Translation in Personal Crises: Opportunities for Wearables Design

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ABSTRACT

This paper reports on a qualitative study exploring personal crises that emerge during transitions. Personal crises, like crises caused by natural disasters, often lead to new behaviors and opportunities for technology appropriation and design. Through interviews with 14 military veterans re-integrating into civilian society, we find that the veterans' transitions involve several impediments related to translation work—the process through which people make sense of the conflicting rules and norms between former and present social realities. We developed guidelines for the design of new wearable devices that can aid veterans in the translation process by proposing a six-fold schema of design criteria for wearables—detection, nudging, portability/proximity, inconspicuousness, connectivity, and reflection—to empower veterans in managing personal crises, fostering resilience, and creating normalcy. Finally, we develop the concept of *identity creep* to explicate these translation-breakdowns.

Keywords

Transitions, personal crises, identity, identity creep; sensors, wearables, design.

INTRODUCTION

When people experience disruption, the routine practices on which they typically rely may change drastically (Quarantelli, 2005). Disaster studies have explored how people affected by natural disaster, such as earthquakes, modify their routine behaviors to restore normalcy (Dynes, 1970; Mileti, Drabek, & Haas, 1975). Conceptualizing the restoration of normalcy through the context of natural disaster is a sound analytical frame; however, it falls short in studies where crises extends beyond settings of natural disaster, such as personal crises brought on by the death of a loved one, experiencing a chronic disease, or job loss.

In this paper, we explore the personal crises experienced by United States (US) military veterans during their transition back into civil society. The veteran transition experience is complex, as they must often negotiate several personal crises at once, such as post-traumatic stress disorder (PTSD) and traumatic brain injury (TBI). Research suggests that of the 19.6 million veterans living in the US today (Bureau, 2014), 22 veterans commit suicide daily (Times, 2012), and PTSD affects up to 31% of Iraq war veterans (NIH, 2015). Moreover, and what has received less attention, veterans also experience a crisis of identity (Collins, 1998), which becomes entangled with the other personal crises they face in transition. That is, when returning home from military service, the rules and norms of the civilian world conflict with the rules and norms of the military.

Whereas recent scholarship in crisis informatics has focused on the use of information communication technologies (ICTs) during disruptive events as caused by natural disaster and earthquakes (Mark & Semaan, 2008; Palen & Liu, 2007; Palen & Vieweg, 2008; Vieweg, Hughes, Starbird, & Palen, 2010), the personal crises veterans experience are difficult to detect (Saleh, Saltmarsh, Favarò, & Brevault, 2013) and often require a number of resources to facilitate recovery and restore normalcy (O'Sullivan, Kuziemsky, Toal-Sullivan, & Corneil, 2013). Previous studies of veteran transition have also explored how veterans appropriate mobile ICTs to seek and provide mentorship (Semaan, Britton, & Dosono, 2016; Weick, 1995), manage identity and personal disclosure

(Semaan et. al, 2017), control emotions (MacLean, Roseway, & Czerwinski, 2013), and for PTSD-detection in clinical settings (Fletcher et al., 2011; Webb, Vincent, Jin, & Pollack, 2013). However, to our knowledge, few studies explore in situ design opportunities for sensor devices, such as wearables, to aid veterans in the important translation work—whereby people make sense of conflicting rules and norms—of managing personal crises.

Through a qualitative interview study, we uncover several issues that veterans experience in adapting to the civilian world, and how wearable technology and its design present rich opportunities for augmenting current issues faced in struggles to develop a new normal. We find that the issues they experience relate to difficulties translating between the rules and norms of military and civilian social structures. We introduce the concept of *identity creep*—when previous rules and norms creep into the present, thus creating moments of breakdowns in translation. To address this, we analyze issues that emerged from interview data to inform design criteria for wearable devices, which have the potential to empower veterans in engaging in translation work.

LITERATURE REVIEW

Personal Crises, Transition, and ICT-use

In the aftermath of a personal crisis, people undergo a transition process—a period of adjustment whereby people cope with changing routines, relationships, and roles (Schlossberg, 1995). Importantly, one of the major obstacles experienced in transition relates to emergent crises of identity.

Goffman (Goffman et. al, 1978) describes how identity is a social construction whereby people draw on well-defined rules and norms within a social setting. We often draw on these rules and norms as a means through which we manage other people's impressions of us—or, what Goffman refers to as impression management. The rules and norms that we draw on can vary across different social settings. For example, the ways in which people act in the privacy of their own homes can differ from how they act at work, or in a public space, as the rules and norms of any given setting differ. Identity crises in transition, then, emerge from conflicting rules and norms as people transition from one social setting to an unfamiliar environment.

The process through which people make sense of conflicting rules and norms is a type of translation work—a process where people learn to integrate the rules and norms of their new social structure into their identity. This translation work emerges across three phases—separation, liminality, and incorporation—or, what are known as the rites of passage (Van Gennep, 2011). For the purposes of this paper, we focus on the translation work that emerges during the liminality phase. Liminality is defined as the 'space between'—whereby people learn and make sense of new rules and norms. For example, when a veteran starts a new job, the rules and norms of their present work environment may differ from the rules and norms of their former work environment. Thus, during the liminality phase, people engage in the translation work necessary to make sense of these differences, to incorporate these differences into their identity.

