

Decision making in music therapy: The use of a decision tree

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Abstract

The prescription of decision making within music therapy interventions is a key topic for both clinicians and researchers. Decision trees are graphical representations of problems and are commonly used in the healthcare setting to determine solutions to complex choices. They are efficient and easily interpreted, and assist with finding connections and ultimately potential outcomes to the decisions faced. They are straight-forward to replicate and therefore strengthen the validity of decision making in the therapy or research setting. This article will describe the development and application of a decision tree which was designed for a study of group music therapy for women with breast cancer. Additionally the decision tree provided a framework for determining applicable clinical interventions to meet the needs of participants. Case vignettes from clinical work with women with breast cancer will be used to illustrate the use of this tool.

Key words: Decision tree, breast cancer, decision making, group therapy

Interest in the area of decision making developed in the 1960's under the title "behaviour decision theory" (Lowenstein & Lerner, 2003). Decision making is viewed as a cognitive process, involving calculating which action offers the most positive outcome. Decision trees are an outgrowth of this "cognitive revolution", and have influenced the professions of psychology, linguistics, economics, anthropology, philosophy and neuroscience (Gardner, 1985, p.26). Their use has grown in the health care literature and has been used to facilitate better patient choices; evidenced based approaches (Pauker & Wong, 2005); determining prognoses, and data mining (Burke, Rosen, & Goodman, 1997). Within the therapy setting a decision tree enables the decision making process to be formalised, by articulating the clinician's intuitive process used in the decisions made. There is criticism in the psychosocial therapy literature about the lack of detail regarding the interventions used in therapy groups

and the reasons for their use (Forte, Hill, Padzer, & Feudtner, 2004); a decision tree is one way of providing a coherent explanation for clinical decision making.

Decision Trees Within a Research Protocol

To exemplify the decision tree process, the author first outlines the study in which the decision tree was used, to provide a context for the reader (University of Tasmania ethics clearance # H9805). The mixed methods study with an embedded qualitative component within a quantitative study to examine the impact and effect of group music therapy on levels of anxiety and depression, together with quality of life and coping strategies in women with breast cancer who were outpatients. The research was carried out at the main teaching hospital in the area and the participants for the study were recruited from the outpatient oncology unit.

The author drew from her clinical experience in oncology and palliative care and incorporated receptive and active interventions which she had found were meaningful and useful with these clinical populations. The emphasis of the group program was on relaxation, goal setting, and expression of feelings. The music therapy interventions used during the study were songwriting, improvisation, music listening, music and imagery, song singing, visualization and movement and music.

Central to the author's decisions during the program was the importance of interpersonal relationships and providing corrective emotional experiences for the women. There are many different approaches to decision making in group therapy but the author selected a decision tree process over other group therapy approaches for two reasons. The study sought to retain the components of the pre-existing clinical protocol while also providing a replicable and trackable consistency and uniformity in the decision making process across the four groups during the research.

The demonstrable benefits of music therapy as a group or individual therapy intervention addressing the psychological and physical functioning of cancer patients have been illustrated in numerous studies (Aldridge, 1995; Aldridge, 1996, 1999; Bailey, 1984; Bonde, 2000, 2005; Burns, Harbuz, Hucklebridge, & Bunt, 2001; Burns, 2009; Burns, 2001; Burns, Sledge, Fuller, Daggy and Monahan 2005; Cassileth, Vickers & Magill, 2003; Dileo & Bradt, 2005; Hanser et al., 2006; O'Brien, 1999, 2004, 2005; O'Callaghan and McDermott, 2004; O'Callaghan, 2007; Rykov, 2008; Standley, 1992; and Walden, 2001). However, when the author first

embarked upon her study there was a paucity of music therapy and breast cancer research which investigated the impact of group music therapy on multiple variables such as anxiety, and depression.

In recent years a small number of music therapy studies have illustrated the uniqueness and effectiveness of music therapy for breast cancer patients. A mixed methods study by Burns (2009) examined the effects of an 8-week improvisational group music therapy program for women recently diagnosed with breast cancer. Anxiety and depression, adjustment to cancer and quality of life were assessed using a variety of psychometric measures, and salivary IgA and cortisol levels were also determined. Focus group interviews were conducted on completion of the program. The results illustrated a significant effect for mood, however no other significant results were detected; however the qualitative inquiry illustrated positive experiences that were contrary to the quantitative results.

