Full-Length Article

Protocol for a Neurophenomenological Investigation of a Guided Imagery and Music Experience *(Part II)*

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Abstract

This is Part II of a two-part article that includes a step-by-step description of the methodology undertaken in my study [*1*], as well as a discussion regarding the clinical implications of the data collection process. This application of *neurophenomenology* integrated individual experiential reports with EEG data to obtain a description of responses to a modified music and imagery (GIM) session based upon the Bonny Method of Guided Imagery and Music. This article details the methodological challenges in addressing such questions, and ways in which I sought to work around and with them. The process of analyzing both the subjective and neuronal data revealed interesting questions both about the nature of the GIM experience, as well as about the limitations of integrating these very different sets of data, including: To what degree can participants fully convey their experiences to a researcher, and by extension, to a GIM therapist? How do participants recall their imagery experiences after the session, and what does this mean for practitioners during the session? To what degree can neuronal activity be attributed to specific imagery or perceptual experiences? What does a productive session look like from a neurophenomenological perspective? Pursuing these questions can lead to greater understanding of the mechanism of GIM's effectiveness.

Keywords: ***Bonny Method, Guided Imagery and Music, neurophenomenology, EEG, Neuroimaging.***

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Materials and Methods

Trial Session

I developed and refined the method of data collection and analysis through a trial session I conducted with myself as research participant. In this role, I hoped to gain awareness of the participants' perspective of the EEG situation and the music and imagery protocol, so that I could modify the procedure in order to promote the most optimal experience for participants and collect reliable, valid data.

My preliminary research into EEG methodology revealed that it would be very difficult to collect artifact-free EEG traces during a typical Bonny Method session. Because the client dialogues with the therapist throughout the music and imagery experience, the electrical impulses created by the participant's facial muscles would cause many disruptions in the EEG signal. While these artifacts could be removed from the signal later for analysis, doing so could eliminate a large amount of EEG signal related to the music and imagery experience, limiting the data. Therefore, I modified the session in order to eliminate the need for the participant to talk during EEG acquisition. This modification would demand the participant's creative, imaginal listening to music while in an ASC; thus this application would no longer be considered pure Bonny Method as practiced in its dyadic format, however the modification retains essential elements of the general practice of Guided Imagery and Music (GIM) as delineated and defined by Bruscia[2](pxxi).

I created an open-ended script which I recorded over an abbreviated music program used in GIM--two pieces of music from the *Nostalgia* Bonny Method program [3], Alwyn: Oboe Concerto Grosso #1 (Siciliano) [4] and Barber: Piano Concerto – second movement (Canzone – Moderato)[5]. Together these pieces are approximately 12 minutes in length, with additional time at the beginning and end for the guided induction and "return" into and from the imaging experience, unaccompanied by music. I designed the script to match the musical form and therapeutic intent of these pieces as they are used in clinical Bonny Method situations; the theme and variations form of both pieces, along with their haunting melodies, suggested revisiting past memories or places (K.E. Bruscia, email communication, May 2009). The open-ended

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script provided some structure to the music-imagery experience, while permitting the participant some freedom in imaging as he/she wishes. The recorded guiding interventions would also be fixed points of reference for each participant, occurring at the same points during the music program. Because the EEG acquisition station automatically creates a video recording of the session, this video could be replayed immediately after the session. The researcher would then use this video to facilitate a phenomenological interview to generate data about the participant's first-person experience and would then correlate these data, moment-by-moment, with the EEG traces, looking for relationships between types of imagery experiences and locations and types of brain response.

A colleague, who was a fully-trained Bonny Method fellow and experienced phenomenological researcher, conducted the phenomenological interview with me immediately after the trial session. We reviewed the video recording of the session made by the EEG acquisition station, where I controlled the video playback, pausing it in order to recall moment-by-moment experiences prompted by the replay of the music and guiding interventions. Using the interview technique described by Petitmengin-Peugot [6] my colleague followed up with probing questions to draw out how I became aware of my imagery experiences; in this sense, the interview did not focus so much on the content of my session as it did the nature of my awareness throughout the session. As a result, the interview would elicit phenomenological elements, or, "structural invariants"[7](p342) that could be compared to concurrent EEG data.

After I transcribed the interview and analyzed my imagery experiences and types of awareness during the session, I engaged in an analysis and modeling of my descriptions[6]. Through this analysis, I determined nineteen different types of imagery experiences, with as many as five experiences simultaneously occurring at a single moment. When I attempted to notate on the EEG recording where each type of event started and ended, this became a nearly impossible task; if multiple experiences occurred simultaneously, one experience may have started before another, with overlapping types of experiences over several seconds. Furthermore, I could not say with certainty the exact moment a particular experience began and ended. This would have been challenging even if I could have reported the experience at the moment it occurred, but doing so retrospectively was very difficult and imprecise, even for my own imagery.

