

# Felt Emotions Evoked at Key Structural Moments in Drum and Bass Music

Katarzyna Glancey  
Durham University

## ABSTRACT

The aim of the following study was to elucidate which felt emotions, and their intensity, are evoked at key structural moments in Drum and Bass (DnB) music, namely ‘build’ and ‘drop’. This was conducted through a quantitative within-participants questionnaire focused on subjective feeling, with a sample of 32 participants. The exploratory nature of the study owes itself to a lack of previous studies on DnB. However, related studies and structural knowledge of the genre resulted in one twofold hypothesis. This hypothesis posits that the ‘drop’, rather than the ‘build’, would produce firstly, higher emotion ratings for valence and arousal from the dimensional model, and secondly, power, joyful activation, and tension from the GEMS-9 model. There was no hypothesis for the remaining GEMS-9 emotions, simply an interest in the results. The hypothesis was largely supported, with valence, arousal, and power being consistently higher during the ‘drop’, calculated through Excel and RStudio. Joyful activation and tension, however, were not higher during the ‘drop’ and the remaining GEMS-9 emotions yielded interesting results, with some subgenres eliciting certain emotions more than others. Overall, the study concluded that ‘drop’ and ‘build’, the dominant aspects of DnB, have a strong effect on felt emotions.

## 1. INTRODUCTION

The genre of Drum and Bass (hereafter, DnB) is a particularly under-researched area within music academia, especially within the psychology of music. The few studies on DnB itself have been preoccupied with the club and dance experience, or the drug-use which often, and regrettably, discredits the genre.

DnB, the generic focus of this study, came to fruition in the mid-1990s (Snoman, 2019: 402). Two of its defining features include the use of syncopated breakbeat patterns such as the renowned ‘Amen break’, a staple of many DnB tracks, and a bassline intended to be ‘deep and earthshaking’ (2019: 408), often at such a low frequency that it can be physically felt by listeners in a club setting. The bassline is typically half the tempo of the breakbeat, which is usually between 165-185 bpm, and is typically introduced after a ‘build’ and ‘breakdown’ in the ‘drop’. Some tracks are purely instrumental while others feature an MC who provides vocals, or a verse and a chorus.

Research on music as a whole has demonstrated the huge importance it plays in our lives and its strong impact on human emotions. Reportedly, it is present for 37% of our waking time and evokes emotions around 64% of the time spent listening to it (Juslin & Västfjäll, 2008). In addition, reports have shown that the primary motivation for listening to music is to evoke or regulate emotion (Juslin & Laukka,

2004). Emotion is defined as ‘a quite brief but intense affective reaction that usually involves a number of sub-components - subjective feeling, physiological arousal, expression, action tendency, and regulation - that are more or less ‘synchronized’. Emotions focus on specific ‘objects’ and last minutes to a few hours (e.g. happiness, sadness)’ (Juslin & Sloboda, 2010). Of these sub-components, subjective feeling was the focus of this study.

There are two seminal emotion models, the discrete model (Ekman, 1992) and the dimensional model (Russell, 1980). The former pertains to the basic emotions, a number of fundamental emotions which differ in terms of expression and reception (Ekman, 1977). These include anger, fear, sadness, enjoyment/happiness, disgust, and surprise (Ekman, 1992), which can be combined to form more complex or compound emotions, such as happiness and contempt to produce smugness (Ekman, 1999). In the latter model, Russell argues that affective experience is best represented as a two-dimensional bipolar space in a circumplex model. This bipolar space comprises two axes (see Figure 1), one for valence (pleasure-displeasure dimension) and the other for arousal (arousal-sleep dimension), on which emotions can be plotted. From this study he deduced the ‘fuzziness of affect terms’ (1980: 1165), that each of the emotions could be plotted in a number of different places, and thus emotions were plotted continuously around the perimeter of the model (1980: 1167). But these axes alone lent themselves to this study as a more general emotional indication of pleasure/displeasure and excitement/calm.