Allen's (2010) PhD research investigated a 10 week group music psychotherapy program on improving self concept in breast cancer survivors. Body image, and factors involved in self concept such as identity, self esteem and body image were measured pre and post intervention. Significant results were found for a number of the psychometric items indicating the positive impact of music psychotherapy for breast cancer survivors.

Both of these studies demonstrate the effectiveness of music therapy with this vulnerable client group. They also highlight the importance of group therapy with these women as they benefit from peer support and reduced isolation.

Key Components of the Decision Tree Process

Recently, a small number of music therapy researchers (Sanfi, 2012; Shoemark, 2007; Shultis, 2012) have developed and or incorporated decision trees into their research to inform their clinical decision making. These researchers utilized decision trees as navigating tools to assist in evaluating their participants' needs and to make informed therapeutic strategies and decisions.

A decision tree is a graphical representation of choices, and represents a way of making assessments about options and possible consequences (Pauker & Wong, 2005). The decision tree weighs the "risks and benefits" of alternative choices and can be modified easily to suit the

changing situation (Pauker & Wong, 2005). These “powerful classification algorithms” (Dursun, Walker & Kadam, 2005, p. 119) are easily testable and offer a “simple and easy-to-follow pathway” for both making decisions (Pauker & Wong, 2005), and for understanding the decision processes (Dowding and Thompson, 2002). Decision trees are robust tools which accommodate both large and small data sets. They are also able to be validated statistically, with each node given a numerical value. CHAID (chi square automatic interaction detection) is the most common statistical method for analyzing decision trees as it determines the relationship between variables. It can be used to establish if the independent variables have combined to impact the dependent variable therefore causing a significant effect (Badriyah, Briggs and Prythorch, 2012). Statistical methods were not used in the construction of this decision tree; however they can be applied in future replicated decision trees.

Traditionally decision trees are tree-like in appearance with each branch node representing a particular choice between a number of alternatives and each leaf node representing a classification or decision. The internodes represent a path to another alternative or secondary decision (Shi & Weiler, 2007). If data becomes obsolete or unnecessary the different nodes can be removed by pruning.

There are variations in the traditional tree-like shape, some decision trees also appear as a series of questions, and this is seen in the work of Heiney et al., (2006), who reviewed measurement tools used in research and group interventions for women with breast cancer. They developed an exclusion decision tree to determine which studies to exclude from the review. Their rationale for the decision tree was to increase consistency across the review.

The structure of the decision tree used by Heiney et al., (2006) was adopted by the current author as it was easy to replicate and use. The current decision tree lends itself to the traditional tree like model with each node representing an alternative intervention; however for ease and efficiency the author adopted the question format established by Heiney et al., (2006). It was visually clear and simple to interpret in a group setting where the dynamic is ever changing.

Disadvantages of Using Decision Trees

While there are many advantages to using decision trees there are also disadvantages. Decision trees can be unstable and complex, and are

dependent on being fed reliable information, (Dowding and Thompson, 2002), that is, information which is relevant and specific to the clinical population, setting and function of the decision tree. The less reliable the information is, the less effective the process becomes because inaccuracies and changes can cause significant alterations in the decision making process (the shape of the tree). Decision trees can also be complex and time consuming to develop (Nayab, 2011).

All decisions contained in the decision tree are based on the researcher's expectations and there is not an absolute way of predicting all eventualities, therefore the researcher's inconsistencies or bias in their expectations and predictions can cause errors (Tavakoli et al., 2000). Not all contingencies or choices can be planned for and their omission can lead to intervention errors or bad documentation decisions (Nayab, 2011). Tavakoli et al., also (2000) question the reliability of artificially simplifying problems and suggest it is inappropriate to quantify emotional and subjective issues.

Given the identified weaknesses, Dowding and Thompson (2002) suggest all types of decision making are dependent on the amount of information available to clinicians and are open to criticism but also propose that the weaknesses in decision analysis are made more explicit and transparent in the decision tree process than they are in other decision making processes (Dowding and Thompson, 2002).