Therefore, through this trial session, I learned that in order to precisely correlate imagery experiences with an ongoing EEG study and concurrent music, I needed to attempt to contain and limit the types of imagery experiences through the direction in the guiding script. This adjustment in methodology meant that I would not be able to track EEG responses moment-by-moment across the session; rather I would be analyzing the EEG data in groups of segments according to guiding categories. Thus I refined my research procedure for data collection based upon the categories of imagery I experienced in my trial session.

Modified Music and Imagery Script

I modified the music and imagery script from the trial session, creating modality-specific guiding interventions to help focus participants' imagery modalities and reduce complicating the imagery experience with multiple types of imagery at once. Whereas it was more focused than the trial session's script, this version would still allow participants to create unique and personally meaningful imagery within a given structure of imagery modalities. I recorded and mixed the script over the same music from the trial session. Using the same overarching narrative as in the preliminary script, the final guiding script suggested open-ended imagery within a suggested scene of a house with several rooms. As the guiding continued, the script encouraged participants to recall people and memories from their past as they explored the house.

The first phase of the guiding recording contained the induction, a relaxation exercise used in Bonny Method to guide the participant into a relaxed state. The recorded script described an image of a ball of light which relaxes the participant progressively from head to toes. At the end of the exercise, the guiding described a specific starting image: a path emerging from a wood and leading to a house.

The next phase contained specific directions for the participant to continue imaging the path while listening to the music. Each direction guided the participant to focus on a particular type of imagery experience related to the ongoing narrative. I refined these six categories of imagery from the 19 categories experienced in my trial session. They included: Body, Visual, Kinesthetic, Interaction, Affect, and Memory. The Body category guided participants to experience imagery involving body-based sensations, including but not limited to, awareness of body parts and functions (such as breathing), tactile sensations, and internal body sensations while moving or standing still. The Visual condition guided participants to experience visual awareness of their imagery, noticing what they saw including shapes, colors, and where they and/or objects were in space in relation to themselves or other objects. The Kinesthetic category guided participants to be aware of the sensations associated with moving their bodies in their imagery. During the Interaction condition, the script guided participants to interact with objects or people in their imagery, whether through a form of communication, or by touching or picking up the objects. In the Affect condition, the script guided participants to be aware of their emotional states within the imagery experience. Guiding during the Memory condition encouraged participants to experience memories within the context of the ongoing narrative.

Given the minimum amount of clean EEG signal needed for analysis of each probe, and given the tempo and pacing of the music, the recording script included a 10-second period of no guiding after each guiding direction. In this space, participants had time to image in response to the guiding. Thus I recorded the guiding directions over the ongoing music, pacing my speech and the start and ending of each direction with the music. After each guiding direction, the participant would continue to image to the music independently for 10 seconds, presumably according to the guiding directions. Each guiding direction and subsequent 10 seconds of silent imaging to the music constituted a "probe." The EEG data analysis would later focus only on each of these 10 second, music-alone periods for each probe, creating a precise window for analysis.

Whereas the script was somewhat directive and could not spontaneously respond to the participants' imagery, the script still permitted participants to create original images within a given type of imagery. For instance, the opening direction to imagine a house encouraged participants to experience rich visual images, but the specific content (size, shape, color, etc.) of those visual images (e.g., the house) was left up to each participant. Table 1 shows the frequency of each probe category in the session script. Once the script was recorded and mixed over the music selections, it was recorded onto a CD for playback during the research sessions.

Probe category	Frequency
Body	14
Visual	16
Kinesthetic	3
Affect	8
Memory	3
Interaction	7
Total	42

Table 1. Frequencies of Each Probe According to Category

Data collection

Participants

Given my expectation that this study would generate a very large amount of both phenomenological and neurological data to collect and analyze, I decided to recruit only four participants for this investigation. Two male and two female participants (four total) responded to emailed appeals to local Bonny Method practitioners or to flyers posted in a large university's college of music and dance. Their ages ranged from 33 to 58. None of the participants had been my client in the past or at present, and none had any neurological problems that would have affected the EEG signal (e.g., seizure disorders, history of any brain injury or stroke, or degenerative neurological conditions). None of the participants had any psychological or physiological problems that would have hindered full participation in the sessions (e.g., taking psychiatric or neurologic medications, hearing loss, physical pain or disability, psychosis or other severe mental illness). While I attempted to recruit an equal number of musician and non-musician participants, only musicians volunteered.