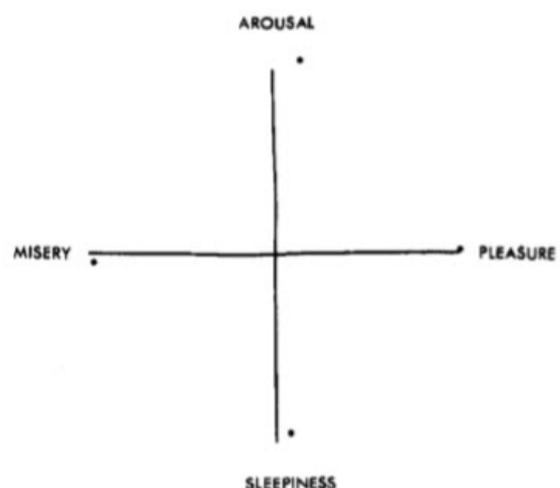


Figure 1: Russell's Circumplex Model

Though these studies have their merits, a model for explicitly music-specific emotions was designed by Zentner et al. (2008). The Geneva Emotional Music Scale (GEMS) consists of forty-five labels of emotions evoked by music and whose intensity is measured using a Likert scale. This was further condensed into twenty-five labels and later to nine labels, an ultra-condensed version of the full scale in its primary factors with emotion adjectives to define each factor. While these nine factors (wonder, transcendence, power, tenderness, nostalgia, peacefulness, joyful activation, sadness and tension) are more nuanced and thus somewhat more akin to the dimensional model, they also refer to something fundamental, much like the basic model. Thus, the GEMS-9 model was utilised in this study to yield music-specific emotions.

A further point of consideration applies to all of the aforementioned theories—the different types of emotion that can be evoked when listening to music: perceived emotions and felt emotions (Gabrielsson, 2001). Perceived emotions refer to the perception of emotional expression, such as perceiving sadness without necessarily feeling sadness in response to music. Felt emotions refer to the felt emotional response to the music, such as to feel sad (2001: 124). Gabrielsson recognises that emotional experience is rarely purely perceptual or purely felt, instead, experience can be laid out on a continuum of simultaneously perceived and felt emotions. This is because there is always a relationship between the perceived and felt emotions, and because emotional experience, especially felt emotions, are also dependent on listener properties (2001: 136). Listener experience is thus always a complex combination of these two aspects. Nevertheless, participants were asked to focus on specifically felt emotions during this study. Additionally, Gabrielsson also notes that many studies support Russell's circumplex model, and that many emotions can be represented as a combination of valence and arousal (2001: 126).

In 'Waiting for the Bass to Drop' (2014), Solberg examines the correlations between theories of intense emotional experiences and production techniques in electronic dance music (EDM), specifically 'build' and 'drop', which are intended to create tension and emotional intensity. She does this via two theoretical approaches: musical expectancy and gravity (being lifted, held in suspense and dropped), based on Lakoff and Johnson's orientation metaphors and Huron's ITPRA, but strengthens her conceptual framework further with psychological concepts including Peak Experience, Strong Experience and Absorption. She supported her theories with two case studies, 'Body' by Cinnamon Chasers and 'Icarus (Extended Version)' by Madeon, where she identified five features which generate intense emotional experience. Of most interest to this study was the removal and reintroduction of the bass and bass drum. Understood through her concepts of expectancy and gravity, they generate tension and anticipation which captures the correlation between production techniques and why these generate intense emotional experiences. Though Solberg did not test her hypotheses through the use of human participants, she provides a convincing theoretical study as to why people

experience intense emotional experiences in response to production techniques in EDM.