Development of the Decision Tree

In order to develop the tree the author considered the essential elements which informed her decision making in choosing music therapy interventions in group therapy. She reflected on the questions 'what do I notice?' and 'what do I look for?' and consolidated three areas; 1) language themes, defined as the essence of what someone in the group says about her personal situation, 2) body language that is observed as the woman speaks or listens and 3) conversation themes. Conversation themes are distinct from language themes as they involve at least one other person and there is an exchange and sharing of themes or emotions, whereas language themes may take the form of a comment made to no one in particular and are a reflection of how someone is feeling. Within each area the author continued to use a reflexive process to develop a taxonomy (a means of classifying themes), which was discussed and validated by the skilled research associates (in this case the author's PhD supervisors). The effect

of the discussion enabled the author to present and explain her ideas for the taxonomy further and in turn be challenged by the questions asked about the relevance of the themes by the research associates. This process enabled the author to crystallize her thinking and judgment about the themes for the taxonomy and the development of the decision tree. As the decision tree was based around articulating the author's own decision making process, it was essential to determine what contributed to this process through reflection and brainstorming, and then verifying this through discussion and validation with competent professionals. By reflecting and brainstorming about participants' language, the following themes emerged (Table 1).

Table 1
Language Themes for the Taxonomy for the Decision Tree

Happy	Positive	Peaceful	Humourous	Ambivalent
Cheerful	Excited	Eye contact	Talkative	Laughing
Agreeable	Jolly	Negative	Tired	Sad
Exhausted	Weary	Ponderous	Wistful	Melancholic
Dispirited	Somber	Stuck	Morose	Downhearted

The same reflective and brainstorming process was carried out on the category of body language and the following themes were developed (Table 2).

Table 2
Body Language Themes for the Taxonomy for the Decision Tree

Eye contact	Quiet but engaged
Unresponsive to others	Quiet
Laughing	Frowning
Resistant to conversation or to others	Talkative
Sitting with others and engaged	Smiling
Sitting alone	Sitting with others and disengaged
Disengaged with others	Sitting alone
Quiet but engaged with others	No eye contact

In the area of conversation themes, only a small taxonomy emerged as presented in Table 3.

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Table 3

Conversation Themes for the Taxonomy for the Decision Tree

Positive, ambivalent, or negative reflections on past session/s.
 Positive, ambivalent, or negative discussion about treatment or the disease and the impact on them.
 Positive, ambivalent, or negative discussion about themselves or their relationships and the impact them.

The themes within the three categories provided information about the participants in the group, therefore determining the connections between the themes developed a more comprehensive picture of the group and contributed vital information essential in decision making. For instance, language that is happy, and body language such as being able to hold eye contact, with positive themed conversations are generally viewed as optimistic or positive. Language which is wistful, and reflective, and body language that depicts being quiet but engaged, coupled with ambivalent conversations are also connected. By reflecting upon the themes within the three categories the author felt that the themes from the taxonomy were underpinned by the following three categories of positive, ambivalent, and negative. Themes across the three categories which were affirmative emerged into a positive category, whereas themes which were neither entirely negative or positive were determined as ambivalent, and themes which were unenthusiastic were classified as negative. Through further reflection, the author determined that mood and energy were central to the themes across the three categories, and from this, six sub categories were developed which provided additional information about the participants, and was used in determining decisions. The six sub categories were as follows: energized/cheerful, quiet; tired, reflective; angry, sad/disappointed which are indicated in the following Table 4.

