

Understanding the Influence of Music on People’s Mental Health Through Dynamic Music Engagement Model

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Abstract. Research shows that music helps people regulate and process emotions to positively impact their mental health, but there is limited research on how to build music systems or services to support this. We investigated how engagement with music can help the listener support their mental health through a case study of the BTS ARMY fandom. We conducted a survey with 1,190 BTS fans asking about the impact BTS’ music has on their mental health and wellbeing. Participants reported that certain songs are appropriate for specific types of mood regulations, attributed largely to lyrics. Reflection, connection, and comfort were the top three experiences listeners shared during and after listening to BTS’ music. External factors like knowledge about the context of a song’s creation or other fans’ reactions to a song also influenced people’s feelings toward the music. Our research suggests an expanded view of music’s impact on mental health beyond a single-modal experience to a dynamic, multi-factored experience that evolves over time within the interconnected ecosystem of the fandom. We present the Dynamic Music Engagement Model which represents the complex, multifaceted, context-dependent nature of how music influences people’s mental health, followed by design suggestions for music information systems and services.

Keywords: Music information systems and services, Mental health, Wellbeing.

1 Introduction

The benefits of music on people’s mental health and wellbeing have been well-researched in music psychology, neuroscience, psychiatry, and music information retrieval (MIR). There is potential for music to be used in treatment and therapy as it can influence complex neurobiological processes in the brain [26, 31], regulate moods and emotions, and support the overall wellbeing of listeners [32, 33, 41]. Music can lessen anxiety, ease tension and stress, reduce pain, [8, 11, 20, 37, 54], and can provide beneficial intervention for people with mental illness [13, 34]. In their review of 33 studies on the topic, McFerran and colleagues [35] found that young people’s perception that music can have a positive impact on their mental health was strong, especially in the voices of adolescents themselves.

Research investigating how music and mental health are related typically focus on subjectively or objectively measuring either passive (e.g., listening) or active (e.g.,

playing an instrument) music engagement [14]. Studies that show how music engagement directly and indirectly contributes to mental health in the real world are limited, particularly, with the increasingly pervasive use of digital media for consuming and sharing music. We aim to examine this engagement with music and its influence on listeners' mental health from the perspective of information science.

The current information ecosystem allows users to have a much more complex engagement with musical content beyond a simple auditory experience. The prevalence of social media, music streaming services, collaborative playlists, music mixing and creation apps, and music games has changed the ways people engage with music [27, 39]. Schedl and Flexer [51] discuss the importance of user-centric MIR approaches. They highlight how in addition to the factors related to the music content (e.g., rhythm, melody), music context (e.g., semantic labels, lyrics) and user context (e.g., mood, activities) influence perception of music. Furthermore, the fans (defined as "individuals who maintain a passionate connection to popular media, assert their identity through their engagement with and mastery over its contents, and experience social affiliation around shared tastes and preferences" [18]) have started playing a much more active and complex role in engaging with music and music related content [15, 28]. Many artists are much more visible to the fans in this information environment and there are more ways for fans to get connected with their favorite artists. This can also influence the fan's perception and thoughts on music. For instance, prior research in fan studies highlight how the relationship between artists and fans and/or fan-to-fan relationships in communities can influence people's mental health and wellbeing [17, 21].

Transmedia storytelling approach, which is becoming increasingly common in pop culture, is discussed as an opportunity where fans take a much more active and participatory role in appreciating and engaging with media content [10, 19, 50]. The development of new apps and virtual environments to stream music and host collective music listening experiences like live concerts and streaming parties continues to change the way people access music and music related information [1, 39] which may impact people's listening behavior. However, when studying how music benefits the listener's mental health and wellbeing, currently there is a lack of consideration for these contextual and social aspects of using information systems and services to access music. Consequently, this limits the design of music information systems to support such beneficial experiences with music and music information.

We aim to study how fans engage with music and relevant content in the real-world situation in their current environment to better understand how music supports people's mental health and wellbeing. Understanding the music fans' behavior is important as the information systems and services which provide access to music and related media are avidly used by fans [28]. This improved understanding helps us derive design implications for music information systems to improve and support people's positive engagement with music and relevant content for their wellbeing.

Through this research, we answered the following research questions:

RQ1. What aspects do we need to consider to comprehensively understand how people engage with music to support their mental health within the current information ecosystem?

1.1. Which aspects of music do people describe as being helpful for supporting their mental health?

1.2. How do listeners describe their experiences with music in terms of supporting their mental health?

RQ2. What are the implications for building MIR systems and services to facilitate people's engagement with music to support their mental health?