Arguably, Solberg developed her theories practically in 'Moved by the music' (2015), where she primarily investigated pleasure, affective arousal, and a desire to move in a club-like setting compared with a home-like setting. In Experiment 1, motion capture was used to record the body movements of sixteen participants to four tracks, two EDM and two control, in a simulated club setting with a focus on ecological validity. Experiment 2 simulated a home listening setting, measuring the physiological responses of electrodermal activity, heart rate and respiration of twenty-four participants to five EDM excerpts, with one acting as a control. Both experiments were followed by the same questionnaire on self-reported pleasure and bodily and affective appraisal of the music, where participants had to rate pleasure and familiarity, and describe the characteristics causing arousal and a desire to move. Results from Experiment 1 showed an increase in the quantity of motion during and after the 'drop', whilst physiological data from Experiment 2 also showed greater arousal at this time. Questionnaire responses reported that the 'build' and 'drop' were especially pleasurable, causing a greater desire to move and identified five similar features which generated affective and bodily peaks, reinforcing Solberg's earlier study. She concluded that there was a correspondence between musical features and dance/desire to dance and intensity of affective arousal, indicating that pleasurable and intense experiences of EDM can occur regardless of setting and bodily engagement, overall supporting her previous article, and that EDM has similar responses regardless of setting.

In light of Solberg's work, and structural knowledge of the genre, this study aims to expand on which felt emotions, and their intensity, are experienced at key structural moments specifically in the EDM genre of DnB. It has been demonstrated that the 'build' and 'drop' generate intensely pleasurable emotional experiences, and as these are the dominant features of DnB, it is of interest which felt emotions, and their intensity, are experienced in what can thus be considered a particularly emotionally intense genre. This is explored through the axes of the dimensional model, valence and arousal, and the GEMS-9 model, as neither of these have been used in DnB studies. As Solberg (2015) highlights that the 'drop' generates greater arousal, I suggest that felt emotions will generally be more intense during the 'drop' rather than the 'build'. Ergo, my twofold hypothesis stated that felt valence and arousal will be more intense during the 'drop', as well as power, joyful activation, and tension from the GEMS-9 model for all DnB tracks in this study. Though there was no hypothesis for the remaining GEMS-9 emotions, there was an expectation that some emotions, such as transcendence, will apply to lighter styles of DnB rather than heavier styles, demonstrating that some emotions apply to subgenres of DnB whilst others apply to all DnB more broadly.

## 2. METHOD

*Design.* The study was a within-participants quantitative experiment based on a questionnaire conducted through Qualtrics. The independent variable (IV) was the ‘build’ and ‘drop’ section of each track, and the dependent variable (DV) was the emotional response ratings.

*Participants.* There were initially 125 respondents, but the sample was reduced to 32 (14 males, 16 females and 2 ‘prefer not to say’) because 93 survey responses were incomplete. Participant ages ranged from 18-24 years ( $M = 20.1$ ,  $SD = 1.25$ ). They were asked whether they typically listened to DnB, of which 50% did. This group was then asked how much they typically enjoy listening to DnB, of which 8 participants (50%) selected ‘very much’, 5 participants (31.25%) selected ‘quite a lot’, and 3 (18.75%) selected ‘moderately’, on a five-point Likert scale, meaning that 75% of this sample strongly enjoy DnB. All participants were asked to complete the *Emotion* subscale section of the Goldsmiths Musical Sophistication Index (Gold-MSI) to assess how well participants felt they could engage with music and emotions on the only seven-point Likert scale used in the survey. Results showed that for all but one statement, 75% of participants or more demonstrated a strongly sophisticated emotional engagement with music. Most importantly to the study, 90.63% disagreed with statement 2 and 81.25% agreed with statement 5; see Table 1, which also contains the mean, mode, ‘anti-mode’ and range from the Gold-MSI responses. Participants were sought through the social media platform Facebook and private messages and were all students at Durham University.