An essential component of neurophenomenology is that, in order to obtain the highest-quality subjective reports that can best inform the neurological data, participants must be trained in reflexive awareness. Varela and his colleagues trained their subjects in meditation techniques, particularly borrowing from Zen Buddhism, so that their subjects would have sufficient reflexive awareness for their research[7]. Notably, clients who engage in the task of imaging and reporting their experiences during a Bonny Method session develop many of the same kinds of reflexive awareness as experienced meditators do; thus for this study I sought experienced Bonny Method clients who would be able to recall their experiences in detail from the music and imagery session. These participants' personal experience in the Bonny Method ranged from 25 to over 70 personal sessions. One participant was a Bonny Method Fellow, and two participants were advanced trainees.

Temple University's Institutional Review Board (IRB) approved this research and participants gave informed consent before participating in the study. The EEG technicians and the consulting neurologist and neurology resident each signed a form assuring the confidentiality of participants' identities. Most sessions were 3 hours in duration, including preparing for the EEG acquisition and the post-session interview. Participants received $20 for each session they completed in compensation for the time, effort, and costs required to participate in the study.

Equipment and Materials

EEG was recorded using 21 scalp (Ag-AgCl) electrodes using a NicoletOne station with a v44 amplifier and recording software v.5.8 (Nicolet Biomedical, Madison, WI). The electrode sites included Fp1, Fp2, Fz, F3, F4, F7 and F8 (frontal), T1, T2, T3, T4, T5, and T6 (temporal), Cz, C4, and C4 (central), Pz, P3, and P4 (parietal), and O1 and O2 (occipital). EEG and artifact signals were amplified with a band pass filter of 0.053-55 Hz with sensitivity set at 7 mV. Impedance was under 5 ohms. EOG was recorded from two additional electrodes placed at the outer canthi of each eye and ECG from a chest electrode. Two electrodes were placed on each earlobe (A1 and A2) and an additional pair of electrodes placed on the mastoids for reference and ground.

Other equipment included a portable Sony stereo in order to play the music/script CD. During the session, participants reclined comfortably on the provided examination chair. I used a digital audio recorder to record the post-session interviews.

Procedure

The data collection procedure included the music and imagery session and the phenomenological interview of each participant immediately after the session. I conducted the sessions and interviews in a private exam room of an outpatient EEG lab at a large urban hospital. A lab technician prepared each subject and left the room, leaving the participant alone with me to conduct the session.

Music and Imagery Session

Prior to playing the recorded script and music, I asked each participant to remain focused on each sensory modality presented in the guiding, as this would be crucial to the data analysis. I also reminded the participants to remain silent during the session, but that they could use hand gestures to indicate if they wanted the volume of the music and guiding louder or softer. When the participant was ready, I began recording EEG data on the acquisition station. The script began with only verbal guiding for the induction phase of the session, then continued with the two music selections for the music and imagery phase. When the music and imagery phase ended, the script continued with guiding alone to assist participants in returning to an alert state. I continued to collect EEG data during this phase until participants began to move and open their eyes, at which point I stopped EEG acquisition. When ready, I disconnected each participant from the acquisition station, and then we adjourned to a nearby room where we could view the EEG video in a private setting for the phenomenological interview.

Post-Session Phenomenological Interview

As Petitmengin-Peugeot[6] explains, gathering descriptions of an internal experience requires re-entering the "pre-thought, 'lived experience' of an action"(p46). In this context, "action" refers to the internal imagery experience, where the participant's actions are imaginal in nature. Before we began the post-session interview, I informed each participant that I was seeking information about their experiences immediately after each verbal direction of the guiding ("probe" in this report), and that he/she should do his/her best to re-immerse into the imagery in order to recall the experience of the imagery as vividly as possible. To assist in this re-immersion, I began the video playback of the session from the beginning of the induction portion of the session and continued through the return to alertness phase. I asked the participant questions to help him/her describe as fully as possible what she/he was experiencing during the session by describing moment-by-moment awareness of images and sensations, detailing the senses involved in each image, when each image started and ended, the vividness of the image, etc. Following Petitmengin-Peugeot's[6] approach, I guided participants through three stages of awareness: 1) Accessing the imagery experience (reliving the imagery with prompts to recall sensory images associated with that guiding prompt); 2) Access to pre-thought states (slowing down the recall to increase awareness of shifts or changes in consciousness or attention); 3) Putting into words (clarification of imagery experience in terms of "how" it occurred rather than "what" or "why"). To facilitate these stages of awareness, I paused or replayed portions of the session when necessary, in order to help the participant fully describe what was happening for each probe. The interview portion of the sessions took between one-and-a-half to two hours to complete for each participant.