We answered these research questions through a case study of the ARMY fandom, a global fan community supporting the Korean music group BTS. We selected this method as it is a useful approach for investigating “a contemporary phenomenon within its real-life context, especially when the boundaries between the phenomenon and context are not clearly evident [56]”. We chose the ARMY fandom as a representative case in the current popular music environment as they are considered as one of the largest global music fandoms [2, 28]. Furthermore, several prior studies suggested that the music of BTS is helpful for supporting fans' mental health [7, 29, 47]. Based on an online survey with 1,190 ARMYs on experiences of engaging with music for their wellbeing, we present the Dynamic Music Engagement Model to represent the complex and multifaceted nature of how music influences fans' mental health.

2 Related Work

2.1 Popular Music and Mental Wellbeing

Music positively impacts a listener's mental health, including physiological and emotional changes to manage stress [32, 33, 41, 48]. Music used in a therapy can support recovery and self-development, such as for people coping with a long-term illness [5]. However, there are inconsistencies in the literature regarding different music related behaviors, indicating a need for studies collecting “comprehensive data about the full range of individuals' musical behaviors (active/receptive, preferences, intentions for music use), and correlat[ing] these with health outcomes reported from a variety of perspectives” [36], a gap we aim to address in our research.

An increasing number of studies investigate the connection of popular music and mental health. Teenagers might gravitate towards specific genres and imagery in popular music related to underlying mental health needs [4], such as emotional vulnerability [3], or choose to positively engage with music based on their needs [36]. In certain popular music genres such as rap, there has been a significant increase in references about mental health [22]. Artists who experience mental health challenges have included lyrical content about their struggles, which allows fans to relate to the messages [12]. Popular artists from the United States including Selena Gomez, Lady Gaga, and Kehlani have been outspoken about their own struggles with mental illnesses through their music, and the reach of these popular artists encourages fans to not only become aware of their mental health, but also actively seek help [42].

2.2 Popular Music and Fan Engagement

Fans often engage with artists' music individually through melody and the messages within music. With the pervasive use of social media, fans are also able to engage with artists and music socially. Fans who are not able to attend music concerts in-person can still experience live streaming of the concerts while simultaneously being in the presence of or engaging with other fans online [6]. Rendell [43] discusses how artists who are unable to tour, especially due to the pandemic, use an array of streaming and social media sites such as Twitch livestream, Stageit (a web-based performance venue), and Instagram to connect with their audience. The evolving digital landscape for remote global entertainment in the post-pandemic era provides a timely opportunity to study fan-artist engagement made possible by online information systems.

Fan engagement across multiple digital platforms can be seen in the BTS ARMY fandom. The connection ARMYs feel towards BTS, which is well documented, is primarily through the song lyrics, which highlights each member's artistic talent, the group's authenticity, and their lived experiences [38]. Lee et al. [29] found that fans perceive emotional connection through artists' messaging in their lyrics, and in the knowledge that other fans are listening to the same music. ARMYs also connect with the artists through shared mental health experiences and challenges that BTS members discuss in interviews and media other than music. Some ARMYs take an active participatory role in interpreting and creating content and engaging with the artists and others [28]. BTS expresses care and gratitude for ARMY, such as by dedicating songs and messages ARMY (e.g., *2!3!*, *Magic Shop*) and engaging in reciprocal play [45]. This relationship between BTS and ARMY has led to fans' engagement beyond their music, with individuals and ARMY as a whole, creating a collective that is aiming to transform society and culture at a global scale, exemplified through efforts like #MatchAMillion [40]. Online interactions also lead to offline fan interactions in the form of in-person group meetups, concerts, and meetings [23], further expanding the social network of the fans.

2.3 Technologies for Emotional Connection and Music for Fan Communities

Being part of a fan community and interacting with other fans can have a positive impact on emotional connection and wellbeing. Reysen et al. [44] found that ingroup identification within fan communities was positively associated with wellbeing. Similarly, Laffan [24] found that being a fan of Kpop was a significant predictor of happiness, social connectedness, and self-esteem, speculating that a sense of positive connection with artists is possible due to social media technologies.

