Sample only

Relevant background/literature review:

(example 1)

In the United States, it is estimated that the need for prosthetic limb devices will triple by the year 2050[2]. Given the increasing rate of diabetes, which is expected to double by 2030, and other factors of limb loss such as trauma, dysvascular disease, and cancer[2]; it is evident that current standard of care practices can use definite and measurable change to improve the quality of life of those affected by this condition. Traditional socket suspension methods do not provide viable solutions for many who have need of prosthetic assistance. "Recurrent skin infection and ulceration in the socket contact area, a short residual limb, volume fluctuation of the residual limb, soft tissue scarring, extensive skin grafting, or socket retention problems due to excessive perspiration," causes many to be unable to use conventional socket prosthesis[3]. As an alternative to traditional socket suspension of prosthetic attachment systems, Rickard Brånemark and his colleagues developed an osseointegrated prosthetic device in the year 1990[4]. They were able to demonstrate clinical applications of the rudimentary osseointegrated design[4]. Standardization of this treatment method didn't occur until almost nine years later in 1999 when OPRA protocol was released and subsequently used as the new treatment method. Although results were promising at the time; patients incurred superficial infection once every two years, and six of the 51 patients had deep infections that resulted in the complete removal of one transfemoral device[5]. Device related infection is one of the major risks associated with this implantation technique, and ultimately, it has resulted in the ongoing studies aimed at addressing these concerns. As mentioned previously, one of the major reasons for infection is the lack of epithelial cell-to-implant integration at the skin-implant interface, which forms a pocket, or nidus.

Epithelial cell migration results as part of a normal wound healing process when tissue is disrupted or damaged, and until then, epithelial-mesenchymal cell junctions are disassembled, apico-basal polarity is lost, and migratory capabilities are enhanced[6]. This "flow," or migration, of epithelial cells is what accounts for normal skin healing and wound closure at the injury site to create the skin barrier, which protects against infection. However, with the introduction of a percutaneous osseointegrated device, the skin demonstrates the inability to reform the necessary amount of cell-cell junctions that effect complete tissue remodeling and wound closure around the surface of the device. An in-vivo pig back model will allow us the ability to analyze the inherent properties of epithelial down growth and location of attachment to resolve nidus formation and prevent ongoing infection.

(example 2)

A variety of health outcomes have been linked to the use of multisensory interventions in individuals with disabilities and health conditions. In individuals with Autism Spectrum Disorder (ASD), decreased aggressive and self-injurious behaviors (Singh et al., 2004), decreased anxious behaviors (Shapiro, Sgan-Cohen, Parush, & Melmed, 2009), and a reduction in stereotypic behaviors (Brandenburg, 2012) have all been recorded following multisensory interventions. For individuals with neurocognitive disorders, MSE interventions have improved positive and withdrawn behaviors (Van Weert, Van Dulmen, Spreeuwenberg, Ribbe, & Bensing, 2005) and decreased agitation (Staal et al., 2007). Individuals with Traumatic Brain Injury (TBI) have experienced decreased heart rate and agitation (Hotz et al., 2006), and increased feelings of relaxation (Gomez et al., 2016). MSE interventions have also been used to treat individuals with chronic pain (Schofield & Davis, 2009). Despite these positive findings across diverse populations, no research currently exists related to the use of MSE interventions in a substance abuse population.

However, several commonalities exist between individuals with TBI, ASD and substance abuse, as they all experience dysfunction of the limbic system in the brain. The limbic system consists of the amygdala, hippocampus, thalamus, hypothalamus, and basal ganglia. These structures play important roles in human emotion centers, learning on the basis of reward/punishment, formation of new memories about past experiences, emotional reactivity, rule-based habit learning, emotional pain

reactions, and regulation of aggressive behavior (Boundless, 2016). Neuroanatomic observations of the brains of individuals with ASD have seen abnormal cell size in the hippocampus and amygdala (Bauman & Kemper, 2005), and the amygdala and hippocampus are active in the pleasure and reward system of the human brain when drug dependency is involved (Wise, 1996). Since MSE treatments have lessened symptoms of anxiety, agitation and pain in individuals with TBI and ASD, it can be argued that they are likely to produce similar effects in a substance abuse population.

Therefore, this project aims to answer the following research questions:

1. Does participation in a MSE intervention impact anxiety levels in individuals being treated for substance abuse issues?
2. Does participation in a MSE intervention impact agitation levels in individuals being treated for substance abuse issues?
3. Does participation in a MSE intervention impact pain levels in individuals being treated for substance abuse issues?
4. Do individuals with substance abuse issues perceive MSE interventions as a positive addition to their treatment?