Data Analysis

Phenomenological Data

After transcribing each participant's interview, I worked probe-by-probe, first reducing the text into "descriptive aspects of the experience"[6](p49) and then presenting a "diachronic model of the experience"[6](p52). The latter task involves re-sequencing each participant's descriptions of his/her experience into the order of internal events as they were experienced during the music and imagery session. This is necessary because participants often recalled their experiences according to what was remembered at the moment of description during the interview, and often not in the same sequence in which the experiences occurred in the moment during the session. After I re-sequenced the data, I checked with participants to verify that the re-sequencing matched their recollection of their music and imagery experiences, and that the descriptions were accurate.

At this point, my analysis method diverged from Petitmengin-Peugeot's[6] because the phenomenological method she employed focused on analysis of a type of experience ("intuition") that occurs in a single moment. In the present study, I sought to gain descriptions of ongoing experiences that shift and change from one moment to the next, and which were guided by the six different types of guiding probes. Therefore, I then analyzed each probe's data according to the categories of experience that became apparent to me through the interviewing, transcribing, and re-sequencing phases of the process thus far (see Appendix). The main coding areas included: Type of Imagery Experience (body, visual, tactile, etc.), Imagery Vividness (the degree of richness and detail reported about the imagery), Imagery Dynamics (how the imagery shifted, changed, or stayed the same during the probe), Music Awareness (reported quality of awareness of the music), Guiding Awareness (reported quality of awareness of the guiding), Altered State Awareness (reported quality of the altered state of consciousness during the probe), and Congruence with Guiding (whether the imagery during the probe matched the modality of the probe direction). Thus each probe image contained seven coding areas associated with the EEG signal for that probe, with varying numbers of subcategories contained under each coding area.

EEG Analysis

For each participant's EEG record, I marked the 10-second music-only segment for each of the 42 probes for each participant directly onto the EEG output using the acquisition station's software. I labeled each probe by its category (Body, Visual, Affect, etc.), and also labeled segments of EEG from the very beginning and end of each session (before and after the GIM script) which would serve as a background comparison condition. I then exported this data into a universal EEG data format (EDF+) for analysis, and then coherence analyses were performed according to each of the six probe categories. *Coherence* "is the measure of the state in which two brain signals maintain a fixed phase relationship with each other or with a third signal that serves as a reference for each"[8](p108). In other words, coherence occurs when the electrical rhythms (frequencies) of different areas of the brain synchronize. This synchronization indicates that these areas of the brain are in communication with each other, thus showing not only which parts of the brain are active during a given task, but also the nature of the neural networks involved in that task.

Coherence analyses were conducted using EMSE® v5.4 software (Source Signal Imaging, Inc., San Diego, CA). First, the EEG traces were preprocessed by bandpass filtering the data from 0.1-50 Hz, removing eye movement artifacts, and then spatially filtering the data using a Laplacian montage to eliminate crosstalk between electrodes. Each of the four participants' raw EEG data sets were divided into seven conditions: six conditions according to the events marked on the data by guiding category (Affect, Body, Interaction, etc.), and a background comparison condition for each participant. This segment of EEG data was marked from the beginning of each session where participants were not following any guiding cues (participants had eyes closed, and were in a relaxed position) until the first guiding cue of the induction phase. The background condition served as a baseline to compare to each of the six guiding conditions. Within each of these seven conditions, power spectral density was estimated. *Power spectral density* (PSD) describes how the power of a brain signal is distributed across the brain according to its frequency; in other words, how strong each frequency band is across different regions of the brain. These estimates were pooled into seven frequency bands conventionally used in EEG (e.g., delta, theta, alpha, etc.).

Using the PSD results, calculations determined coherence relationships among all the electrode pairs for each condition for each frequency. Non-parametric statistical methods were used to determine whether there was a significant difference between each of the guiding conditions' coherence and the background condition's coherence [9]. Coherence statistics (mag of delta) with a p value < .05 were determined to be statistically significant. Significant results were plotted on a topographic map of the head showing the conventional 10-20 system of electrode coordinates; any statistically significant coherence connections were marked via a solid line between the relevant pair of electrodes. Coherence analyses were mapped for each guiding condition, resulting in a matrix of maps, one map for each probe category according to each of the seven frequency bands, for a total of 42 maps per participant.