Table 4

Categories and Subcategories for the Taxonomy for the Decision Tree

<u>Category</u>	<u>Subcategory</u>	<u>Category</u>	<u>Subcategory</u>
Positive: Energized/Cheerful	Energized Laughing Smiling Positive discussion about treatment/disease and the impact on them Happy Sitting with others and engaged	Positive: Quiet	Quiet but engaged with others Quiet but engaged

	Excited Talkative Positive discussion about themselves or their relationships and the impact on them Humorous Peaceful Jolly Agreeable Cheerful Positive reflections on past session/s		
Category Negative Ambivalent: Tired	Subcategory Unresponsive to others Disengaged with others Ambivalent reflections on past session/s Ambivalent discussion about treatment/ disease and the impact on them Ambivalent discussion about themselves/ relationships and the impact on them	Category Positive Ambivalent: Reflective	Subcategory Melancholic Wistful Ponderous Quiet
Category Negative: Angry	Subcategory Angry Frowning Resistant to conversation/others Negative reflections on past session/s Negative discussion about treatment/disease and the impact on them Negative discussion about themselves and the impact on them Negative discussion about themselves/relationships and the impact on them	Category Negative: Sad/disappointed	Subcategory Sad Morose Defeated Downhearted Dispirited No eye contact Sombre Sitting alone Stuck Sitting with others and unengaged

Four criteria were established from the categories and subcategories which were: positive, positive ambivalent, negative ambivalent, and negative. By reflecting upon the taxonomy the author determined that mood and energy levels underpinned all of the themes within the categories and subcategories. In the author's opinion many decisions in therapy are influenced by mood, emotions and perceived motivation levels, therefore a series of questions were developed based on the established four criteria and the themes which underpinned them, which in turn informed the decision of an active or receptive music therapy method used for the sessions. In the author's clinical oncology and palliative care experience, when there is an underlying positive mood and energy level the

participants' can be more responsive to active interventions, conversely where there is low energy levels and mood the participants maybe more amenable to a receptive intervention. However, where the mood and energy levels were deemed negative ambivalent or positive ambivalent, the six sub categories provided additional information which enabled the researcher to determine which intervention would be the most appropriate. The decision tree is presented in Table 5.

Table 5

The Decision Tree

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| <ol style="list-style-type: none">1. Is the mood within the group positive and energised? (<i>active intervention</i>)2. Is the mood within the group positive but with low energy? (<i>receptive intervention</i>)3. Is the mood within the group ambivalent with low energy? (<i>receptive intervention</i>)4. Is the mood within the group reflective, but there is evidence of energy? (<i>either an active or receptive intervention</i>)5. Is the mood within the group negative, but energized? <i>active intervention.</i>6. Is the mood within the group sad or disappointed, and is there low energy? (<i>receptive intervention</i>) |
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Applications of the Decision Tree in Group Therapy

Vignette 1: Getting started. The first vignette is taken from a group where four women were well enough to attend the first session. Three of the women were treatment free, and another had advanced cancer. Of these four women, one had a significant hearing impairment and relied on lip reading, and another woman was autistic.

The opening conversation consisted of one woman speaking repeatedly about the sessions being close to Christmas, yet it was only October. She wanted to know what experience the author had and if she had conducted music therapy groups before. She would ask others questions about themselves and answer for them. Someone else spoke about some pain they were experiencing, and their concern about the outcome of an up-coming doctor's appointment. Another woman noticed the researcher's guitar and recounted how she had one at home. Someone else spoke only to say "hello" to the author and another woman in the group.

From this opening conversation the author noticed the language themes were anxious, vulnerable, and expectant. The body language of the women was quiet but passively engaged, some were talkative, there was some eye contact with the author and with each other. There was some evidence of resistance to others through avoiding eye contact and looking

away; there was also some smiling from others. The conversation consisted of ambivalent and positive themes. The over-riding feeling was one of ambivalence with low energy, so the author selected a receptive intervention. Given it was the first session, and the women were nervous about what the program would involve, the researcher selected the receptive intervention of music listening. A receptive intervention involves the music experience of listening and is the foundation for a therapeutic dialogue (Wigram, Pederson, & Bonde, 2002).

The author asked the women to 'sit comfortably' in their chairs and listen to five pieces of pre-recorded music and one piece live music, following this they were asked about what they heard and if they noticed any changes in their breathing or other physical responses. From the analysis, this intervention generated much conversation, the women talked about how they 1. felt listening to music they would not have ordinarily heard; 2. had heard the words rather than melody, 3. felt calmer; and 4. wanted to be able to recreate inner calmness. From this the author offered some ideas about how they may use music at home in order to relax and find some internal stillness.

