PREDICTIVE POWER OF PERSONALITY ON MUSIC-GENRE EXCLUSIVITY

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ABSTRACT

Studies reveal a strong relationship between personality and preferred musical genre. Our study explored this relationship using a new methodology: genre dispersion among people's mobile-phone music collections. By analyzing the download behaviours of genre-defined user subgroups, we investigated the following questions: (1) do genre-preferring subgroups show distinct patterns of genre consumption and genre exclusivity; (2) does genre exclusivity relate to Big Five personality factors? We hypothesized that genre-preferring subgroups would vary in genre exclusivity, and that their degree of exclusivity would be linearly associated with the openness personality factor (if people have open personalities, they should be "open" to different musical styles). Consistent with our hypothesis, results showed that greater genre inclusivity, i.e. many genres in people's music collections, positively associated with openness and (unexpectedly) agreeableness, suggesting that individuals with high openness and agreeableness have wider musical tastes than those with low openness and agreeableness. Our study corroborated previous research linking genre preference and personality, and revealed, in a novel way, the predictive power of personality on music-consumption.

1. INTRODUCTION

Existing music-personality studies have specifically examines the relationship between music preference and Big Five personality factors [4, 13, 16]. The music people listen to–their musical preferences–reveal aspects of their identity [12], to the point where music can be worn as a "badge" of honour [16].

Big Five personality factors are designed to delineate basic, measureable features of personality. Each factor consists of various traits that describe behaviour, thoughts and emotions; traits that co-vary with one-another are categorized under one factor [3]. Factors in the current Big Five model are openness, conscientiousness, extraversion, agreeableness, and neuroticism. Each factor is defined based on terms from everyday language [7].

In detail, the Big Five personality factors are as follows. Openness measures open-mindedness to new experiences, including traits such as creativity, insightfulness, and originality. Conscientiousness measures efficiency and organization, including resourcefulness and intelligence. Extraversion measures sociability, including outgoingness, self-confidence, and aggression. Agreeableness measures friendliness and compassion, including trustworthiness, compliance, and modesty. Lastly, neuroticism measures emotional vulnerability, including moodiness, hostility, self-consciousness, and impulsivity [11].

In respect of individuals' personalities, the Big Five are quantified using the NEO-PI psychometric inventory [3]. A common methodology of music-personality studies associates NEO-PI results with music-preference tests (e.g. for genres). Results from existing studies have revealed many relationships between the Big Five and musical preferences, which will now be overviewed.

Individuals with high openness typically prefer genres such as blues and jazz, while avoiding pop and country [19]. They also enjoy a wider variety of musical genres overall [15]. High conscientiousness has been linked to soul and funk [19]. Extraverts prefer pop and rap [19], which commonly occur in social situations, and thus may appeal to those high in extraversion [14, 15]. High agreeableness is associated with soundtracks (e.g. of films). The fifth factor, neuroticism, predicts preference for genres with exaggerated bass, such as dance [10].

The current study examined music and personality in terms of music-consumption patterns. The primary pattern we studied was genre exclusivity–a measure of the variety of genres in users' music collections. Genre exclusivity can be thought of as a scale with two extremes. The lower end contains homogenous music collections with very few genres (referred to as "genre exclusive"); the upper end contains heterogeneous music collections with many well-represented, distinct genres (referred to as "genre inclusive"). We investigated the link between genre homogeneity/heterogeneity, musical preference and factors within the Big Five, and in so doing evaluated the predictive power of personality on genre exclusivity.

1.1 MixRadio Database

This study utilized a music-download database, the majority of which were made onto Nokia mobile phones. The data became accessible through a data sharing agreement between McMaster University and the Nokia Corporation

which begun in 2012. In January 2015 the Nokia division responsible for music became a separate entity under the name MixRadio. Henceforth, we referred to the data as coming from the MixRadio database.

The MixRadio database contains downloads from 33 countries across the globe [1] and spans from 2007 to September of 2014. Currently, the database contains the metadata of 1.36 billion individual downloads from over 17 million MixRadio users. [2] MixRadio users had free access to unlimited amounts of music on online music stores, meaning they could explore musical genres without cost constraints. Each download's metadata includes information such as track name, artist, album, genre, user ID (anonymous), date, (local) time and country. Open source databases including MusicBrainz (the open music encyclopedia) [9] and The Echo Nest [6] are used to supplement download metadata and enrich the database. Examples of supplemented information from additional databases include track-release date, tempo, key, mode, time signature and instrumentation. The data are arranged into a relational database management system and queried using the open-source MySQL implementation of SQL [18], and the Python Database API [9], enabling more extensive, iterative analyses to be undertaken.