Veterans often experience identity crises caused by the civil-military cultural gap (Erikson, 1994). That is, there exist intense differences between the rules and norms of the military world and the rules and norms of the civilian world require. On the one hand, the social structures of military culture are centered on collectivist values, hierarchy, obedience and control, structured routines, hyper-masculinity, and merit-based remunerations. On the other hand, the social structures of civilian culture are centered on individualism and freedom from authority and control. These stark differences in the social structures of military and civil societies can create various issues for veterans as they engage in the translation work necessary to incorporate the rules of civil society into their new identities. For example, veterans may struggle to make sense of the ways in which organizations promote members in the civilian world. Whereas in the military promotion is based purely on merit and time served, in civilian society promotion can be related to values that are foreign to veterans, such as how well people social network.

Research exploring the role of technology during transitions has explored residential moves (Shklovski, Kraut, & Cummings, 2006), breakups (Massimi, Dimond, & Le Dantec, 2012; Sas & Whittaker, 2013), bereavement (Mancini, Sinan, & Bonanno, 2015), sexual assault, homelessness (Le Dantec & Edwards, 2008), the transition from high school to college (Cummings, Lee, & Kraut, 2006), and gender transitions (Haimson, Brubaker, Dombrowski, & Hayes, 2015). Most relevant to our work have been studies exploring technology use amongst veterans undergoing the transition back to civil society (Franco, 2016). Semaan et al., 2016 found that veterans used social and mobile media as a means to make sense of the rules and norms of civil society and develop identity awareness. Similarly, Semaan, Britton, and Dosono (2017, forth), found that the hyper-masculine norms of military life impacted veterans when disclosing issues while in transition, but that they used online platforms, such as Facebook, to navigate these challenges and connect with supportive resources. Moreover, Franco and colleagues (Franco, 2016) developed a mobile application to help veterans prevent and detect anger issues.

Identity Crises and Veteran Transitions: Towards Opportunities for Wearable ICT Design

Whereas previous work has started to explore the role of technology to help facilitate the veteran transition process, to our knowledge, few studies exist that explore design opportunities for sensor devices, such as wearables, in helping veterans engage in the translation work necessary to manage personal crises and subsequently adapt to new rules and norms while transitioning into civil society.

Previous studies have explored wearable use for mental health recovery and life transitions such as using a wearable to foster identity and self-awareness for children with ADHD (Garcia, Bruyckere, Keyson, & Romero, 2013; Kefalidou et al., 2014), a biofeedback stress-intervention tool (MacLean, Roseway, and Czerwinski 2013), for "Just in Time Adaptive Interventions" (Nahum-Shani et al., 2014), stress detection of depression in college students, and DIY-created applications (Webb et al. 2013; Fletcher et al. 2011; Tan et al. 2010). Other studies include the use of situated and participative enactment of scenarios" in HCI design of wireless devices (Iacucci & Kuutti, 2002), and using wearables to enhance self-reflection (Kefalidou et al., 2014). These studies underscore the promise of biosensors for tracking health information, a practice highly applicable to a wearable device for veterans.

However, existing studies do not use *in situ* commercial technologies and have not focused on translation work. Research exploring the translation work by populations undergoing transitions has found that the liminal phase has negative psychological consequences (Noble & Walker, 1997) and we believe that there exist opportunities to design wearables to aid veterans in this critical process. Obtaining accurate, timely information about situated activity from veterans is difficult and yet critical to detecting and recording behaviors of more and less successful cases.

METHODOLOGY

We use semi-structured interview data of US veterans undergoing re-integration into civil society. Our data is part of a broader study of the use of ICTs by underserved populations experiencing life disruptions. We draw on interviews conducted from May 2015 to May 2016 with fourteen US military veterans. Informants served various deployments in relatively recent US-involved conflicts including Operation Desert Shield, Operation Desert Storm, Operation Iraqi Freedom, and Operation Enduring Freedom.

To ensure a diverse representation of veterans, we recruited from multiple sources concurrently, such as through the Institute for Veteran and Military Families (IVMF) and Veteran Administration (VA); and snowball sampling. Study eligibility was limited to participants who had served in the military. We did not limit recruitment by campaign served or window of time since discharge given our conversations with experts at the IVMF and VA and the literature, which emphasized the longitudinal dimension of the reintegration process, spanning months or years after the initial transition. Participants did not receive compensation for their involvement in the study.

Interviews consisted of semi-structured life histories that ranged from 1 – 4 hours. We conducted face-to-face interviews where the participant felt most comfortable, such as at a café or at home, or via Skype or the telephone. During the interviews, we asked veterans to guide us through their lives before, during, and after military service. We asked about their daily routines from when they were in the military to their current processes, and any issues faced during the liminal stage of their transition. Instead of prompting the veterans about their use of ICTs, we allowed that information to come out of the discussion organically. All informants reported the proficient use of technology. All interviews were audio recorded and transcribed for later analysis.