By observing and attending to the women's behaviour and conversations during the opening discourse, and applying the principles of the decision tree, the author was able to make a clinical decision based on the evidence she had observed in the room. The women responded positively to music listening, they willingly participated, and all of them were talkative during the conversation which followed on from listening. The women were surprised by their physical responses to the music especially changes in their breathing. Given the positive responses, the author felt validated in her decision to select music listening. She felt it was an appropriate intervention to use during the first session given the women's initial nervousness and ambivalence.

Vignette 2: Animated and engaged. In one of the other groups, four of the women were well enough to attend the fifth session. Two of the women were undergoing active treatment for early breast cancer, another woman was treatment free and the final woman was receiving treatment for advanced cancer. One woman's father had died during the previous week and she had just attended his funeral.

The opening conversation involved discussion about the effects of treatment and hair loss; one of the women was excited with finishing her chemotherapy treatment and she arrived without her headscarf. There was

much laughter about the relief of finishing treatment. Another woman talked about her father's funeral which had taken place a few days before, and one woman spoke about the uncertainty of having cancer and how those close to her really did not and could not understand what it was like, even though they tried to understand.

The language themes were reflective, jolly, weary, and humourous. The body language between the women was engaged, there was eye contact between everyone, there was laughter, and they were talkative. Their conversation themes were about the negative and positive impact of treatment, and there was positive and ambivalent discussion about relationships. Despite the diversity of the conversations, the overall mood and energy level in the room was elevated and positive so songwriting was suggested by the author. The group songwriting process provides a creative space, allowing clients to find points of contact with each other, through sharing their own stories and exploring the commonalities and differences in their experiences (Thompson, 2009). The women were able to use the themes of the discussion as the basis of a song about their experience of having cancer and how cancer does not exist in isolation. The title of their song was "Shut up and listen me!"

The women's cues during the opening conversation were diverse, there was both sadness and laughter however none of the women were quiet or subdued, and they were animated and engaged with each other. During the songwriting process the women's conversations continued and they took ownership of the song, collectively directing the content and structure of it. At the end of the hour they elected to continue working on the song during the following session. Their positive responses to the intervention confirmed the author's understanding of their cues; she felt her clinical decision was suitable, and the collective process of songwriting validated the women's personal experiences.

Discussion

The women who participated in the study were at different points on the breast cancer trajectory and therefore had diverse needs. A decision tree was constructed to support the women emotionally with relevant music therapy interventions and provide consistency in the therapist's decision making throughout all the research study sessions. The author followed a logical decision-making process to observe the behaviour of the women,

listen to their language themes and conversations, and be present to the interplay between the women. Using the decision tree also ensured that the decisions were consistent throughout all the sessions and within each group. It provided essential uniformity and validity in the decision making process (Pauker & Wong, 2005).

When establishing the taxonomy for the decision tree the author was reflexive in her approach in order to try to be as considered as possible. She examined what had contributed to her knowledge and how she had constructed it when reflecting on her practice (Pillow, 2003). She was conscious of not making assumptions and attempted to represent her clinical experience accurately through self-analysis and self scrutiny (Pillow, 2003).

As a clinician one can never be completely accurate in one's judgment and decision making, as any situation is perceived, from a singular perspective which is influenced and limited by one's own experience. For instance the author is an experienced practitioner and the idiosyncratic features she reflected upon to inform her clinical judgment when developing the decision tree may have been relevant to her clinical practice but not relevant to a research therapy program for women on a health continuum who all had divergent needs.

Traditionally, group therapy with cancer patients is restricted to cancer type and stage as it is felt that the needs of the subjects are similar. Due to issues with recruitment the author's research combined stages of breast cancer, this was a risk as it had the potential to negatively affect the women participating, as it may have been confronting for them. However, the author attempted to be vigilant in her reflexivity about her practice and attempted to produce a comprehensive and applicable set of criteria and taxonomy for the decision tree. The women's ongoing interest, sharing of their feelings, positive feedback and continued engagement in the program indicated that the interventions were purposeful and the criteria for the decision tree were useful and relevant. This suggests the need to apply reflexivity when developing criteria for a decision tree rather than generalize and apply assumptive knowledge (Pillow, 2003), so that it is relevant to the situation and client population.