Currently, the design of music streaming platforms such as YouTube or Spotify support limited socializing, such as commenting or uploading fan made content. These tools are separate from social media platforms such as Twitter, the latter supporting direct multimedia fandom engagement through dialog, translations, and fanmade content. At the time of writing this paper, BTS uses social media (e.g., Weverse, Instagram, TikTok, and Twitter), streaming platforms for sharing music (e.g., YouTube, Apple Music, Spotify, Soundcloud, Melon, Genie), and multimedia platforms dedicated to BTS ARMY that are run by HYBE, the entertainment company managing BTS (VLIVE and Weverse). Conversations among fans occur within and across these multiple systems based on the preferences and access needs of the fan. In

addition to Korean and English, the ARMY fandom brings together people speaking many different languages [2] across these platforms. In this paper, we aim to learn how the fans' connections with music, artists, and other fans are facilitated in this complex digital information ecosystem to influence their mental wellbeing.

3 Study Design and Methods

We asked Twitter users (≥ 13 years old) across the world who self-identified as listeners of BTS' music to complete a descriptive, mixed-methods survey in February 2021. The study was approved by the institutional review board at the University of Washington.

We developed an online survey using Qualtrics. Using Saarikallio and Erkkilä's [49] framework on seven mood regulation strategies as a guide, we developed 38 questions about: fans' engagement with BTS' musical and non-musical content, BTS-related activities, overall experience in the fandom, and their mental health. The survey also included demographic information regarding gender identity, race, country of residence, and mental health diagnoses.

We distributed the survey via Twitter, which is the most actively used social media in the ARMY fandom [25]. When participants accessed the survey link, they were asked to indicate their consent via Qualtrics before proceeding the survey questions. They could skip any question they did not want to answer or quit the survey at any time. No incentive was given to participate and we did not collect identifying information. The survey was open for two weeks. We obtained a total of 1,190 valid responses after removing duplicate, incomplete, and spam responses. Table 1 presents the aggregated demographic information.

Table 1. Demographic Information of Survey Participants.

Age (years)	Mean = 26, Min = 13, Max = 71, Standard Deviation = 10.02
Race	Asian = 567, White = 317, Hispanic = 210, Black = 43, Native Hawaiian/Pacific Islander = 7, American Indian/Alaska Native = 3, Described in own words = 106
Gender	Female = 1105, Non-binary = 29, Male = 15, Described in own words = 26
Country of Residence	USA = 268, Philippines = 155, India = 123, Indonesia = 54, Malaysia = 47, Mexico = 45, South Africa = 38, UK = 32, Germany = 29, Canada = 26

* We only report for countries where 20 or more participants indicated residence

To analyze the open-ended questions, a codebook was developed after rounds of inductive coding with four coders and iteration through consensus [16]. We inductively coded all open-ended responses and then compiled themes through an affinity diagramming exercise where each coder noted themes that emerged through coding. We collaborated to consolidate themes and created a codebook with two main categories: 1) attributed aspects of a BTS song that helped participants experience different mood regulations supporting their mental wellbeing (e.g., vocal/rap, lyrics, melody, rhythm), and 2) participants' experience when engaging with BTS' music (e.g., negative emotions, positive emotions, imagery, remembering). As the analysis

progressed, we iterated on the codebook and discussed coding discrepancies with the entire team, ultimately coming to consensus. We used a finalized codebook (Figure 1) to code the remaining responses using ATLAS.ti.

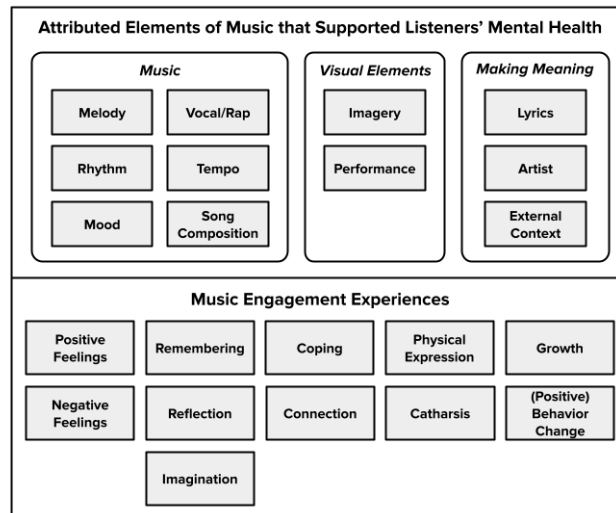


Fig. 1. Codes for helpful music elements and listeners' music engagement experiences.

4 Findings

4.1 Elements of Music Helpful for Mental Health

BTS has a diverse range of songs in their discography spanning over 9 years of releases, incorporating elements from a variety of music genres. We wanted to understand what participants considered as their “go-to” songs for changing their moods and supporting their mental health. In Table 2, we summarize the top songs mentioned by participants in each category of Saarikallio and Erkkilä's [49] framework on seven mood regulation strategies (i.e., entertainment, revival, strong sensation, diversion, discharge, mental work, and solace) and explain how it impacted their mood.