The process of coding was ongoing, and the research team met multiple times a week to discuss findings in a collaborative coding approach. We conducted inductive and thematic analyses of the data by coding and memo-ing, using a technique from grounded theory (Strauss and Corbin). Several codes emerged, e.g. PTSD and shame, which related to the issues arising from shift from military to civilian life and veterans' attempts to manage issues. We grouped issues and management strategies into broad themes, through axial coding, and these latter code categories included social rejection and self management.

Our participants comprised fourteen veterans (5 female, 9 male) who served in the Air Force, Army, Marines, and Navy and served in a variety of positions, including infantry, technical infrastructure engineers, and officers. All participants were discharged from active duty between 3 months to 10 years ago. Participants have a wide span of educational attainment ranging from no college to a doctorate degree. Their current employment status is also diverse, from unemployed and full-time student to entrepreneur and IT engineer.

RESEARCH SETTING: A LACK OF ASSISTANCE IN TRANSLATING EXPERIENCES

Veterans experience lack of assistance translating experiences due to the inadequacy of formal transition assistance programs. As a result of the military's pervasive hyper-masculine, collectivist culture and the lack of

formal assistance and structure, veterans are unprepared for the social, cultural, and emotional translational work necessary for transition to civil society. They find themselves failing: to find employment, to successfully complete school, amongst a range of shortcomings.

Veterans who experienced trauma during active duty now suffer from mental and physical injuries. Our informants experience a host of mental health issues including PTSD, alcoholism, homelessness, hyperarousal, anger issues, depression, and suicidal ideation. Physical health issues range from TBI and chronic pain to loss of limbs.

Moreover, and as will be described in detail in subsequent sections, veterans also experienced trauma in translating between the rules and norms of military and civilian social worlds, as related to the shift from norms dictated by collectivism, hyper-masculinity, obedience to authority, routinized structures, and merit-based rewards, to norms dictated by individualism.

Informants expressed how formal programs do not prepare or train veterans for the social and cultural skills they need to successfully transition. Our informants felt blindsided by underestimating the extent to which the level of difficulty transitioning would affect their mental, social, and physical well-being. As one participant reported:

"You see that people are changing jobs every 18 months or two years. They can't stick with a job. It's not that they can't stick with a job. But it's that navigation, but figuring out what the truth is. Understanding what you're good at. Trying to get the organization to map the skills you need. Whereas with the military they are looking at you as a person, instead of a headcount. It's a huge paradigm shift and nobody tells you that everything is going to be turned on its head."

Whereas programs exist to help veterans adjust to their life as civilians, our informants described how formal transition programs such as the Transition Assistance Program (TAP), fall short. Similarly, participants described how the VA did not prepare them to re-enter society, providing only generic job-seeking guidance. Programs leave out critical reintegration preparation such as social literacy skills. Informants elaborated on how the programs fail to address organizational culture, networking, and facing the translation of military norms to civilian norms in the context of work. As such, formal assistance is not available to help them cope with the emotional side of adapting to civil society.

RESULTS

Through the analysis of informant accounts, we discovered that various personal crises emerge as veterans grapple with their changing identity and circumstances. Their efforts to live productively between two worlds involves translating between the norms and rules governing their former and current social worlds. Reconciling two worlds aggravates implicit tensions and are experienced as triggers, or stressful events characterized by unpleasant emotional upheavals (Noble and Walker, 1997). In the sections that follow, we expound on the informant accounts of issues in transition, and then focus on how issues could be addressed with the use and design of wearable ICTs, illustrating opportunities for the design of wearable ICTs that can help people undergo the translation process while in transition

ISSUES IN TRANSLATION WORK

Social Rejection in a New Social Reality

In this section, we discuss how veterans encounter difficulties generated by conflicting rules and norms related to social rejection. These social rejection issues include: *difficulty maintaining and forming relationships because of stereotyping and stigma* and *difficulty maintaining military relationships because of loss of camaraderie*.

Difficulty Maintaining Relationships: Stereotypes and stigma

Social rejections can act as triggers for personal crisis, and occur when relationships crumble because of the difficulty translating military-informed cultural norms of relationships, active duty experiences, and skills to a new social reality. When relationships between veterans and their families or significant others were not strained or complicated by outright hostility, they were tense and uncommunicative from lack of understanding of each others' respective norms and rules. As conveyed by P7, stereotypes of military members was a cultural mismatch between her own and her civilian colleagues' "preconceived notions" about her identity:

"I think the biggest problems I've had are just fitting in. I fit in just fine in the military. I kept up with the guys. That doesn't seem to fit as well on the civilian side. …People aren't very accepting and they get preconceived notions about you. Some love you, then others think you're all baby killers."