An expert in EEG coherence then examined each participant's coherence data by frequency band (theta, alpha, beta, gamma) and described the meaning and practical significance of the mapped coherence relationships. Each of these frequencies have particular functions in the brain, which are described in basic terms in Table 2. This interpretation also takes into account the brain processes associated with the major regions of the brain detectible by scalp EEG.

Frequency	Normal function
Theta	Meditation[9]; memory[10] and attention[11]
Alpha	Resting, relaxing; idling brain regions[12]
Beta	Short-term memory, ongoing, outward attention[13,14]; Motor planning[15]
Gamma	Binding sensory information; sensorimotor integration[15]

Table 2. EEG Frequencies and Their Normal Function

Finally, the raw EEG traces were analyzed to determine the clinical level of attention throughout each session for each participant. Each probe was examined to identify where relaxed-alert, drowsy, and sleep states occurred, and I added these interpretations to the other EEG results for each probe for further analysis in conjunction with the phenomenological data.

Within- and Cross-Case Interpretation of Analyses

I began the within-case integration of the data by first grouping each participant's EEG and phenomenological data for all his/her probes according to the probe categories, for example, all the Visual probe data together, all the Affect probe data together, and so forth. Next, I created a large table (Table 3) where I summarized the EEG coherence data according to each guiding condition and frequency band, then the phenomenological codes for each condition.

PROBE TYPE (# probes)	**Affect (8)**	**Kinesthetic (3)**	**Memory (3)**	**Interaction/ Communication (7)**
EEG				
• Theta	Cross-hemisphere temporal, visual interaction	Cross-hemisphere temporal, visual interaction, more central involvement	Cross-hemisphere temporal interaction, more central involvement	Cross-hemisphere temporal, visual interaction
• Alpha	No significant interactions. (See summary column)	No significant interactions.	No significant interactions.	No significant interactions.
• Beta	No significant interactions. (not numerous enough to interpret)	No significant interactions.	No significant interactions.	Bilateral temporal and frontal
• Gamma	Occipital – left temporal	Same as Affect	No significant interactions.	Same as Affect
Subjective Reports				
• *# Congruent probes/total probes*	2/8	2/3	3/3	5/7
• *Reported Sensory Modality* *Congruent = C* *Non-Congruent = NC*	C = 1 Emotional 1 Auditory NC = 3 Visual 1 Olfactory 1 Auditory 1 Kinesthetic	C = 2 Mult senses NC = 1 Visual	C = 2 Mult senses 1 Emotional	C = 3 Mult senses 2 Cognitive NC = 2 Mult senses
• *Imagery Vividness*	1 PV 5 DR 3 NPV	1 PV 2 NPV	1 PV 2 NPV	7 NPV
• *Imagery Dynamics*	8 SI	2 SI 1 ISs	1 IE 1 ISm 1 ISs	4 SI 1 IC 1 IE 1 ISs
• *Music/Guiding Awareness*	1 MI 2 SR 2 DG	1 MI 1 FR	1 NMI 1 FR	2 MI 1 NMI (MIM) 1 FR 3 SR
ALERTNESS LEVEL				
Raw EEG: # probes Awake/total probes	8/8	3/3	3/3	7/7
Subjective Reports	No ASC reports	No ASC reports	No ASC reports	No ASC reports
EEG/Subj report integration	Awake in all probes, no EEG or ASC connection to Awareness reports.	Same as Affect.	Same as Affect.	Same as Affect.

Table 3. Example Comparison Table: Linda's Integrated Responses to Four Imagery Conditions*

After entering the data into the table, I integrated the EEG and phenomenological data for each condition, checking each kind of data against the other for consistencies and inconsistencies. In order to make an accurate comparison with the different kinds of data, I referred back to the raw phenomenological data for each probe in order to be sure I accounted for all the imagery experiences the participants reported and the kinds of processing implicated by the EEG. If the EEG data did not match the phenomenological data, or vice-versa, I sought to provide an explanation whenever possible.

I also examined each condition's alertness data for each category, finding patterns within the self-reports of alertness and the EEG data regarding alertness and looking to see where alertness patterns coincided or differed with the phenomenological data for that guiding category. I summarized the integration of these data and looked for relationships between general alertness states and each participant's overall imagery experience as he/she reported it during the interview.

After completing this process for each individual's data, I then pooled all the data together and repeated the integrative analysis across all participants. This involved looking for similarities and differences in imagery experiences, EEG responses, and clinical brain states. I also examined the degree to which the phenomenological analysis and EEG analysis each reflected participants' experiences, and whether there were any discrepancies or inaccuracies that may hinder the conclusions.