Table 1. Gold-MSI Mean, Mode, ‘Anti-Mode’ and Range

Statement	Agreed/Disagreed	Mean	Mode	‘Anti-Mode’ <sup>1</sup>	Range
1	71.87%	5.09	6	1	6
2	90.63% <sup>2</sup>	2.09	1/2	6	6
3	96.87%	5.93	6	3	7
4	75%	5.09	6	1	6
5	81.25%	5.28	5	2/3/4	5
6	96.87%	6.37	7	4	14

*Stimuli.* To reflect what participants would be most likely to experience, 10 DnB tracks comprising 5 popular subgenres were used. This ranged from lighter styles such as ‘Liquid’, to heavier styles such as ‘Neurofunk’, and ‘Commercial’, ‘Ragga’/‘Jungle’ and ‘Jump Up’. A mixture of known/less-

<sup>1</sup> Lowest selected option. Note that other options may not have been selected.

<sup>2</sup> The only percentage in the column in which participants disagreed with the statement.

well known tracks with/without vocals were used for each of the two subgenres where possible. The MP3 file of each track was edited in Audacity to focus on the ‘build’ and ‘drop’. However, because EDM relies on a repetitive and layered texture (Solberg, 2014), to fully isolate each of these features would have sounded unnatural and abrupt. Thus, the beginning of each track to the first ‘build’/‘drop’ was retained for each excerpt, followed by a small fade out to combat this. As well as being able to more closely reflect how each track would usually be heard, this also eliminated any potentially distracting visual elements. Two emotion models were consistently used: the valence and arousal axes of the dimensional model, to measure these emotions, and the GEMS-9 model, with its explanatory emotion adjectives, to measure musical emotions participants experienced, both on a five-point Likert scale.

*Procedure.* Firstly, participants were given background information on the study and gave their consent to taking part. Then, perceived and felt emotions were distinguished and participants were told to focus on felt emotions as well as given general instructions. Demographic questions followed and whether they typically enjoyed listening to DnB, and if so, how much they enjoyed this, and the *Emotion* subscale of the Gold-MSI. The main body of the questionnaire consisted of 10 blocks, one for each track, which were randomised to minimise order effects (Schwarz & Hippler, 1990). Each comprised 7 questions, 3 for the ‘build’, followed by 3 for the ‘drop’ and a final question rating familiarity with the song. Again, taking the ‘build’ as an example, participants were asked specifically how the end of the excerpt made them feel according to the valence and arousal model and the GEMS-9 model, to pinpoint the ‘build’, and how much they enjoyed the ‘build’ excerpt. The same format was followed for the ‘drop’, and then each block concluded with a question on familiarity with the song overall. Participants controlled when excerpts played, and they could be replayed to allow time for emotion models to be read and understood. After completion participants were thanked for their participation and given a contact email in case they had further questions, or were interested in the outcomes of the study.

## 3. RESULTS

My hypothesis that valence and arousal would be felt more intensely during the ‘drop’, as well as power, joyful activation, and tension from the GEMS-9 was supported by the total averages across all tracks. This can be seen in Figure 2 and Table 2, in which valence during the ‘build’ was significantly lower ( $M = 3.33$ ) than during the ‘drop’ ( $M = 3.47$ ) according to a t-test ( $p < .05$ ), whilst arousal during the ‘build’ was also significantly lower ( $M = 3.4$ ) than during the ‘drop’ ( $M = 3.57$ ,  $p < .05$ ). Furthermore, arousal for both ‘build’ and ‘drop’ was felt more intensely than valence for ‘build’ and ‘drop’ on average, most likely due to the intensity of DnB on the whole. Power and joyful activation were also felt more intensely during ‘drop’ (from  $M = 2.92$  to  $M = 3.13$  and  $M = 2.75$  to  $M = 2.8$ ) but not tension, which decreased from  $M = 1.91$  to  $M = 1.70$ . Upon further consideration, this can be explained by the tension caused by the anticipation of

the ‘build’ that is subsequently resolved at the ‘drop’. However, valence, arousal, power and joyful activation demonstrate that the ‘drop’ is an emotional high point, where these emotions are felt most strongly.