(example 3)

Romantic relationships have a profound impact on physical and mental health (e.g., Kiecolt-Glaser & Newton, 2001). People in long-term romantic relationships often rely on their romantic partners to meet a broad range of psychological needs; including emotional intimacy, sexual intimacy, social support, acceptance, and personal growth; as well as practical needs, such as co-parenting children and co-managing finances and households. However, modern romantic relationships may in fact be suffocating under these demands, as society encourages unrealistic expectations about a single person's ability to meet such a broad range of needs simultaneously (Finkel, Hui, Carswell, & Larson, 2014). Indeed, the divorce rate doubled in the 1960s and 1970s before stabilizing at just below 50% since 1980 (Schoen & Canudas-Romo, 2006).

Sexual intimacy can be a particularly challenging issue in the context of long-term monogamous relationships. Couples who are monogamous rely solely on their romantic partners to meet their sexual needs. Yet, sexual desire often wanes over the course of a long-term relationship (see review by Impett, Muise, & Peragine, 2014). In the majority of long-term heterosexual relationships, one partner experiences chronically lower desire than the other (Mark, 2012). One common consequence of these issues is infidelity, which is currently the number one listed cause of divorce (Amato, Previti, 2003). Relationships that are considered to be monogamous may not necessarily function as such, with estimated rates of non-consensual non-monogamy (i.e., infidelity) in marriage around 60% (Vangelisti & Gerstenberger, 2004). In one study, approximately half of the people in a monogamous relationship admitted that they were sexually unfaithful at some point in their relationship (Weaver, 2007).

One potential strategy for combating marital problems like infidelity—which is currently gaining considerable traction in Western culture—is to practice Consensual Non-Monogamy. CNM is an umbrella term that includes open relationships (sex without love without a partner's participation is okay), swinging (focus on having sex without love) and polyamory (focus on loving more than one person) (Matsick, Conley, Ziegler, Moors, & Rubin, 2013). People in CNM relationships have been shown to enjoy similar levels of relationship quality to those in monogamous relationships. CNM relationships rank similarly in terms of sexual satisfaction, relationship satisfaction, closeness, trust and commitment (Seguin, Blais, Goyer, Adam, Lavoie, Rodrigue, Magontier, 2016). This finding challenges the notion that romantic bonding is only successful in a relationship between two people, and suggests that CNM may provide benefits to couples who are otherwise struggling with the challenges of monogamy. Specifically, participating in CNM may help people to meet their relationship needs without placing the sole responsibility on their romantic partner (Conley, Moors, 2014).

However, CNM relationships are not necessarily a panacea for marital difficulties. People who practice CNM report that their relationships require high levels of dedication and vigilance to maintain communication and trust (Anderson, 2016). Furthermore, infidelity can still occur in CNM relationships, especially when a partner violates a relational agreement. Overall, the emerging research on CNM relationships suggests that some CNM relationships are more successful than others, and that

certain individuals and couples may be better-suited to CNM relationships than others.

In the present research, I will examine whether the *reasons* why people open their relationships predict how satisfied they are with their relationship with their primary partner and subsequent partners. (Redacted) currently has a dataset of over 800 individuals practicing CNM. North American participants were recruited through online forums and social media platforms and were asked a broad range of questions about themselves and their CNM relationship experiences, including their motives for practicing CNM. (Redacted) and I have conducted some exploratory analyses and determined that people's stated reasons for practicing CNM fall into three categories: orientation/identity (e.g., "Non-monogamy is part of my identity"), freedom/exploration (e.g., "I wanted to explore my sexuality without the limits of monogamy"), and relationship reasons (e.g., "My partner and I have different sexual interests"). Furthermore, we have found that both the orientation/identity factor and the freedom/exploration factor are associated with higher relationship quality. However, the relationship reasons factor is not. These results provide some preliminary evidence that practicing CNM may be of more benefit to people who enter into CNM relationships for authentic reasons (e.g., wanting new experiences), and of less benefit to people who practice CNM for the purposes of "fixing" their existing relationship.

(example 4)

PFD affect one in four women in the United States [1]. Additionally, one out of nine women receives corrective surgery after developing a PFD [2]. While it is generally accepted that childbirth, obesity, and pelvic floor surgery put women at greater risk to develop PFD, new evidence suggests that strenuous physical activity also increases risk for PFD [3]. While the definition of the term "strenuous activity" is relative, in pelvic floor literature it is referred to as activities that are thought to significantly increase a woman's intra-abdominal pressure (IAP).

Because of these assumptions about "strenuous physical activity", IAP, and PFD, physicians will often recommend short-term and long-term activity restrictions for women with existing PFDs or who are at high risk for developing PFD [4]. These restrictions are placed in an attempt to reduce the woman's IAP. Due to the lack of research and information on IAP in general, these activity restrictions can differ greatly among physicians. When these restrictions are used, they place significant limitation on patients' daily activities which negatively impacts their lives [5].

Previous methods of measuring IAP prior to the development of the MAP sensor were uncomfortable to use, and often required the subjects to be tethered to a computer or measurement device by a cable or wire, making them particularly difficult to use during physical activity. The use of convenient intra-vaginal pressure transducers (like the MAP sensor) is well tolerated by the users and allows for a much greater range of activities, as well as a continuous stream of data [6].