Discussion

The focus of this paper is the explication of the research process and methodology of this project; full results of this study are contained in my dissertation[1] and will be published separately. During the data collection process, I encountered logistical challenges and clinical responses that shaped the methodology of the study. Here I discuss three primary challenges and their implications for clinical work and future research.

Accounting for Multiple Simultaneous Imagery Experiences

The primary challenge that emerged from the trial session was the great difficulty in teasing apart multiple types of imagery experiences occurring simultaneously, and precisely pinpointing when each image occurred for the EEG analysis. This was complicated by the need to eliminate ongoing dialogue between the participant and the researcher, as this would introduce movement artifacts into the EEG signal. With participants silently imaging to the recorded script and music, the only way to identify exactly when images occurred was through the post-session interview. Though participants might be prompted by a particular musical or guiding probe in the session video regarding exactly when images occurred, ongoing EEG analysis requires split-second precision. Overall, this aspect of the imagery experience is important to consider for future research in this area: imagery can be, and often is, multisensory and multilayered. It is not a simple matter to link ongoing imagery experiences to concurrent EEG signals.

Clinically speaking, this is notable in that clients may be unable to adequately report the entirety of his/her imagery during the music-imagery session, even with ongoing dialogue with the therapist. I know from my own experience as a guide that often a client can report only a fragment of his/her imagery during the music-imagery portion of the session, and only later during the postlude of the session does the client have the time, space, and awareness to attempt to fully describe what occurred. Indeed, though therapists attempt to be as fully immersed in the imagery experience with their clients as possible during their guiding (and may be in an ASC themselves[16]), logistically clients often cannot fully convey to therapists their experience; perhaps this is due to the multisensory nature of the experience, or the strong affective nature of the experience, or even due to a transpersonal experience where the client feels disconnected with his/her body. This is the nature of GIM work, which is both its strength and its clinical challenge: imagery can be complex, multifaceted, ineffable, and incomprehensible. Translating these experiences into words, whether in the moment or immediately afterward, has limitations both in a clinical and in a research context. These limitations must be considered in any future in-situ neuroimaging study regarding GIM.

Pacing and Imagery Focus of Guiding Script

In order to work around the problems regarding a lack of ongoing dialogue and potential for simultaneous, multiple imagery experiences during the music-imagery portion of the EEG study, I created a guiding script with imagery directives and with proscribed periods of time between the end of one directive and the beginning of the next directive. While I paced my speech to fit the tempo and cadence of the music selections, this pacing may not have fit how these participants would have preferred to engage in the music and imagery experience. In a more naturalistic clinical situation, the participants would have set the pace of the ongoing dialogue with the therapist. However, in this research situation, the participants were tested in regard to their compliance with the guiding script; not only were they expected to image at the pace suggested by the script, but also in the modalities suggested by the script.

Interestingly, those participants who were most compliant with the guiding script more easily recalled their imagery experiences in the post-session interview. These two participants readily recalled their reactions and images when prompted by the playback of the session video. These participants also had more widespread high beta and low gamma coherence networks across all the guiding conditions[1]. The other two participants sometimes stated they could not even recall hearing a particular guiding direction, and therefore were not exactly certain what image was occurring during that probe. These participants had more limited coherence networks at the high beta and low gamma range compared to the participants who were more compliant with the guiding directives[1].

This phenomenon of compliance in some ways contradicts the very nature of the Bonny Method, where clients image freely, in any way they choose, in response to the music. However, even in pure Bonny Method sessions, clients also are challenged by the music selections made by the guide. Despite clients' personal preferences or desires, the expectation in a Bonny Method context is that clients engage in whatever response they have to the music. How they do so concerns therapeutic dynamics, including resistance and transference to both the therapist and the music [17]. Thus, even in this research context using a modified Bonny Method session, these participants may have been exhibiting resistance to the music and guiding. The concurrent neuronal responses could provide some additional information regarding what occurs when clients do not fully engage in the music and directive guiding. Thus, this research highlights not only how the participants engaged in imaging during an ASC, but also how they did so in response to the external music and guiding in a clinical context. This interaction of internal response to ongoing external music and verbal cues during an ASC is what makes such research unique in the neurosciences.

Imagery Experience in Lived Time

During the phenomenological interviews, each participant, to varying degrees, recalled imagery events in a different sequence than how they unfolded in lived time during the session. While most participants generally had little difficulty reporting and recalling their imagery, the participants often spoke first about the most striking or memorable image for them after each probe, and then had to track backward to explain how that image developed and then changed. In some cases, participants also got lost in the recollection of the imagery, sometimes having to "double-back" to report additional events or experiences they did not initially report during the interview. This was the case even in one participant's imagery which involved strong emotional content regarding significant persons and events in his life[1]. The implications of this regarding ongoing dialogue between the guide and the client in a typical Bonny Method session are unclear, since this phenomenon concerned how the participants recalled the imagery immediately after the session. Rather, this aspect of imagery recall relates more to how imagery experiences stay with clients immediately after the session; for these participants, the recall involved flashes of the same imagery experience in participants' memories, often prompted by the video of the session which included replaying the music of the session and the guiding probes.