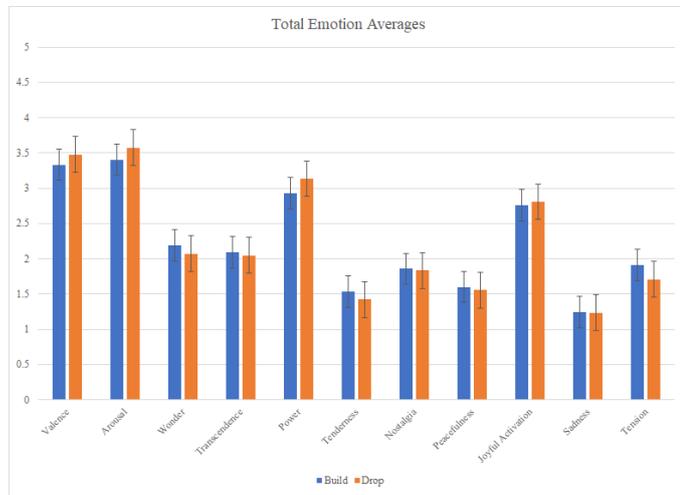


Figure 2: Total Emotion Averages for Build and Drop across all tracks

Table 2: T-tests for each Emotion

Emotion	T-Test	Significant
Valence	$t(319) = -2.90, p = .003$	Yes
Arousal	$t(319) = -3.24, p = .001$	Yes
Wonder	$t(319) = 0.78, p = .43$	No
Transcendence	$t(319) = 0.85, p = .39$	No
Power	$t(319) = -3.90, p = .0001$	Yes
Tenderness	$t(319) = 2.66, p = .008$	Yes
Nostalgia	$t(319) = 0.51, p = .60$	No
Peacefulness	$t(319) = 1.04, p = .29$	No
Joyful Activation	$t(319) = -1.05, p = .29$	No
Sadness	$t(319) = 0.49, p = .62$	No
Tension	$t(319) = 3.92, p = .0001$	Yes

T-tests were conducted in RStudio in order to identify whether the rating for each emotion was significantly different between the two conditions, ‘build’ and ‘drop’ (see Table 2). As expected, valence and arousal were statistically significant ( $p < .05$ ), as was power and tension, confirming the previous results. Unexpectedly, joyful activation was insignificant. The ANOVA test was then conducted to determine whether multiple emotions were statistically different from each other

according to the two conditions. Valence and arousal were statistically significant ( $p = .03$ ), with a pairwise t-test revealing that  $p = .003$  for valence and  $p = .001$  for arousal, with the latter being most significant (see Table 2).

The same five emotions (valence, arousal, power, joyful activation, and tension) which were felt most strongly in all tracks were considered in relation to subgenre (see Figure 3). The average for valence during the ‘drop’  $M = 3.66$  was higher than during the ‘build’  $M = 3.39$ , and the same applied to arousal (‘drop’  $M = 3.26$ , ‘build’  $M = 3.07$ ). However, arousal for ‘build’ and ‘drop’ was lower than valence for ‘build’ and ‘drop’ in Liquid, most likely because it is a lighter genre, and therefore less likely to generate as much excitement. The results for Ragga/Jungle, a slightly heavier genre, showed that valence and arousal were higher during the ‘drop’ (valence ‘build’  $M = 3.4$ , valence ‘drop’  $M = 3.68$ , and arousal ‘build’  $M = 3.46$ , arousal ‘drop’  $M = 3.78$ ), consistent with DnB generally. The negligible difference in valence in the Jump Up subgenre between the ‘build’ and ‘drop’ ( $M = 3.23$ ,  $M = 3.23$ ) may be accounted for by the high intensity of this subgenre, which is sometimes described as silly or strange. Similarly to valence, arousal in Jump Up does not support my hypothesis. Arousal decreased during the ‘drop’ ( $M = 3.45$ ,  $M = 3.40$ ) even though I expected this to increase. This may be explained by what I describe as the ‘double function of the drop’, that the ‘drop’ is both an emotional high point but also a release from the ‘build’. Regarding the three GEMS-9 emotions considered in relation to subgenre (see Figure 4), power was shown to be felt more intensely during the ‘drop’ than the ‘build’, supporting the hypothesis. Conversely, joyful activation either increased only slightly during the ‘drop’ e.g. Commercial ( $M = 3.07$ ,  $M = 3.09$ ) or decreased e.g. Neurofunk ( $M = 2.93$ ,  $M = 2.76$ ). That it only increased significantly during Liquid tracks ( $M = 2.1$ ,  $M = 2.46$ ) suggests that joyful activation was felt more keenly during Liquid, and thus could be elicited by other lighter subgenres of DnB. On the other hand, tension decreased during the ‘drop’ for each subgenre, reinforcing the idea that the ‘drop’ is felt as a release after the anticipation of the ‘build’.