Table 2. Summary of top songs in each category of mood regulation.

Mood regulation	Top song	Elements stated to be helpful	Freq.
Expressing negative mood (Discharge)	UGH!	Lyrics, tempo, rhythm: a rap song with high tempo and central lyrical messaging towards a criticism of society with intense audio elements like gunfire	168
Forgetting negative mood (Diversion)	Magic Shop	Lyrics, context: song dedicated to ARMY; listeners found hope and comfort during difficult times	93
Feeling understood/ comforted (Solace)	Magic Shop	Melody, lyrics, imagery: a song that brought warmth, comfort, and feeling like getting a hug	167

		and/or being in a safe place where one's worries are removed	
Reflection (Mental work)	Spring Day	Lyrics, context of survivors of Sewol ferry tragedy, and chord progressions stimulating memories, personal/artists' experiences, and creating emotional space to reflect	73
Revised/Relaxed (Revival)	Life goes on	Lyrics and context of accepting the pandemic	92
Maintaining positive mood (Entertainment)	Dynamite	Rhythm, imagery: Upbeat disco-pop song with bright positive imagery in lyrics and music video	148
Feeling thrilled/energized (Strong sensation)	Mic Drop	Lyrics, rhythm, artists' context: A hip hop song with distinctive beats and lyrics about winning despite haters	108

Figure 2 shows the frequency of elements that were mentioned by participants as being helpful for supporting their mental wellness. Among the elements of BTS' songs, **lyrics** were most frequently cited by listeners as the element that helped them experience the seven moods. Lyrics play an important role in the musical experience allowing the listener to directly connect with the artists' words and intentions, and depending on how it is used with other stimuli like melody, it can counteract or reinforce different emotions [53]. BTS' expression of their emotions and past experiences in their lyrics was something participants noted as helping them express their own feelings and experiences (elaborated in 4.2).

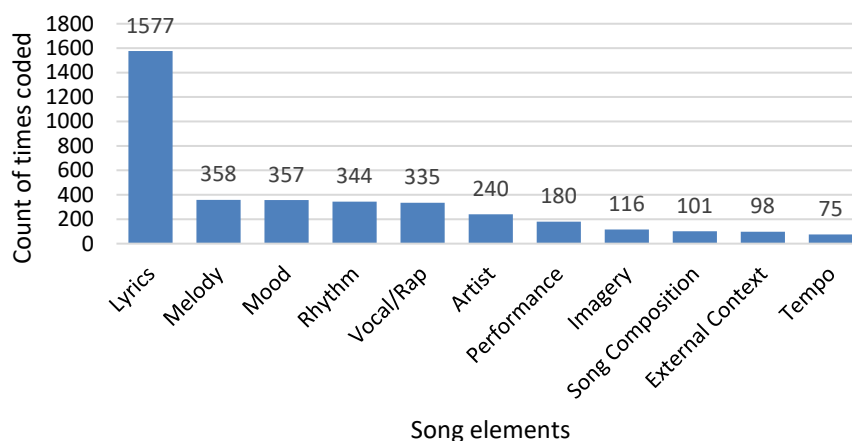


Fig. 2. Attributed helpful elements for supporting music listeners' mental wellbeing.

In addition, listeners mentioned that BTS' songs created the perfect atmosphere for the mood they wanted to experience. This atmosphere was attributed to the rhythm and melody of the song. **Rhythm and melody** often supplement a song's lyrics, increasing the impact the lyrics had on listeners. Listeners who did not know Korean often

encountered the non-lyrical elements first. Referencing the song *Butterfly*, P1154 stated, “prior to reading the lyrics I could already feel how the song felt like finally a hand to hold after reaching out for so long. So when I did read the lyrics, it became even more meaningful.”

Additionally, many participants brought up the intense energizing experience of **hearing the songs in live concerts** they attended. This experience heightened a sense of connection with the songs because of the memories they evoked afterwards, making them recall the overall concert experience and memories of experiencing specific songs. Live performances of *So What* were most frequently mentioned. P1175 reflected that, “*So What* has and always will be my first choice for feeling thrilled and energized...Being at the concerts, I was my best self. I did not have any worries and I had so much fun.” Specific experiences of the live concert brought additional energy for P79: “Whenever I listen to this song I think of their Speak Yourself concert...I feel really energized every time I think about it.”