In the context of medical relationships, veterans had issues communicating psychological health needs when the hyper-masculine norms and rules of strength, pride and hiding weakness led them to deny mental health problems because the doctor's norms and rules of communicative transparency by talking about psychological health concerns (what veteran norms consider "weaknesses"). Further, the conflicting norms of civilian doctors and veterans relating to identifying and treating health needs emerged as the issue of a stereotyping P13's issues and subsequently mistreating her PTSD:

"In their infinite wisdom, they put a single female with depression issues and PTSD into a mother's post-partem depression group. That's just asinine to put me into a lumped in depression group with all these people who were talking about how they feel after they had their kid."

Furthermore, family members were not always sympathetic to the veteran's experiences and do not understand that their child's experience is a rational response in the face of unreasonable circumstances of the liminal phase, where the social reality of their military experiences creeps into their civilian social expectations, relationship formation and maintenance, and mental health disruptions. P9's parents disparaged her experience and created relationship tensions:

"My parents are not very supportive in this matter, and my dad called me and told me to stop acting like a child."

Family members would infantilize their grown children, denying their emotional or mental competent in coping with health issues, further stigmatizing veterans' valid experiences of traumatization and choking a dwindling source of trusted social support.

Our informants faced communication breakdowns that ranged from language barriers and cultural communication misfires to stereotypical and stigmatizing criticism, to skepticism about informants' technical competency. This judgement of a veteran's mental health, work ethic, and wartime experience by family members, health providers, and workplace colleagues caused conflict and feelings of social rejection.

Difficulty Maintaining Military Relationships: Loss of Camaraderie

Informants described issues related to the loss of camaraderie in the civilian world. One informant, for example, compared the tensions of translating the different "mentalities" of military and civilian interpersonal relationships:

"I liked military life. There's a lot of BS that goes with it, but I'd rather be around someone who was in the military. [Civilians] want to throw you under the bus for a 10 cent raise." [P7]

Often, veterans would only talk to people who they perceived would understand their experience because they anticipated these translational obstacles and the ensuing issues that emerged:

"I would only talk to the people who would understand military life. I couldn't talk to close people to me. My mom, my dad, or my brother, they didn't understand that I carry around this semi-automatic gun, I'm going in kicking doors down and doing this really dangerous stuff. They didn't really understand what I saw on TV. The crazy bombs and the shootouts, they didn't understand the normal day to day experience." [P2]

The conflicting norms about how to relate to others contributed to social rejection and isolation which emerged for veterans as the issue of a dearth of camaraderie. Six of our informants expressed the feeling of loss as a need for camaraderie which resulted because of the cultural breakdowns in how to form social relationships.

"Just trying to get that network back, I mean I missed having the camaraderie, you know it's like who's going to get coffee this morning, you know, hey I'm going to get lunch who wants something. ...It's just been a huge, gap in my life since leaving. People come and go at work and you're lucky if you get a good morning out of them." [P2]

Social rejection was a serious issues that came from a breakdown in rules and norms around how communicate past experiences of war to significant others and present feelings and thoughts that could be mental health concerns to medical providers, and made it difficult to climb the professional ladder because of different values of merit and reward systems in producing economic value and participating in the workplace, and to relate to others intimately in experiences of friendship called "camaraderie" in military norms, rules, and cultural practices.

Self Management and Self Control

In this section, we discuss how veterans experience issues that emerge from the conflicting rules and norms differentiating the military and civilian worlds as related to self management and self control. Through our analysis of informant accounts, we identify several issues making it difficult for veterans to engage in translation work necessary, including: *betrayal and alienation, difficulty identifying internal states,* and the *loss of structure.*

Betrayal and alienation: Ambushed by a lack of control over body and mind

Twelve information described suffering from multiple psycho-social issues in tandem, ranging from PTSD to suicidal tendencies. These issues stemmed from their experiences in the military. For example, one informant who was sexually harassed suffered from assault trauma as well as self-inflicted injury:

"I had a very hard time, I was sexually harassed, it was swept under the rug. It was just a shitty, shitty, time…That morning I decided to shoot myself...I missed my heart by a couple of centimeters. I messed up my lung, and I had three chest tubes…."

While in transition, our informants experienced a lack of control over basic physical and mental needs. That is, their experiences in the military transferred to the civilian world, and they attempted to translate their experiences by drawing on the norms of military society. P8, an African American female veteran, described how she reacted to situations in the civilian world based on her experiences in the military, thus reacting to situations by drawing on her combat experiences:

"I would try to think first, then act. But with my training, I would react first, then think. Any sudden, unexpected noise in an environment would make me afraid."

This alarming, emotionally overwhelming experience of involuntary surrender of sovereignty over one's own thoughts and actions alienates the veteran from herself. Self management becomes difficult, then, because it is impossible to establish a foundational level of trust when frequent, repeated betrayals of body and mind in reaction to social and environmental contexts ambush their plans. In other words, our informants described how behaviors formed through previous military experience undermined their sense of agency:

"You don't have to tell someone if they ask, it's supposed to be your choice, but the way PTSD works is that it makes you do things differently."