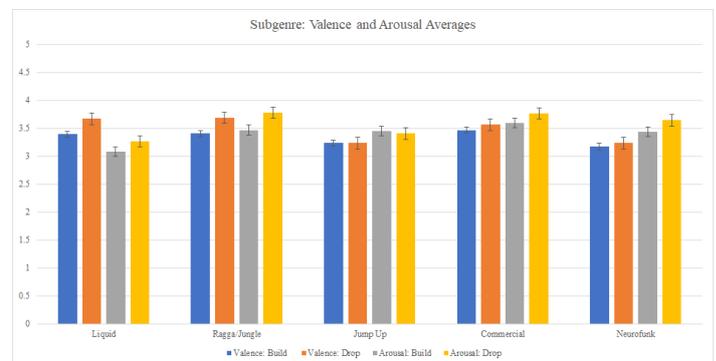


Figure 3: Valence and Arousal Averages per Subgenre

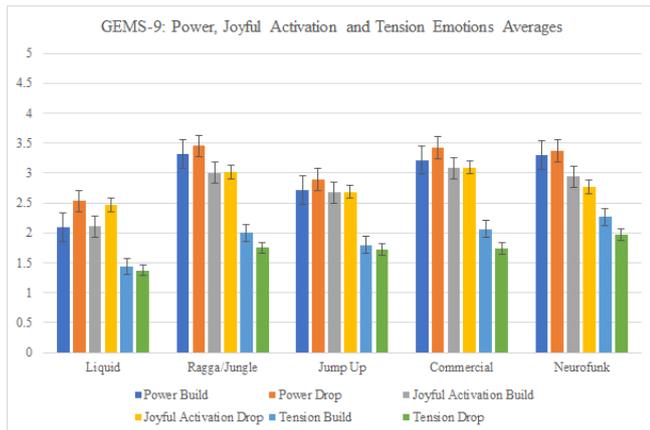


Figure 4: Power, Joyful Activation and Tension Emotion Averages per Subgenre

The remaining GEMS-9 emotions were felt less intensely for both 'build' and 'drop' overall, and in all examples decreased during the drop (see Figure 2), perhaps suggesting that these emotions do not capture felt emotions as effectively at these structural points. Surprisingly, tenderness was revealed as statistically significant in a t-test (see Table 2). Given that joyful activation was not significant, this suggests that these emotions did not capture felt emotions in response to DnB as effectively.

ANOVA tests for the GEMS-9 emotions demonstrated that these emotions were not statistically significant ( $p = .62$ ). This was followed by further pairwise t-tests to test these emotions individually. Apart from power, tenderness and tension, the other GEMS-9 emotions were statistically insignificant ( $p > .05$ ), accounting for why the  $p$ -value was insignificant overall.

Taking into consideration other factors which may have affected emotional responses, familiarity was shown to be statistically significant ( $F(1,637) = 5.03$ ,  $p = .02$ ) in the ANOVA test, having a strong effect on valence and arousal ratings. Similarly, typical listening to DnB ( $p = .03$ ), subgenre ( $p = .03$ ) and enjoyment ( $p = .002$ ) were statistically significant, showing the complexity of emotional experience and a likewise strong effect on valence and arousal. However, familiarity etc. were insignificant in relation to felt GEMS-9 emotions, suggesting that these factors did not have much of an effect on these emotions.