4.2 Experiences of How BTS’ Music Supported Mental Health

Participants’ self-reported experiences with the music are presented in Figure 3. Participants reported feeling an array of emotions, feeling connected to the artists and other fans, as well as changes in their behavior or perspective in some cases.

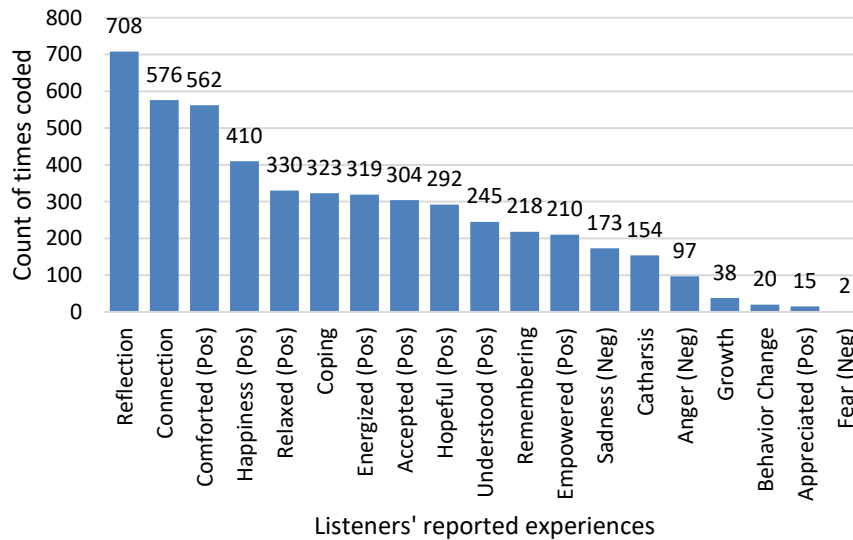


Fig. 3. Listeners’ reported music engagement experiences. (Pos: positive feelings; Neg: negative feelings; other experiences can be a mix of positive, neutral, and/or negative)

Participants explained that BTS’ lyrical content played an integral role in helping them **feel connected to artists’ lived experiences** expressed through their music. BTS members take part in writing these songs and listeners find comfort in knowing that

BTS members' feelings and experiences are reflected in their songs so that they are not alone. P658 noted this for *Magic Shop*:

“Where many artists’ approach to writing is to romanticize troubles and end a song on that note, BTS often consistently provides solutions and advice to their fans through music. This one tells the message of the power within me and my endless ability...It makes me want to show up for myself and be my best self just like I know the boys would want for me.”

P624 explained BTS’ **authenticity** saying that *Blue & Grey*, *The Truth Untold*, and *Outro: Tear*, among several other BTS songs, “are proof that the boys also experience what we usually experience too, since we are all humans here. They are somewhat saying that it's okay to feel such things, it's normal...” P673 explained a **healing** experience of being understood and remembering their childhood trauma through the lyrics of *Inner Child*: “The song talked to a part of me I forgot I had, and helped me begin to heal, to form a healthy, much needed connection with my own inner child.”

Participants related with BTS’ regular inclusion of lyrics that discussed **serious issues plaguing current society** and in particular the challenges faced by youth. Their authentic messages transcended time, generations, and geographic locations. They debuted with a single, *No More Dream*, in which they talk about South Korean youth’s challenges with the education system and being forced into specific career paths at an early age. BTS’ messages through lyrics have evolved since then to include more songs that openly express negative emotions like grief, as described in *Spring Day*’s lyrics. Although written before the pandemic, *Spring Day* resonated with P392 during the pandemic:

“I don't know how they did it but they made a pandemic song years before the actual pandemic. The lyrics about missing people and not quite being able to reach them are so appropriate for this time in particular. There is always comfort in knowing that no hardship can last forever, and this track perfectly encapsulates how I've been feeling during the pandemic and reminds me to avoid catastrophizing the situation.”

The **external context that motivated the creation of the song** further influenced how users felt about the song; for instance, *Spring Day* which was associated with the sinking of Sewol ferry in Korea where 304 people drowned, most of whom were high school students¹:

“When numbness consumes me, I listen to Spring Day to “feel” again because the melody successfully translates the feeling of longing and with the Sewol ferry tragedy in the back of my mind, I can’t help but shed tears.” - P491

Some participants talked about **relating to the artists’ passion**, wanting to quit their dream or passion but deciding to keep going, or after having already quit what they considered to be their dream, finding comfort in the acknowledgement from the artists that it is okay to do so (e.g., *Black Swan*, *Paradise*, *Burn it*). *Paradise* was mentioned

¹ <https://www.reuters.com/article/us-southkorea-ferry-idUSKBN0NJ07R20150428>

as a form of comfort for those who did not know what their dream or next step was. P472 stated that in *Paradise*, BTS expresses “exactly how I feel about not having a goal and tell me it's okay. That I will figure it out.”