Our first study used the MixRadio database to explore music consumption behaviours of genre-defined subgroups of users. We referred to these subgroups as "x-heads", where "x" was a user's most downloaded genre. As genre is the most commonly used musical classifier [16], we assumed genre to be a reliable marker of musical interest.

The second study examined the relationship between genre exclusivity of x-head subgroups and Big Five personality factors. We correlated measures of genre exclusivity with measures from an existing study associating the Big Five with preference for particular genres. We hypothesized that openness values would positively correlate with genre inclusivity (having a heterogeneous music collection). In other words, those high in openness should also be open to numerous genres. Previous literature has found that those high in openness tend to prefer diverse musical genres [15]. We conjectured that the remaining Big Five factors–extraversion, neuroticism, agreeableness and conscientiousness–would not correlate with genre exclusivity, due to lack of evidence of this in previous studies.

1.2 Study Parameters

As existing music-personality study focused on Western populations, we elected only to include user data from European countries (14 countries in total): Austria, Finland, France, Germany, Great Britain, Ireland, Italy, Netherlands, Norway, Poland, Portugal, Spain, Sweden and Switzerland. Downloads were also limited to the ten most com-

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[1] Argentina, Australia, Austria, Brazil, Britain, Canada, Chile, China, Finland, France, Germany, India, Indonesia, Ireland, Italy, Malaysia, Mexico, Netherlands, Norway, Poland, Portugal, Russia, Saudi Arabia, Singapore, South Africa, Spain, Sweden, Switzerland, Thailand, Turkey, United Arab Emirates, United States of America, Venezuela

[2] This represents only a portion of MixRadio's total database, and is not indicative of market share.

monly used genres in existing music and personality studies: classical, country, dance, folk, indie, jazz, metal, pop, rap and rock. Finally, to ensure robust measures of genre exclusivity, only users with between 10 and 5,000 downloads were included; heuristically, we decided that fewer than ten would be an insufficient sample size; greater than five-thousand might indicate that a user was simply a musical "stamp collector".

2. STUDY 1.1

We used the MixRadio database to explore genre exclusivity in genre-defined subgroups of users. Each user in the study was categorized as an "x-head", where x was the most popular genre within a user's download collection. For example, if a user's total collection contained 40 metal downloads, and 10 dance, they were defined as a "metal-head", and placed within the metal-head subgroup. If no genre was more popular than any other in a user's collection (e.g. 10 pop and 10 rock), the user was classified based on whichever genre they downloaded first. The raw counts per genre were obtained for each user, and a (normalized) level of genre exclusivity per user calculated by dividing the SD of the genre counts by their total number of downloads.

So as to weigh each country's contribution to genre exclusivity equally, users in x-head subgroups were then subdivided based on user-country, and a median SD per x-head subgroup per country was calculated; this value was called "x-med". For each x-head subgroup the x-med was derived from fourteen SD values (one per country). X-head subgroups were ranked based on their degree of genre exclusivity, i.e. x-med value. The lower the x-med, the more genre inclusive the x-head subgroup; the higher the x-med value, the more genre exclusive the x-head subgroup.

2.1 Results

Table 1 displays x-med values for x-head subgroups from most inclusive on left, to most exclusive on right. Indie-heads, who had the lowest x-med (0.137), were the most genre inclusive subgroup, while pop-heads who had the highest x-med (0.200) were the most genre exclusive. A more detailed look at x-head subgroups' collections based on genre is discussed in Study 1.2 below.

3. STUDY 1.2

This study examined how x-head subgroups consumed music from individual genres. Specifically, we looked at pairs of x-head subgroups and examined the degree to which both x-head subgroups consumed each other's main, group-defining genre. Equation (1) calculates the degree to which x-head subgroups consumed each genre.

$$S_{j,i} = \frac{1}{N} \sum_{j=1}^{N} \left(\frac{C_{i,j}}{C_{j,j} + C_{i,j}} \right) \qquad (1)$$

X-HEAD	Indie	Jazz	Folk	Country	Classical	Rock	Metal	Rap	Dance	Pop
X-MED	0.137	0.142	0.158	0.160	0.161	0.165	0.167	0.178	0.181	0.200

Table 1. Percentage of genres in each x-head subgroup's collection compared to their main genre.