Cultural and population specific factors should be taken into consideration when considering criteria for a decision tree so that it accurately reflects and supports the clinical environment. Diversity, styles of interpersonal communication, use of language, non verbal

communication and cultural customs are essential issues to be examined; a reluctance to address these factors has the potential to limit clinical work as it can impact on establishing a therapeutic relationship and the relevance of the therapy. However, one of the benefits of a decision tree is that it can be modified so that features that have been disregarded can be reported so all possibilities are accounted for (Dowding and Thompson, 2002). The value of a decision tree is that the decision making process is transparent, so that anything that has been overlooked will be obvious.

Within the clinical setting, decision trees offer a framework which assists in exploring all available options, while being mindful of the complexity of the variables which influence decision making (Bonner, 2001; Buckingham & Birtle, 2011). They can be used during the early sessions in a group program to assist in establishing the group, and their application follows the same format when working individually with clients and may aid the newly qualified clinician navigate the therapy process. Decision trees also support a rationale for the choice of interventions used, thus providing information about the clinical setting. As there has been criticism in the psychosocial literature about the insufficiency of information supplied about the interventions used in therapy groups, (Forte, Hill, Padzer, & Feudtner, 2004; Robb, Burns, & Carpenter, 2011) the use of decision trees has the potential to meet this need and respond to this criticism.

The decision tree determined whether a receptive or active intervention was used which was preferable to dictating specific interventions which the author felt was too prescriptive, as she wanted to have some flexibility in the choices she made in the therapy setting. She was also aware of the emotional and physical impact a cancer diagnosis and the accompanying treatment can have on people, and therefore identified mood and energy levels as important characteristics which informed her decision making. The flexibility of the decision tree enabled the author to offer a choice of interventions in some of the groups towards the latter sessions in the program; this was once group cohesion had been established. In offering a choice the author was guided by the decision tree and would suggest interventions which were suitable to the mood or energy levels within the group.

Group work by nature is complex and unpredictable. By using a decision tree the author was able to remain present with what was happening in the moment rather than pre-determine the structure of a

session. Based on the experience of using the decision tree in this study, the following benefits were found: 1) for experienced researchers, it confirms their judgment and offers insights into their process of clinical decision making, 2) it ensures consistent decision making within each session and across a music therapy program, 3) it provides a roadmap for the direction of a session and, 4) it enables future replication of a music therapy program.

The development of the decision tree may be one of the main contributions of this study to the music therapy literature as it provides a means of standardizing therapeutic interventions in research while also allowing for flexibility in meeting participants' clinical needs. In this study the decision tree was based on the energy level and mood of the group, and the language, body language and conversations evident at the beginning of the session. In this study these parameters were important facets of the decision. In future studies the components of the decision tree may be different.

Another contribution of the decision tree was that it enabled the author to carefully reflect on the most important cues that she gleaned from the group, on which clinical decisions are made. The decision tree therefore may be important to clinical work as well as to research studies.

Conclusion

A decision tree is an efficient way of making decisions in a therapy setting. It also preserves uniformity around decision making and supports the efficacy of the process. Decision trees are easy to apply and can be modified to suit the changing needs within the clinical environment. Their potency is reliant on being developed with consistent and relevant information; precise cultural and population factors are essential to accurately reflect the clinical context. Decision trees are applicable to the experienced clinician, or the newly qualified graduate, and they can be applied as a research protocol or as a framework for determining applicable interventions in group or individual therapy. Using a decision tree also allows for replication of research, as it provides a formal process of decision making, in a largely intuitive based area.

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A response to Stephanie Thompson's article, including a tribute to Denise Grocke (AJMT 2013 Vol 24)

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In "Decision making in music therapy: The use of a decision tree" Stephanie Thompson provides a detailed account of the origin of the decision tree's growth from decision making theory across broad fields. While this literature spawned one "branch" focussing on interest in and development of decisional supports and decision aids to assist patients/families in medical treatment decision-making (AHRQ, n.d.), Thompson focuses on that which enables practitioners to reflexively