Our participants cited thunder, rapid movements by family members, large crowds, and fireworks that caused emotional upheavals leading to uncontrollable behaviors:

"When I went home, it was July and I had already been blown up twice at that time. Fireworks were not my cup of tea. Being in Louisiana around July, they go off all the time and it doesn't matter. That was really intense for me. Dealing with that emotionally was really intense." [P2]

Betrayed by social understandings of reality carried over from her previous military experience, uncertainty festered creating the emotional tolls of frustration and anxiety. Previous rules and norms that successfully predicted danger break down when confronted with fundamentally different social realities. She no longer can manage her thoughts and actions, and fears for those around her, as well as struggles to understand these disruptions, especially their seemingly unpredictable onsets. Many veterans get "ambushed" by PTSD symptoms of intrusion (Sherman, 2015):

"When I was in Iraq, we heard a lot of improvised explosive devices (IED). …We heard a lot of these explosions all the time. … I'm working and my back is to the window, and I hear this roar. I didn't know what it was and I jumped under my desk, and I had just gotten back from Iraq and my colleagues come running, and I said, get down, get down, I don't know what's going on! And they said, what's wrong? I said, did you hear that! It was thunder. There's no thunder in Iraq, it doesn't rain! That persisted for years!" [P8]

Control over mind and body is a major issue that requires negotiating new social and environmental realities, given that the disruptions come from the old world-learned schemas creeping into the new social reality, making translation work difficult.

Difficulty identifying internal states: emotional availability

Informants reported having difficulty recognizing the cause of a stressful trigger because the causes are often multiple or the nature of the cause is an inarticulable cultural mistranslation. This issue emerges as veterans draw on the norms of military culture, or hyper-masculinity, which puts a premium of stoicism and impassivity, where hiding weakness is a source of pride. P8 describes how she had to repress emotions and identity in the military and acknowledges that the military likes to "pretend things don't happen":

"For a female I always said that you either had to be a lesbian, you either had to be a bitch or you had to pretend nothing bothered you. So I had to put myself in a category because being nice was not really going to work for me."

Few veterans are aware that the military's masculine culture dictates values of impression management such hiding weakness by denying issues through restrained disclosure:

"I went to a counselor to see if there's something wrong with me. I went to her and I wasn't ready to admit that I had PTSD. I was in denial, I didn't go for treatment..."[P7]

As a result of this bottling up, informants described difficulty connecting with others, because they would not or could not talk about their experiences. This results in a coping mechanism of becoming emotionally unavailable. As described by P8:

"As far as emotionally, dealing with not really having the people you could talk to about that understand your everyday experience when you were in the military, I didn't have any of those in my life."

Further, veterans often experience difficulties with self-imposed isolation as a response to this emotional unavailability, compounding issues cited in the previous section on social rejection in a new social reality. Emotional control, a norm of military culture, makes translation work difficult as people continue to draw on hyper-masculinity rather than seek support and disclose their struggles.

Loss of Structure: diminished self-worth from perceived lack of purpose

During their transitions, one of the most dramatic differences between military and civil society related to a loss of purpose. That is, as informants shifted to civil society, they no longer felt that their lives held meaning. The shift from collectivism to individualism created a vacuum in sense of purpose because without the collectivist culture to declare goals, our veteran informants were not used to generating self-direction. Seven informants professed difficulty transitioning based on lack of purpose linked to collectivist imperatives. As described by P6:

"Knowing the mindset of the soldier is that you often do things that don't make sense, but it's part of the bigger picture and you have to do it anyways. Compared to being a civilian, you're doing it for yourself and only yourself. You don't see the big picture of how you're making an impact…"

Thus, informants were drawing on the social structures of military culture when translating their experiences in the civilian world. This created disruptions in their ability to transition as, by applying rules and norms of military social structures to the civilian world, they had difficulty in determining their purpose. As described by our informants:

"I went from being a war hero who got these medals to being a college student who doesn't know how to write papers, doesn't know how to ask for help, doesn't know anything about the civilian world."

In the military, the purpose and goals were clear:

"You knew who was evaluated and very clear who was in charge," whereas "going through the transition you realize you're just a speck in this great big world. You become nothing again."

The liminal pressure applied by transition into civil society requires a translation of an old identity and purpose to a new one, formed in a negotiation with others who co-constitute civilian society. This intersubjective process requires a radical reconfiguration of social reality and the understanding of identity politics. One informant described the experience with language of mourning at abandonment of her identity when forced to suppress her military persona:

"Transition is almost like the death of a career. Once I did transition and I talked to other people, they had the same challenge that I did…You can't really be who you are, you have to put your game face on." [P8]

The abrupt change from a highly-structured environment where "someone who is higher ranking than you orders you to do stuff" to radical freedom made our informants feel unprepared for civilian life. In the military, daily activities included structured routines, rigorous physical training, strict adherence to time schedules, a lack of personal freedom, and disciplinary action for infraction. However, civilian life is unstructured and individualistic, representing a seismic shift in motivation mechanisms for veterans from an intimidation and reward model to self-initiated approach. Five of our informants expressed how many aspects of their activities were motivated by a superior. As described by P5:

"You had this drive that wasn't really yours. You have someone who outranks you telling you what to do that can get you in trouble."