As stated previously, the participants who had the most difficulty recalling their imagery also seemed to have the most limited cross-hemispheric coherence patterns in the EEG signal at the high beta and low gamma ranges. At times this phenomenon occurred along with drowsy brain states. The participants who had the least difficulty in reporting their imagery experiences, and the sequences in which they occurred, had much more cross-hemispheric coherence networks at these same frequencies[1]. High beta and low gamma frequencies relate to attention and information binding processes, respectively. These brain responses seemed to relate to these participants' ability to sustain attention and meaning-making processes over the course of the session.

Staying with Challenging Images

One participant's ("Daphne") imagery experience involved a coherent ongoing narrative throughout the session, which she could easily recall in the post-session interview; this participant had the most widespread coherence networks at the high beta and low gamma frequencies. Daphne also reported that she felt this experimental session was just like a typical Bonny Method session in the sense that she explored biographical material from her past and experienced emotional and meaningful moments as she did so[1]. Perhaps these coherence patterns in conjunction with the phenomenological data indicate that a productive GIM session involves not only relaxation and openness to the imagery experience, but also an ability to sustain focus on the imagery and its biographical and affective content. Thus, from a clinical perspective, this participant actively engaged with the imagery, and sustained the engagement even when the imagery involved potentially challenging and difficult emotions and experiences.

The clinical phenomenon of staying with challenging imagery despite discomfort, fear, etc. has been shown in case studies and qualitative inquiry to lead to turning points in Bonny Method work[18–21]. Such confrontation and working-through of internal challenges and obstacles is also the primary task of most depth psychotherapies. Thus, engaging in imagery in this way is considered the heart of the work in a Bonny Method process—and includes what Grocke calls "pivotal moments"[19]. Furthermore, the phenomenon of an ongoing narrative and metaphor in Bonny Method imagery has been theorized to lead to personal growth through archetypal plots and storylines which assist clients in meaning-making and problem-solving around their personal circumstances [20].

The indication of a possible correlating brain state for these imaging phenomena (global coherence networks at high beta and gamma frequencies) brings up an interesting question—to what degree does the client's choice to actively engage with challenging imagery and to sustain the imagery narrative affect the client's ability to do so, and to what degree does the client's brain state influence the client's ability to engage with challenging imagery? It may never be possible to answer this chicken-and-egg question, but additional study may reveal additional phenomenological and neurological features of the GIM experience that can assist in greater understanding. An additional research topic would include neurophenomenological investigation of clients at various stages of their therapy processes, to determine whether clients' experience both in the GIM situation as well as experience and history in exploring a particular clinical concern relate in any way to global beta and gamma coherence networks.

Conclusion

The Bonny Method of Guided Imagery and Music is a unique experiential therapy. Helen Bonny's combination of ASC, music, guide, and a client's openness to self-exploration led to the development of a powerful interaction of body and mind unlike any other form of therapy or method of self-discovery. This research investigated the ways in which mind and body relate during this experience by integrating the reality of participants' internal subjective experiences during a music and imagery session with their neuronal data. This neurophenomenological foray into the music and imagery experience provides much-needed prelimianary data that will guide future investigations and practice of GIM. This knowledge is essential to understanding the demands of the GIM experience, considering the potential risks for negative or even re-traumatizing experiences that may emerge as a result of vivid imagery evoked using this method. Given the growing evidence base for neurologic biomarkers of trauma[22–24], understanding the neurologic demands of a possible indicated therapy is becoming increasingly important to practitioners and clients alike.

EEG has some limitations in the clinical context, which led to the need to modify the in-situ experience in order to obtain artifact-free, relevant EEG signals. These modifications, which involve a guiding script and lack of ongoing verbal dialogue between the participant and researcher, are a departure from the Bonny Method as traditionally practiced and defined. A by-product of this modification, resulting from the phenomenological interview immediately after the session, permitted participants to not only recall their imagery experience, but to expand upon this recall and elaborate on the nature of the experience. This provides an additional layer of first-person data that would not be obtained by analysis of in-situ reports of imagery alone. Therefore, despite these modifications, the implications of this study are still relevant to Bonny Method practitioners, though the implications cannot explain all the phenomena of a Bonny Method session. These implications, including the multi-faceted and complex nature of imagery and brain behavior, should guide future research in this arena.