GENRE

X-HEAD	Rock	Pop	Indie	Metal	Rap	Dance	Folk	Jazz	Classical	Country	X-HEAD MEDIAN
Rock		29.1	13.1	15.5	6.1	6.2	2.6	2.7	2.5	2.2	**6.1**
Pop	20.9		6.1	6.0	8.1	9.9	2.0	1.9	2.6	1.6	**6.0**
Indie	29.4	25.8		5.7	7.9	11.5	2.3	1.8	1.7	1.3	**5.7**
Metal	26.8	19.5	5.1		5.8	4.9	1.1	0.7	0.9	0.8	**4.9**
Rap	11.7	23.4	4.5	5.7		11.2	0.6	0.0	0.5	0.5	**4.5**
Dance	12.7	27.5	7.6	3.9	11.7		0.5	0.8	1.0	0.5	**3.9**
Folk	16.8	22.9	4.4	4.5	3.4	3.0		1.8	3.0	2.1	**3.4**
Jazz	17.3	22.1	3.8	2.9	2.5	2.8	2.7		7.7	2.8	**2.9**
Classical	11.9	21.8	3.4	1.7	1.6	2.5	2.7	6.1		1.1	**2.7**
Country	16.2	21.7	3.4	3.5	2.1	2.1	2.3	1.4	1.5		**2.3**
GENRE MEDIAN	**16.8**	**22.9**	**4.5**	**4.5**	**5.8**	**4.9**	**2.3**	**1.8**	**1.7**	**1.3**	

Figure 1. Percentage of genres in each x-head subgroup's collection compared to their main genre.

$C_{i,j}$ = count of genre i in x-head j's collection
N = number of x-heads
$S_{j,i}$ = the value of nth row and i^{th} column (in particular, $S_{j,i}$ is a measure of the average relative proportion of genre i in x-head j's collection)
Each value of $S_{j,i}$ refers to a cell shown in Figure 1.

3.1 Results

Figure 1 shows the degrees to which x-head subgroups consumed other genres. The left-axis lists x-head subgroups; the top-axis lists the genres they consumed. The darker the cell, the greater the degree of genre consumption. The x-head medians listed in the far right column are the median percentages of the genres consumed by x-head subgroups. The genre medians listed along the bottom are the median percentages that each genre is consumed by the x-head subgroups. Figure 1 is symmetrical along its diagonal axis (diagonal line of white cells). By comparing each side of the diagonal axis, relationships between genre pairs can be explored. For example, rock-heads and pop-heads consumed the greatest percentage of each another's genres: rock-heads consumed 29.1% of pop, pop-heads consumed 20.9% of rock.

Various "classes" of relationships appeared based on the degree of genre consumption by pairs of x-head subgroups. Some x-head subgroup pairs consumed equal amounts of each other's main genre, and therefore had symmetrical relationships (same-shaded cells across the diagonal axis, e.g. rap and metal). Some x-head subgroup pairs consumed unequal amounts of each other's main genre, and
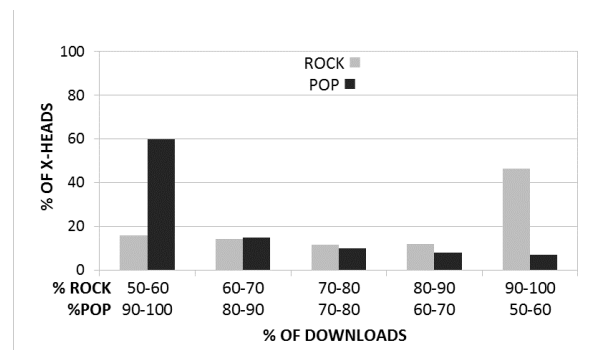

Figure 2. H-H consumption relationship between pop-heads and rock-heads.

therefore had asymmetrical relationships (differently shaded cells across the diagonal axis, e.g. indie and pop).