#### 4. DISCUSSION

In conclusion, the results from both the averages and statistical tests showed that valence and arousal are felt more intensely during the 'drop' rather than the 'build' in DnB, supporting the former part of my hypothesis. This also applied to power, which was consistently demonstrated across all data analysis, but did not fully apply to joyful activation or tension. The average for joyful activation was higher for the 'drop', but further tests on subgenre and statistical analysis concluded that this was largely insignificant. Tension was lower during the 'drop' and higher during the 'build' consistently, showing that the tension of the 'build', which anticipates the 'drop', is

resolved with the introduction of the 'drop'. This is consistent with Solberg's expectancy and gravity theories (2014) but also shows that 'build' and 'drop' have a strong impact on the felt emotion of tension. The remaining GEMS-9 emotions, wonder, transcendence, tenderness, nostalgia, peacefulness and sadness, were lower on average during the drop. They were all statistically insignificant apart from tenderness. The low ratings of these emotions on the whole suggests that either the GEMS-9 model was unsuitable or too reductive for the genre and perhaps that these emotions would not have been suggested by participants if they were asked to explain their emotions without a model. The dimensional model, however, captured felt emotions in response to DnB very well, suggesting that use of a circumplex model, with either emotion provided or participant-suggested emotions, would have captured more felt emotions better. Nevertheless, these models did show differences between subgenres, as seen in the lower arousal ratings for Liquid in comparison to Neurofunk and the higher joyful activation felt during the 'drop' in Liquid compared to Jump Up where it largely stayed the same. To help explain this, I suggest the phrase 'the double function of the drop' as both a high point, accounting for the expected and demonstrated higher emotional ratings during the 'drop', but also as a release from the 'build', providing some kind of resolve. Furthermore, the factors of familiarity, typical listening, subgenre, and enjoyment were statistically significant for valence and arousal, having a strong effect on these emotion ratings, but were insignificant for GEMS-9 emotions, further suggesting that some of these did not explain felt emotions effectively.

Aside from this, one limitation of the study was the high loss of participants. Though this did result in a good gender balance, having a higher number of results would have further strengthened conclusions from the study. This is ultimately one of the drawbacks of using a questionnaire as opposed to other methods, however, this was intended to try and mitigate the effect of factors which would not usually affect day-to-day listening. On the other hand, this also means that listening conditions could not be controlled, meaning that distractions or poor listening conditions may have also affected the results and/or the number of participants. Part of the reason for so many incomplete responses may have been due to the length of the study, an internal pitfall, as excerpts had to be repeated for the high number of questions, likely causing confusion. Thus, if the study were to be repeated, fewer excerpts and questions may yield more responses. Despite using a variety of tracks, and trying to maintain ecological validity with excerpt, editing each track was another internal pitfall, inevitably decreasing ecological validity. A control condition, track or group was not used either, which may have been a useful point of comparison. Furthermore, this study could be supplemented by a multi-method approach conducted in a laboratory, even though subjective emotional experience can only be gained through reports (Gabrielsson, 2001:127), or the approach of Solberg's studies, looking at specific aspects of EDM, could be applied across a number of studies to DnB. A pilot study would have also been beneficial, as there were no previous DnB-specific studies on which to base this study.

With this in mind, further theoretical and practical research is required on DnB and there is wide scope for further exploration given the lack of existing scholarship on the genre. Its capacity to generate strong felt emotions through intense structural moments is of interest in and of itself, and thus other emotional sub-components such as action tendency, are worth consideration. However, DnB, as nearing the apex of intense music, may help illuminate why and how emotions are evoked in other genres. A study of perceived emotions would be also interesting, especially to see how these correspond to felt emotions. Besides this, felt emotions could also be considered according to the basic emotions model, or a variant of the dimensional model to determine whether these models capture felt emotions better than the GEMS-9 model. Irrespective of all these studies, the designation of genres, their cross-fertilisation, and the theoretical codification of features which stands out in Solberg's work, would greatly assist in explaining these results and shape further studies more appropriately for DnB and other EDM genres.

