1. **Statement of Purpose**: State the scientific aim(s) of the study, or the hypotheses to be tested.

Specific Aims:

1. To design and implement a group drumming intervention in a halfway house population.
2. To use mixed qualitative and quantitative methods to evaluate the effects of this drumming intervention on perceived social support, antisocial behaviors and attitudes, symptoms of PTSD, empathy, self-esteem, and self-agency.
3. To publish our implementation process and the data evaluating our program to guide future drumming interventions in this population in other locations.

Hypothesis: We hypothesize that those who participate in the drumming group, compared to those only involved in treatment as usual, will show improvements in quantitative and qualitative measures of perceived social support, antisocial behaviors and attitudes, symptoms of PTSD, empathy, self-esteem, and self-agency.

2. **Background**: Describe the background information that led to the plan for this project. Provide references to support the expectation of obtaining useful scientific data.

The reintegration process from incarceration to community is extremely difficult. Recidivism is a common occurrence for a number of reasons, and several reasons have been identified as “criminogenic needs,” i.e. factors that relate to an individual’s likelihood of reoffending. The “big four” include antisocial attitudes, criminally involved associates, history of antisocial or criminal behavior, and antisocial or criminal cognition; the “central eight” expand this list to include employment, education, family, and substance use (Andrews & Bonta 2010; Wooditch, Tang, & Taxman 2014). As is reflected in this list, research has shown that while addressing practical needs like housing and employment are important, individual change-related services like shifting antisocial cognition and substance use treatment are more beneficial to successful reentry (Lattimore et al 2012).

In light of this, we expect that a Drum Circle intervention will target some of these individual factors, particularly those related to antisocial attitudes and criminal cognition. This is based on three related theories grounded in current research:

1. **Group drumming may counteract antisocial tendencies by creating a sense of community.** Kokal et al (2011) demonstrated that synchronized drumming between partners facilitated prosocial behavior, and this was correlated to enhanced activity in the caudate (a brain region associated with reward-based learning). Such prosocial activity, possibly experienced as internally rewarding may counteract antisocial tendencies. In another study by Winkelman (2003), drumming was used as an adjunct therapy for substance use disorder, where it was noted to alleviate a sense of isolation and create a sense of connectedness with others. In working with post-traumatic stress disorder (PTSD) patients, Bensimon, Amir, & Wolf (2007) saw that drumming decreased PTSD symptoms, increasing a sense of belonging, connectedness, and intimacy.

2. **Drumming may facilitate processing of past trauma.** It is well established that antisocial tendencies are correlated with life trauma (e.g. Fontana & Rosenheck 2005; Semiz et al 2007; Bruce & Laporte 2015), and that individuals engaging in criminal activity often have a traumatic history (e.g. Weeks & Widom 1998; Dutton & Hart 1992; Elbogen et al 2012). Bensimon, Amir, & Wolf (2007) observed that drumming facilitated non-intimidating access to traumatic memories, and both this group as well as Winkelman (2003) reported that subjects felt drumming provided
a release of trauma and rage. This is supported neuroscientifically: in a recent study by Rojiani et al (2016), drumming was well optimized for the communication of arousal (an emotional quality ubiquitous in memories of trauma), and this was processed through the right Superior Temporal Gyrus—established to be a key node in social and emotional processing networks. Through this process, it is possible that drumming may allow individuals to work though traumatic histories that may be fueling continued antisocial criminal behaviors.

3. **Drumming may facilitate a reintegrated self-narrative with a sense of agency.** The importance of reintegrating a sense of self to desisting from criminal behavior is well known (e.g. Murona 2001), as is the importance of a coherent self-narrative to mental health (Pennebaker & Seagal 1999). Reintegration of prior trauma is a necessary part of this, which drumming may facilitate as discussed above. Further, it is a common theme among narratives of formerly incarcerated folks who desist from further crime to develop a sense of personal agency that was not present in their past or in narratives of those who are unable to desist from crime (Maruna 2001). Bensimon, Amir, & Wolf (2007) found that drumming increased a sense of self-control in participants, and the prosocial behavior found by Kokal et al (2011) in synchronized drummers was dependent on the ease of which the participant mastered the drummed rhythm, i.e. the sense of mastery gained over the task.

Thus, we hypothesize that those who participate in the drumming group (in addition to treatment as usual), compared to those only involved in treatment as usual, will show improvements in quantitative and qualitative measures of perceived social support, antisocial behaviors and attitudes, symptoms of PTSD, empathy, generativity, and self-agency.

3. **Research Plan:*** Summarize the study design and research procedures using non-technical language that can be readily understood by someone outside the discipline. If working with a Non-Government Organization (NGO) or other organization, be sure to highlight which are research-only activities and which activities would occur regardless of the research. If working with survey firms, please specify what research activities the research firm will be responsible for.

The Connection is a human services and community development agency with a large network of community-based programs designed to reunite families and reduce recidivism. Amongst these programs are two residential programs, the Roger Sherman House and SIERRA House, which provide structured and focused rehabilitative services for people being discharged from the Connecticut Correctional System. In these centers, the research team in collaboration with The Connection will be initiating a weekly Drum Circle intervention as a new therapeutic effort. This will consist of 4-6 weekly hour-long sessions in which certified Music Therapist and professional drummer Marlon Sobol will teach participants how to drum and will facilitate interactive group drumming activities. The purpose of this study is to administer and utilize qualitative and quantitative measures to evaluate the effectiveness of this intervention.

The Connection will recruit participants and implement the Drum Circle intervention, which will occur on a rolling basis and include approximately 15 voluntary participants. The Connection will also recruit a control group of similar size who will participate only in treatment as usual at the halfway house. The research team, in collaboration with The Connection, will administer self-report measures and conduct the interviews of all participants within the drumming and the control group at pre-intervention and post-intervention time-points. These interviews will be audio-recorded in order to retain all information to use in data analysis. The subsequent data analysis will include coding the interview transcripts for generativity, self-agency, and experiencing, as well as identifying themes consistent across the
transcribed interview responses. Data analysis will also include conducting statistical analyses on the quantified self-report measures to determine effects of the drumming intervention on perceived social support, antisocial behaviors and attitudes, symptoms of PTSD, empathy, generativity, and self-agency.