This hierarchical and collectivist organization culture which dictated our informants structure and routines made the freedom of civilian life challenging. Ten participants expressed how one of the greatest challenges was the lack of structure. As described by P2:

"What made it difficult was the freedom. Really… I was on my own, and I had to structure my own time."

Difficulty with structure included those who had responsibilities and activities imposed on them by civilian

responsibilities. Structuring daily activities even proved difficult for P5, a married man in his mid-40s with children who said his greatest challenge was "… transitioning from a very structured and disciplined environment to a non-structured undisciplined." For P2, a major obstacle for him in civilian life was self-motivation:

"You're depending on yourself rather than a government official telling you what you have to do for the day…When you transition from the military back to being a civilian, you have to have your own drive to get up, go to work, make the best of your everyday life."

Without the structure, participants struggle to navigate for years:

"I'm used to a military structure and it's still hard, even though I've been out for 10 years. I'm going back to school and trying to get my degree, but I don't know what to do, I feel like, a little lost."

The lack of structure in daily activities once provided by the military affected veterans' ability to engage in the translation work necessary to shift from being in the military to assuming their civilian identities.

OPPORTUNITIES FOR WEARABLE DESIGN

Wearable ICTs have gained popularity, largely for managing fitness and health activity. Wearables are commonly equipped with several functions, including: sensors which derive heart rate variability (HRV) and skin conductance to detect a range of cognitive-physiological states such as stress, sleep, attention, and arousal. Wearables also feature real-time trace data markers such as geo-proximal tags "that can accurately stream data that can be stored for retrieval and review at a later time point or transmitted wirelessly for real-time review and analysis" (Carreiro et al., 2015). Wearable devices are also capable of multi-platform connectivity to access a dashboard and visualizations of personal and social network contacts' data either locally or on a web-browser via mobile phones. Further, the culture of quantified self is becoming more mainstream, evidenced by the rapid proliferation of fitness trackers and medical grade devices for personal health management (Martins, 2007; Vawdrey, Hall, Knutson, & Archibald, 2003). Based on the issues faced by veterans, we identified 6 wearable features that enable veteran resiliency in transition: detection, nudging, portability/proximity, inconspicuousness, connectivity, and reflection.

Detection

Wearable devices have stress and emotion detection capacity. Sensors such as electrodermal activity (EDA) and photoplethysmogram (PPG) sensors allow algorithmic detection of heart rate variability (HVR) and arousal, physiological events that are correlated with stress and agitation (Mark, Wang, & Niiya, 2014; Tan et al., 2010).

In our study, we found that people had difficulty detecting issues they were experiencing. For example, they experienced social rejection from the projected stigma of colleagues, family, and friends, and feelings of loss of camaraderie. As reported by P7 and P13, among others, the stigma and stereotypes projected by colleagues, family, and the masculine military culture rendered their experiences as illegitimate and irrational. They need for a way of legitimizing the experiences as rational and "real." Without objective measurement of physiological events and an ability to view mental and physical reactions over time, personal health becomes intractable and even invisible; that is, not easily detected by others, including close friends, family members, or even the individual herself (Semaan et. al 2017, in press; Van Kleef, 2009). Critical events, such as the PTSD-episodes and emotions that prove initially difficult to communicate reported by our participants, are experiences that are often amorphous and imprecise. For example, detection and documentation with physiological data can help lessen the denial of PTSD and assist with the issues of loss of control, by providing a visual and visceral report of bodily activities.

Further, those who report trouble dealing with emotions and mental states like nostalgia, loneliness, and purposelessness, can use detection features to capture the lived experience coupled with consistent physical data over time. Our results suggested that veterans have a need for camaraderie. They struggle with a need social connection and collaborative sense-making of a new social reality. Through detection, veterans can use the wearable as an artifact that makes visible the invisible emotional pain and labor that was previously undocumented in this translational work (Star & Griesemer, 1989). In this way, the wearable has the potential to serve as a neutral third party in the negotiation of veteran's relationship with family, medical team, and social support resources, those belonging to a different social reality than the veterans.

Nudging

A smart wearable device can detect stress and depressive states above or below a given threshold, or in a specified triggering location or situation, and notify the wearer through vibration signals, colors, or other modes of

communication. For veterans immersed in a masculine culture, our results indicate that veterans have trouble dealing with the anxiety and paralysis that accompanies repeated, unpredictable, emotionally overwhelming situations. Our results showed that people were unaware of their feelings and reactions to social and environmental stimuli. Also, because such ambushes trigger a "fight or flight" mechanism, veterans are either fighting or fleeing so cannot mark the moment of crisis in real time. These emotional events are often inarticulable during as well as after the event. For example, many reported they feel a loss of control, and they were trained to "react first, then think." This is not uncommon; patients often express their emotional pain through physical symptoms, especially those who have trouble articulating themselves (Nahum-Shani et al. 2014; A. Smith 2015) such as in a masculine culture of non-disclosure and restrained performance of emotions of the military. These reactions and inability to identify mental states or emotional sensations makes it difficult to manage them, a highly disruptive situation for many of our informants.