BTS’ lyrics often complemented music, making listeners **reflect on their own life** and in some cases, **feel powerful**. The music of *Fire* for P428 was an “instant energy booster” and the lyrics also energized them:

“Whenever I hear this line from [the] song, ‘Live however you want, it’s your life anyway.’ It just pumps me up & helps me realise I don’t need to follow others to fulfill their expectations. I should just look out for what makes me feel happy.”

Some listeners used the inspiration they get from BTS and their songs to channel their **anxieties and worries into creative outlets** such as painting, writing poems, and singing. The lyrics and melodies were used by participants in their writing and when making music (“I like making music myself as a hobby and often make covers of their songs, sample them, or generally take inspiration to write original works.” (P668); “If I feel inspired by a song they have done, I will sometimes paint, just to get the feelings out, or if a book is recommended, I will often read it.” (P360)). Several participants described BTS songs motivating them to dance along, at times, inspiring intentional movement and at other times making the listener “wanna dance despite myself” (P468). Specific songs that inspired participants to dance included *Fire*, which made P444 “dance like a kid”, and *Serendipity*, which S1049 listens to “almost every night...and dance with myself to this song.”

Songs also helped participants **engage in existing or make new social connections**, something that can impact mental health and was affected during the COVID-19 pandemic. Participants shared and discussed BTS songs and performances with existing friends, the music catalyzing P284 to “dance and sing and bond with my friends who aren’t ARMY.” BTS’ music helped forge new friendships in the fandom, with some new bonds impacting mental health in a positive way.

Seeing **how the music affected other fans** also had an impact on some ARMYs. For instance, P1032 shares “Seeing how fans comment on BTS music, has saved them from suicide or getting through worst moments in life was really the start of me asking the question of ‘what is it in their music that made fans relate?’” P749 also talked about a specific incident where a comment from another fan led them to helpful music:

“Once I wrote on weverse in Korean about not feeling well because of a traumatic experience and that it felt like the feeling would never leave. K-armys immediately tried to cheer me up and one of them quoted *저/나/가* [the song, *everything goes*] so I went to listen again to the music while reading the translation and it actually helped me a lot moving forward.”

Sharing personal reactions to music on social media or streaming services also led to **support from other fans** in certain cases. For instance, P567 shared:

“I had a breakdown in 2016 after my marriage ended in the summer. During the *Blood Sweat and Tears* comeback I was having a very hard time not attempting suicide (again) and one night when I was streaming the music video, I randomly

mentioned it in the comments and loads of ARMYs I didn't know came to give me support.”

The comfort and care experienced by our participants shows that the artists' intention with their music is highly important in helping to regulate the listeners' mental health. P1067 shares how BTS' openness to discuss mental health issues help create a culture in the community to value mental health and support each other:

“Being part of a fandom that values mental health and openly supports anyone who is struggling has lowered the barrier and removed any reservations about sharing struggles to the community.”

5 Discussion and Implications

5.1 A Model of Dynamic Music Engagement

Informed by the social-ecological model [9], findings of this study, and additional information about BTS and ARMY, and prior work on music engagement in the context of mental health, we propose a model of “Dynamic Music Engagement” (DME). This model explains the multifaceted interactions of music on the listener's mental health outcomes (Figure 4). In our survey sample, BTS fans do more than just passively listen to songs; they engage with the music listening experience holistically and within a greater socio-cultural context.