Such in-situ investigations are very difficult to execute, however. Fachner et al.[25] are currently attempting to investigate EEG responses to an unmodified Bonny Method session, however the analysis must eliminate EEG signal obtained while participants verbally report their imagery. This approach risks losing important neuronal responses during the music and imagery experience. Perhaps, as neuroscience research continues to advance, future imaging and analysis methods will permit the investigation of neuronal responses to an entire unmodified Bonny Method session in-situ. Investigating outcomes of therapeutic intervention (e.g., resting state EEG traces pre- and post-treatment) certainly avoids the methodological difficulties of in-situ research, however such research simply addresses outcomes of the intervention rather than the live imagery demands of the Bonny Method/GIM on clients. Understanding the mechanisms of these effects can help practitioners refine the method and determine best practices for its implementation, tailoring it to meet the neurological and psychological capabilities of clients. Thus, pursuing both prongs of research (outcomes and mechanisms) will result in a strong evidence base for the Bonny Method and will offer the highest standard of clinical care.

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Appendix

PROBE CODING
Phenomenological Data Analysis

PROBE #____

Guiding Category for probe

- Body
- Visu (Visual)
- Inte (Interaction/Communication)
- Kine (Kinesthetic)
- Affe (Affect)
- Memo (Memory)

Type of Imagery Experience (only code specific modality if modality occurred singularly throughout probe)

- B – Body: Any imagery related to awareness of body parts, body sensations (but not body movement)
- V – Visual: Imagery related to anything seen, including colors, shapes, forms, patterns
- A – Auditory: Imagery related to either external auditory cues (e.g., music or guiding) OR internal auditory imagery
- T – Tactile: Imagery related to sense of touch
- E – Emotional: Affective imagery
- D - Digital/dialogical (words): Imagery involving use of words/language/communication
- O – Olfactory: Imagery relating to smell
- K – Kinesthetic: Imagery related to sensations of body movement
- C – Cognitive: Thoughts, evaluations about the imagery experience
- S – Spatial: Imagery related to sense of one's spatial experience in the image
- M - Multiple senses: More than one sensory modality reported (do not specify which)
- N – No senses: No sensory modality reported

Imagery Vividness – Degree of detail, richness in experience of imagery, as described

- PV – Reported as particularly vivid experience
- NPV – Not reported as particularly vivid
- DR - Difficulty recalling or describing imagery
- II – Incomplete image; unable to form image completely

Imagery Dynamics – Whether the imagery changed, shifted, or deepened over the course of the probe

- IC - Imagery contraction: Reduction of experienced imagery modalities (e.g., Visual and Body experience becomes only Body experience)
- IE - Imagery expansion: Increase of experienced imagery modalities (e.g., Body experience becomes Body and Visual experience)
- IS - Imagery shift: Shift of one imagery experience to another, without increase or decrease in number of modalities (e.g., Visual becomes Body; Visual and Body becomes Emotional and Kinesthetic) *(code 's' for single shift, 'm' for multiple shifts)*
- SI - Stable imagery: Imagery experience stays static, modality does not change (e.g., stays Visual throughout probe)
- SS – Simultaneous, separate imagery: separate but simultaneous modalities in contrast (simultaneous visual image and seemingly unrelated emotional image) [track # of instances, if not enough code according to stability of images] I still don't know the value of this one.

Music Awareness – quality of awareness of music as reported

- MI – reported that image was influenced by music throughout most of probe
- NMI- Reported that image was not influenced by music throughout most of probe
- MND – Influence of music not recalled or described

Guiding Awareness – quality of awareness of guiding as reported

- FR - Reports being fully responsive to guiding during this probe
- SR – Reports selective response to guiding – intentionally responded to portions of guiding, but did not respond to other portions
- DG – Reports being disconnected from guiding for part or all of probe
- GND - Cue not recalled or described

Altered State Awareness – quality of altered state as reported

- O - Not in ASC ('out') majority of probe – as reported by P's perception of 'out' or in the process of moving out of ASC
- I - In ASC ('in') majority of probe – as reported by P's perception of 'in' or in the process of going deeper into ASC
- A - Fell asleep

Congruence with Guiding – The degree to which participants' sensory experiences were congruent with the intended sensory experience of the probe as perceived by the guide.

- C – Congruent: Experienced imagery modalities match guiding cues for most of the probe
- NC – Not Congruent: Experienced imagery modalities have little to no relationship to guiding cues during the probe