A smart wearable device can detect stress and depressive states above or below a given threshold or in a specified triggering location or situation and notify her. That is, the algorithm adjusts to the baseline physiological profile of a veteran, and can nudge them when a threshold is reached or a trigger location is entered to helpfully prompt the awareness of the veteran. The nudging feature can train on the user-input data, such as logging a stressful work event, or feeling isolated at home, and learn to nudge the wearer if their physiological data indicates a neurophysiological correlate of, e.g., a depressive state, anger, and anxiety. User-applied tags for each state will train the device, pairing subjective input with objective data such as HRV, geographic coordinates, or breathing rate. Over time, the nudging mechanism conditions the wearer's emotional availability through self-observation.

Portable with proximal connectivity

A wearable device is "always on, always connected." It can gather geographic location data using geographic coordinates and user-input made available through mobile GPS and check-in apps, e.g. Yelp. Our results show that place and location can be triggers for veterans. The locations that cause issues are usually uncontrolled environments 'in the wild,' such as public spaces. For example, a grocery store setting with as a busy, crowded space, or a family gathering where loud sounds are frequent can trigger anxiety and PTSD symptoms. Because of this unpredictability that can culminate in an experience of betrayal and alienation of the body and the mind, veterans have difficulty retrospectively remembering the context of the trigger events, which causes difficulties in accurately reporting their symptoms to a medical provider.

Geolocation data can address these reported issues of unpredictability, alienation, and documenting trigger environments, working with detection features of the wearable ICT. The mobility facilitates the detection of emotional states that the veteran cannot make immediate sense of by offering "on the fly" documentation, directing addressing the need to avoid retrospective bias associated with reconstructive memory during common trigger contexts. Further, continuous, portable monitoring can afford a sense of omnipresence of friends and social supporters. That is, the physical sensation of a wearable is consistent with extant therapy approaches, such as therapeutic "grounding" techniques (Coffey, Schumacher, Brimo, & Brady, 2005). For example, a smartwatch has the potential to act as a reassuring presence, that the veteran has continuing support in every environment, regardless of time or situation.

Inconspicuous

There is a widespread use of wearable devices use like smart watches and they are non-invasive, looking not like a medical device but a cultural item, e.g. fashion accessory or timekeeping device. The devices are small, and blend not recognized as a medical device per se. In our study, we found that the hyper-masculine norms of military culture led to a lack of disclosure (c.f. Semaan et al., 2017). Thus, the discreetness of a wearable empowers veterans in self management and control during translation breakdowns, where they can record experiences undetected until prepared to disclose.

Because a wearable is either concealed (e.g. a GSR-enabled sock (Healey, 2011)) or commonly worn as a mainstream commercial item, it is relatively unobtrusive, and discreet. Veterans express a need for performing normalcy, that is, translating experiences when confronted with social rejection or hyper-masculine cultural conflict. The watch as a commercial, not medical, device provides a sense of fitting in, and is a metaphor for their experience not as a "disorder" but as a valid, rational reaction to traumatic or crisis experiences. To the point, a wearable has the potential to effectively circumvent the stigma we found in our study associated with mental health issues through the widespread use of wearable devices because of its inconspicuousness.

Social connectivity

Wearables can support applications and are compatible with other ICTs such as mobile phones and laptop

computers, making it possible to assemble additional technical and social networks of support by integrating social media into a resilience and recovery plan. Social rejection in a new social reality demands social connection for translating that social reality into terms that can be understood. Veterans need ways to find, engage with, and share information and social connection with civilians and military comrades alike. The wearable is compatible with social media applications, and the data it collects can potentially be a source of shared understanding. A veteran that is alienated from family member can use the wearable technology trace data to explain their reality, and to connect with former military compatriots to give back to those that have similar profiles to their own.

Communication plays a pivotal role in mediating isolation and for accessing "just in time" support. It also helps veterans to reach to help veteran peers in turn (Nahum-Shani et al., 2014) and connects veterans with similar experiences. Compatibility with other ICTs makes it possible to assemble additional technical and social networks of support, integrating other mobile apps and social media into the resilience and recovery plan.

Reflection and longitudinal evaluation

The watch can provide event-data for long-term analytics and diary practices, by logging physiological data and user-input psycho-physiological states. The labor of translating military work skills and change in culture weighs heavy on veterans' ability to manage personal crises. A wearable might help the veterans document episodes of mistranslation, and natural language algorithms cluster the tags veterans impute on these episodes by environment (e.g. "at work"). Thus, these episode-environment tag-pairs and/or geolocation data can help veterans to see patterns of behavior. The dashboard connected to the wearable app (available through a mobile or PC application) then pairs them with other users with similar experience, e.g. veterans who have similar experiences. A "recommended buddy" can help to connect veterans who are struggling with similar issues as well as those who have successfully managed episodes of mistranslation.

