotypes or caricatures, writing:

> It gives a better effect to create scenarios that are caricatures… . It is much easier… to relate to… . Not that they "believe" in the caricatures, indeed they do not, but it is much easier to use one's commonsense judgment when confronted with a number of extremes than when judging based on some kind of "middle ground."

Team members may consciously realize that a stereotype is exaggerated, but how are they then to anticipate real users' responses to a design? Given no concrete alternative, they may consciously or unconsciously adopt elements of the stereotype, or revert to other biases. As noted earlier, traits are similar to stereotypes. Dynamic traits are more promising, but would require an ongoing effort.

If resources permit, why not provide the team with nuanced representations through personas?

Contextual design

Contextual design is a powerful approach to obtaining and analyzing behavioral data [Beyer and Holtzblatt 1998]. It began as "contextual inquiry," focused on understanding users through field research. Data from the field is used to create flow models, sequence models, artifact models, physical models, and cultural models. These help a field researcher build an understanding of users. They also help in communicating findings to team members, which Beyer and Holtzblatt stressed more and more over time. Although powerful, this analytic decomposition, like task analysis, can be difficult to engage with and use. Personas are a natural complement and partner of contextual design, as Holtzblatt notes in a chapter in this book (see also [Blomquist and Arvola 2002]). Put the other way around, contextual methods can be useful in creating and extending personas.

Ethnography and participatory design: direct contact with specific users

In one sense, the closely observed "informants" of ethnography or descriptive anthropology are ideal personas. They can directly engage our capacity for learning about and engaging with new people. Ethnographic data are expensive to collect in terms of time and resources, and as with contextual design, ethnographers face the challenge of communicating their understanding to designers [Hughes et al. 1992; Dourish and Button 1998], but, when available, ethnographies are valuable contributions [Kiel et al. 2005].

Creating a persona effort around real individuals seems logical, but as noted in Chapter 3 it can have drawbacks. People who match a desired profile have idiosyncrasies that one might not wish to design specifically for. We also face this challenge when developers engage too enthusiastically with the first user they meet. If research shows that 8 of 10 people matching a persona profile have acquired laptops, it is easy to report that a fictional persona has a new laptop. But if you are wedded to a real person who does not have one it complicates matters.

Relying on a small number of real people can mean ignoring or dealing awkwardly with other, potentially useful, sources of information. Usability tests for successive versions cannot employ a small fixed number of people, because exposure to earlier versions will influence subsequent behavior. Reporting composite usability data through a persona is easy, reporting it alongside an ethnographic informant is more complicated. Quantitative data collected from hundreds or thousands of people present similar challenges. Of course, when it is available, ethnographic data is a terrific tool for creating and aging personas, and it can be motivating to use ethnography to introduce team members to some of the real people who underlie the personas.

Personas and ethnography have striking parallels. Each excels in the underlying psychological mechanisms of representation and engagement. Both face the twin challenges of forming and communicating a veridical understanding. Traditional ethnography relies on information obtained from a few people over a longer time to reach an understanding, which is then communicated to others through examples that show the norms and ranges of behavior. Persona design draws on information obtained from many people, over a shorter time, to reach an understanding, which is then communicated to others through examples–personas—that show the norms and ranges of behavior.

Participatory or cooperative design, in which team members and future users interact extensively and get to know each other, is also psychologically compelling. This approach is ideal for projects in which a relatively small development team develops an application for a specific or homogeneous group of users. But it does not work well with a large or distributed

development team, or a diverse and distributed user population. Participatory design and persona use can be viewed as realizing the same outcome in different development contexts [Grudin 2003].

Participatory design and ethnography encounter the "tradition/transcendence trade-off" [Ehn 1993]. Prospective users often focus on the initial disruptive effects that will accompany a new technology. They do not trust that the envisioned benefits will materialize. Such fears can be well founded and should be accepted as part of the response to a product idea. However, this conservative human tendency can be softened in a persona.

FROM ENGAGEMENT TO CARING

Designers of commercial software usually avoid mixing values and design considerations. This has not been universally true of software development. Early Scandinavian participatory design efforts in particular stressed sociopolitical and "quality of life" issues [Ehn 1993]. Today, with computer use often a necessity rather than an option, value issues around security, privacy, spamming, digital property rights, viruses, and other matters are getting more attention. Nevertheless, most usability and interaction design techniques have striven to be value neutral, apart from some attention to universal access.

Persona use is different. It inevitably surfaces sociopolitical issues. Each persona has a gender, age, race, ethnicity, family or cohabitation arrangement, socioeconomic background, work and home environment. Assumptions are easy to identify and challenge. A persona set comprising only middle-age white males becomes an obvious problem. Cooper wrote, "all things being equal, I will use people of different races, genders, nationalities, and colors," noting that the central goal of being credible can limit diversity. (No geriatric hip-hop artists, please.) And that's fine.

Whatever their intentions, a team relying on usability studies, for example, is unlikely to inquire very deeply into the diversity of the participants, few or none of whom they might ever see. But teams live with their personas. A set of personas often starts out with significant diversity, but later an overlooked group is noticed: "Hey, why don't we have any international personas?" Not long afterward, when it is time to expand or change the persona set, international personas are added. This means collecting more data from international users, and as a result they receive more consistent, comprehensive attention.

SUMMARY

Data from psychological studies and artistic experience indicate that we naturally and generatively create and engage with detailed representations of people. Personas tie into this powerful human capability. Most of us do not naturally reason about extensive statistical summaries, but we do reason effortlessly about people, real or fictional. With the power of

personas comes the need to be accurate in constructing them. Evidence suggests that stereotypes might suffice for short projects, but richer personas are better for longer-term use. Personas address weaknesses in some of the major methods that can be used with them. They may be useful in situations in which participatory design is not feasible. Finally, personas can reintroduce a useful discussion of values and diversity in design.