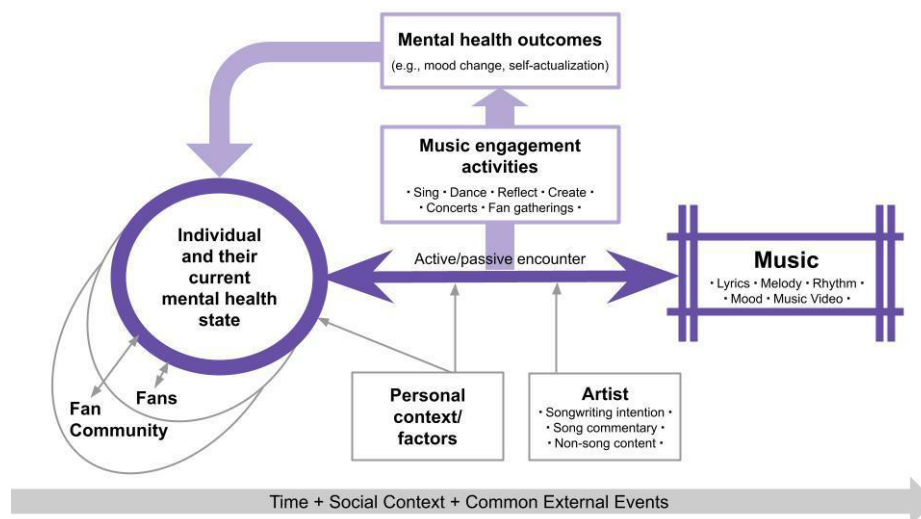


Fig. 4. Dynamic Music Engagement Model.

Much of the previous research investigating the connection with music and mental health tends to focus on specific song attributes (e.g., lyrics, melody) or limited musical behaviors (e.g., passive listening, music creation). Furthermore, there is a lack of

consideration for how the context of the listeners, artists, the fan community, and the interactions among them influence the ways people feel about the music. Through a case study of BTS and ARMY, we found that interacting with the lyrics, tempo, melody, among others—both alone and with other fans—impacts how listeners benefit from music with regards to their mental health. This impact on mental health is dynamic, changing over time as listeners discover new aspects of the songs, such as hearing a song and being moved by the melody and then moved again later after reading the lyrics. Listeners' individual situations and common community experiences also impact how the songs impact their moods; this includes experiences they had during BTS concerts and impacts of the COVID-19 pandemic on their lives. Our results provide evidence that passively listening to music can impact a listener's mental health (e.g., listening to *Life Goes On* catalyzing a cathartic response) and a person's mental health can impact what music they are actively seeking or choosing to listen to (e.g., listening to *Spring Day* when feeling nostalgic). Therefore, the nature of the relationship between the individual and their current mental health state with music is bidirectional (Figure 4).

This research reveals the complex ways in which an artist's discography – and even an individual song – can influence a person's mental health through different modalities, during changing personal and societal contexts, and over time. In the context of BTS and ARMY, authentic and mutual sharing of each other's challenges and motivation is reflected in the artists' lyrics², interviews³, social media posts, concerts and live interactions with fans, award show messages, and the stories they share behind their songs. Our study describes how songs influence mental health in the complex, real-world information ecosystem that listeners find themselves in. Therefore, songs are more than just pitches and words – they are an intricate, dynamic experience, and rich in its messaging that can positively support listeners' mental health.

5.2 Design Implications

In this section, we use the DME model to suggest several design ideas for music information systems and services to support people's engagement with music for their mental health. These ideas incorporate evolving contexts beyond the music itself, including fan-artist interactions, creative participatory engagement, and interactive collective listening.

Designing for Dynamic Participatory Creative Engagement with Fans and Artists.

The DME Model highlights the importance of a fan's engagement with music beyond listening to the song. New media supporting participatory and social experience that nurture the connections between the artist and fans, and among fans, will be increasingly important [28]. Beyond mood regulation or coping, we identified several music engagement activities that involve some creative aspect (e.g., writing songs/poems) that could support the listener's mental health or are a consequence of an improving mental health. Participants shared that listening to music can lead to positive

² <https://doolsetbangtan.wordpress.com/2018/06/01/two-three/>

³ <https://www.rollingstone.com/music/music-features/new-bts-song-2021-worlds-biggest-band-1166441/>

engagement including the **physical expressions** of singing, dancing, reflecting, creating, attending concerts, and gathering at fan meetups. Content creation social media tools such as TikTok and Instagram support such engagement [52, 55]. Participants were actively reflecting on the songs' meaning as well as on their own memories, experiences, fears, and hopes. Moreover, this demonstrates that the impact of music on listeners' mental health lasts longer beyond when actively listening to music, including when discussing it with other fans. Music streaming services can also support creative activities and self-awareness of this change in mental health through using visual markers (e.g., colors representing different moods).

A better integration with other media to foster a sense of connection with artists and other fans can happen through choreo/dance challenge videos. BTS and their company HYBE have encouraged mass participation from fans through TikTok dance challenges and YouTube Shorts (e.g., *Permission to dance* challenge, sharing memories with BTS through *Yet to come* challenge). While these kinds of participation are curated, recorded, and asynchronous, they still foster a sense of belonging and relating with others' experiences. Vizcaino-Verdú and Abidin [55] argue that music challenges are a mode of storytelling where the TikTokers tell the story about themselves and their feelings about the music as a form of transmedia rather than a competition. With the emergence of ad hoc, one-to-many bidirectional auditory interfaces such as Twitter Spaces (that allows the host and participants to speak), there is a potential for technologies to support participatory synchronous and remote audio engagement. Content that supports singing along (e.g., remote social karaoke among fans), live but remote singing with artists (similar to in-person concert experience), or practicing fan chants (a chant that fans recite in unison during the artists' performances consisting of parts of the lyrics, names of the group/members, or other words) could be beneficial for more active engagement with the song.