In our study, we found difficulty controlling thoughts and emotions during translational breakdown such as in thunderstorm or firework triggers. A wearable and the associated dashboard platform aggregates event data and analyze patterns so the veteran can make sense of these unpredictable, ostensibly isolated, unrelated incidences. Such long-term analytics can help the veteran prepare for a crisis by developing sensitivity to trigger "clues," especially given the common experience our veterans reported: it takes years to feel that they have made progress in reintegrating. Thus, reflection practices in tandem with physiological data also promotes self-awareness and collective sense-making to translate across the divide of cultural norms and rules by sharing data with trusted others in the present culture (Weick, 1995).

Further, our results show that veterans had difficulty with a lack of structure in their lives after military service. The wearable application and a connected dashboard can provide structure, for example, by proving an option for segmenting a veteran's day, week, or year into goals to achieve or to schedule activities, including a calendar view. These types of structuring affordances can reflect military structures at first, for example, reward-system with badges that reflect military merits when goals are achieved, and scaffold the veteran's involvement in scheduling and reporting activities as he or she recovers and feels more independent over time.

DISCUSSION

In our study, we described disruptions that emerge during transitions. Previous studies of veteran transition have explored how veterans appropriate mobile ICTs to seek and provide mentorship (Semaan et al., 2016), manage identity and personal disclosure (Semaan et. al, 2017), control emotions (MacLean et al., 2013), and in the clinical use of sensor-technology for PTSD-detection (Fletcher et al., 2011; Webb et al., 2013). However, to our knowledge, few studies explore in situ design opportunities for sensor devices, such as wearables, to aid veterans in the important translation work of managing personal crises.

To describe veterans' translation breakdowns, we introduce the concept of identity creep: the episodic breakdowns in translation that occur when previous cultural rules and norms creep into the present. For example, veterans experienced identity creep when triggers such as the sound of thunder or exposure to large crowds in a supermarket caused emotional and mental turmoil, making it difficult to function in everyday civilian contexts. When environmental or social realities come into conflict, intrusive moments such as this are symptomatic of identity creep.

Whereas some veterans have been successful in managing chronic personal crises while in transition (Semaan and colleagues), this is not the norm as indicated by the suicide rate, alcohol abuse, homelessness, and other issues that plague the veteran community. We believe that the affordances of ICTs, especially those with sensory capabilities, can help people understand these conflicts—as the conflicts, whether emergent from identity crises or PTSD have negative psychological consequences (Noble and Walker, 1997).

We suggest ICTs or wearables are not a silver bullet solution. ICT design requires a view of the veterans in a rich, messy context (Viseu & Suchman, 2010). We argue that ICTs like wearable technology are not immediate fixes, but rather have a powerful potential to augment the recovery process of veterans returning from active duty. For wearable technologies to do so, however, a study of the intimate connections of humans and wearables requires ongoing attention to the labors of our informants, such as pen-and-journal diaries and physiological data alike, that are indispensable to the successful maintenance of human-machine interactions. For example, researchers should not discount the power of face to face interactions of veteran mentors that are pivotal in translating work skills developed in the military to civilian contexts. This process has been effective in research on veterans and mentorship programs such as iPeer (Rizia et al., 2015), which involve a combination of face-to-face mentorship and ICT-mediated contact between veterans and support persons.

Further, when it comes to veterans in transition, especially in design involving quantified self, the body–a site of privacy and identity–is the primary source of data generation and collection. For example, issues of privacy were forefront in our informant data. In the civilian workplace, veterans saw disclosure as a liability in veterans' reintegration. Moreover, we note with caution that a wearable device is a status symbol, like clothing or a car, given that it is costly and may indicate in-group belonging. As such, there are both opportunities for improving translation processes with civilians as well as mis-translations because the artifact's symbolic cultural meaning may misrepresent belonging to a social group, e.g. a smartwatch may convey the wearer as technologically proficient and concerned with fitness.

Thus, the design criteria put forth in this paper is contingent on the input, feedback, and opinions of users, and the veteran user should control the ICTs' design to the greatest extent possible. The proposed criterion should be vetted through a participatory design study with all invested parties (i.e., veterans, health care providers, and research team).

CONCLUSION

Veterans re-integrating from civil society experience several chronic crises related to translation struggles, making it difficult for them to return to normalcy: social isolation, body-alienation, and self-management. We illustrate ways in which wearable technologies could help veterans and other populations undergoing similar crises to regain normalcy. The wearable promises to address these betrayals of body and mind through features that have proven to be effective in cultivating sensitivity to and awareness of internal states.

We highlight the importance of expanding research on personal crises and ICT-use during the processes of translation during life disruptions, while cautioning that the labor of transition is not addressed by technology alone. As the veteran population continues to grow, it will become increasingly important for more scholars to focus on this vulnerable and undeserved population.

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