In sum, this exploratory study explored felt emotions evoked at key structural points in DnB, namely 'build' and 'drop'. The primary hypothesis, that felt valence and arousal will be more intense during the 'drop', as well as power, joyful activation, and tension was mainly supported by the results. On the other hand, not all GEMS-9 emotions were more intense during the 'drop', however, the data supports the notion that some emotions had higher ratings depending on the subgenre. Nevertheless, both of these show that the 'build' and the 'drop', the dominant structural aspects of DnB, have a strong effect on felt emotions.

#### REFERENCES

- Christodoulou, C. (2011). Rumble in the Jungle: City, Place and Uncanny Bass. *Dancecult: Journal of Electronic Dance Music Culture*, 3(1), 44-63.
- Ekman, P. (1977). Biological and Cultural Contributions to Body and Facial Movement. In John Blacking (Ed.), *The Anthropology of the Body*. London: Academic Press, 39-84.
- Ekman, P. (1992). An Argument for Basic Emotions. *Cognition and Emotion*, 6(3-4), 169-200.
- Ekman, P. (1999). Basic Emotions. In T. Dalgleish and M. Power (Eds.), *Handbook of Cognition and Emotion*. John Wiley & Sons Ltd., 45-60.
- Fraser, A. (2014). On the Content and Contribution of MCs in British Drum 'n' Bass. *Dancecult: Journal of Electronic Dance Music Culture*, 6(2), 42-60.
- Gabrielsson, A. (2001). Emotion perceived and emotion felt: same or different? *Musicae scientiae*, 5(1\_suppl), 123-147.
- Juslin, P. N. & Laukka, P. (2004). Expression, perception, and induction of musical emotions: A review and a questionnaire study of everyday listening. *Journal of new music research*, 33(3), 217-238.
- Juslin, P. N. & Sloboda, J. A. (2010). Introduction. *Handbook of Music and Emotion: Theory, Research and Applications*. Oxford: Oxford University Press, 3-12.
- Juslin, P. N. & Sloboda, J. A. (2013). Music and emotion. In D. Deutsch (Ed.), *The Psychology of Music*. (3rd Edition). San Diego: Academic Press, 583-645.
- Juslin, P. N. & Västfjäll, D. (2008). Emotional responses to music: The need to consider underlying mechanisms. *Behavioural and Brain Sciences*, 31(5), 559-575.
- Quinn, S. (2002). Rumble in the Jungle: The Invisible History of Drum'n'Bass. *Transformations*, 3, 1-12.
- Russell, J. A. (1980). A Circumplex Model of Affect. *Journal of Personality and Social Psychology*, 39(6), 1161-1178.
- Schwarz, N. & Hippler, H. J. (1991). Response alternatives: the impact of their choice and presentation order. In P. P. Biemer, R. M. Groves, L. E. Lyberg, N. A. Mathiowetz & S. Sudman, *Measurement Errors in Surveys*. John Wiley & Sons, Inc., 41-56.
- Snoman, R. (2019). Drum & Bass. *Dance Music Manual: Tools, Toys, and Techniques* (4<sup>th</sup> Edition). Abingdon, Oxon; New York, NY: Routledge, 401-11.
- Solberg, R. T. (2014). "Waiting for the Bass to Drop": Correlations between intense emotional experiences and production techniques in build-up and drop sections of Electronic Dance Music. *Dancecult: Journal of Electronic Dance Music Culture*, 6 (1), 61-81.
- Solberg, R. T. (2015). 'Moved by the music': Affective arousal, body movement and musical features of electronic dance music. *Proceedings of the Ninth Triennial Conference of the European Society for the Cognitive Sciences of Music*, 1-3.
- Zentner, M., Grandjean, D., & Scherer, K. R. (2008). Emotions evoked by the sound of music: Characterization, classification, and measurement. *Emotion*, 8, 494-521.