Furthermore, the specific context in which music is experienced, affects the users' emotions as they recall that context; for instance, the life experiences the user was going through at the moment (e.g., losing someone close, first year of college) or the place and person associated with that experience (e.g., going to a concert with a friend, dance practices). Participants often shared these memorable experiences which in turn made them feel strong emotional connections with specific songs.

Features that connect the records of the user's music listening behavior with other content created by the user, for instance, showing what songs the user listened to most for specific time periods represented by the photos or videos they also took at that time, could help users recall those connections and experience the emotions. Developing more interactive features in live streamed concerts that augments the listeners' experience without overly distracting them could also be appealing. Recently, HYBE collected audio recordings of ARMYs fan chants, and aggregated and played it at an online concert to help create an atmosphere that is more like a real concert. They also selected fans to show on multi-screened background walls so the artists could see the fans' reactions and other fans could also see the messages fans were holding. These are examples of supporting the interactions that would occur in a real concert in an online environment which would not replace the in-person experience but can still help create a positive experience in a virtual setting.

Designing for Dynamic Meaning Making of the Songs and Lyrics.

In our DME Model, we have identified that individuals' mental health state is both actively and passively influenced by artists' intentions behind a song or the context of creation through lyrical content. However, this kind of information may not be apparent in the lyrics itself. An annotation system where more knowledgeable users can provide such information in the streaming services for music or music-related content for other users can help enrich the listening experiences [29]. Genius (<https://genius.com>), a platform for crowdsourced annotation of song lyrics, is one example of such a system. Genius relies on users to source the lyrics, annotate the interpretation, and edit it over time [30]. Users can access information about the artists' context (e.g., interview about the song), get links to other relevant media (e.g., performance video), and get answers to various questions they have about the songs. Further including and/or highlighting how the music impacted other fans may help support the user's engagement with the music for positive mental wellbeing. This kind of feature could also be useful for cases of global fandom where people are listening to music that is not in their own language (e.g., a translation note app such as LibL allows Korean fans to explain Korean memes and puns by Kpop artists to non-Korean fans).

Furthermore, the DME Model draws attention to the bidirectional relationship between a fan's current mental state and their engagement with other fans and with the fandom at large. Fans can not only share their reflections on the song's meaning but also on how their mindset has been influenced by the lyrics. This is possible within the music streaming services or through other social media. For instance, social radio services like Stationhead in which users can stream songs and chat together, can incorporate Danmu (a type of video commentary used on the internet that consists of scrolling user/viewer remarks shown on top of the video in real time) into each station allowing users to multitask – sending Danmu to express their thoughts at the main page while listening simultaneously to the same track. The use of Spaces on Twitter to host live discussion sessions or Q&A with the artists is another example to facilitate the collective experience of reflection.

Ultimately, these suggested features are based on the perspective of viewing context, not as static surroundings that impact the user's reception of music, but as a collection of dynamic relationships that are constructed due to the listener's engagement with music [46] and the information systems they use for music. Fans' relationships with the artists and active efforts to interpret music and share it with other fans, and their consequent influence on how other fans engage with music are examples of how music engagement in the digital context is dynamically and constantly shifting.

6 Conclusion and Future Work

With the increase in use of online technologies, engagement with music and related information go beyond an individual, and beyond the moment of listening to the music. Through a case study on the mental health experiences of the ARMY fandom when engaging with BTS' music, we present empirical findings from a survey with 1,190 ARMYs. These findings provide insights into a music fan's complex and multifaceted context in which they engage with music and music related content and informs the various ways such engagement supports the user's mental wellbeing. Based on the temporally changing social context of fans, we derive the Dynamic Music Engagement

Model. This model provides a lens to inform the design of future information systems to intentionally support listeners' mental health experiences, particularly building participatory connection with the artists and their fan community. In addition, it can be used to codesign and prototype these systems to understand the real-world applicability and tensions. This research is based on a case study of BTS ARMY fandom, and future research is needed to examine how the model applies in different contexts and cultures where music engagement occurs and investigate whether there are additional aspects to consider extending the model.

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