Symmetrical relationships were also classified as "hot" or "cold" based on the volume of consumption between two x-head subgroups. Symmetrically hot relationships occurred when both x-head subgroups downloaded significant amounts of each other's main genre. Symmetrically cold relationships occurred when neither x-head subgroup downloaded significant amounts of each other's main genre. Overall, three categories of x-head relationships were identified and are defined below using example pairs of x-head subgroups.

3.1.1 Symmetrical hot relationships (H-H)

Pairs of x-head subgroups downloading significant and approximately equally amounts of one another's main genre, e.g. rock-heads and pop-heads (Figure 2).

Figure 2 shows the composition of rock-heads' (grey) and pop-heads' (black) collections when comparing only the proportion of rock and pop downloads they each consumed. The x-axis displays a series of bins which describe the proportion of rock and pop downloads in x-heads' collections (totalling 100%). The y-axis is the percentage of x-heads that fit into the specifications of each bin on the x-axis. There are two sets of horizontal-axis labels: the upper labels (% Rock) show the proportion of rock downloads represented in rock-heads' collections. The remaining proportion consists of pop downloads. For example, the grey column in the % Rock bin marked "50-60" shows the percentage of rock-heads whose collection contained approximately 50-60% rock downloads and 40-50% pop downloads. The lower labels (% Pop) show the proportion of pop downloads represented in pop-heads' collections. The remaining percentage consists of rock downloads.

H-H relationships are represented in Figure 1 by diagonally related dark-shaded squares. X-head subgroup pairs with H-H relationships can thought of as being mutually
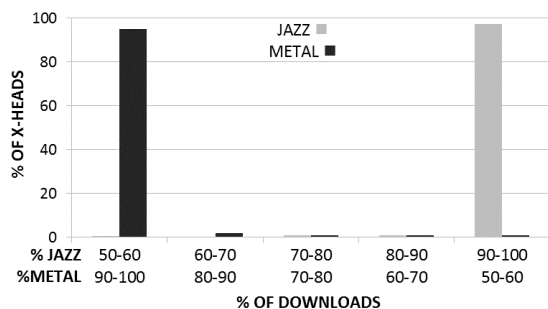
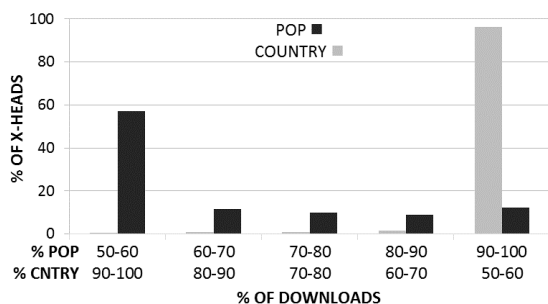**Figure 3**. C-C consumption relationship between jazz-heads and metal-heads.

Figure 4. H-C consumption relationship between pop-heads and country heads.

inclusive, and vice versa for light-shaded squares.

3.1.2 Symmetrical cold relationships (C-C)

Pairs of x-head subgroups who downloaded roughly equal, but insignificant amounts of the each others' main genre, e.g. jazz-heads and metal-heads (Figure 3).

The axes in Figure 3 are the same as those in Figure 2, but represent jazz-heads and metal-heads instead. Bar heights in Figure 3 reveal that a majority jazz-heads and metal-heads had a ratio of 90-100% of their main genre and 0-10% of the other. Very few jazz-heads or metal-heads downloaded equal amounts of both genres. C-C relationships are represented in Figure 1 by diagonally related light-shaded squares. X-head subgroup pairs with C-C relationships can be thought of as being mutually exclusive.

3.1.3 Asymmetrical hot-cold relationships (H-C)

Pairs of x-head subgroups who consumed each other's main genre unequally, e.g. pop-heads and country-heads (Figure 4).

The axes in Figure 4 are the same as those in Figures 2 and 3, but represent pop-heads and country-heads. Bar heights in Figure 4 revealed that many country-heads consumed large amounts of both pop and country music. However, a majority of pop-heads did not consume significant amounts of country music. H-C relationships are represented in Figure 1 by diagonally related cells, between

which there is a mismatch in shading, i.e. light grey to dark grey.

3.2 Study 1 Conclusions

In Study 1.1, x-head subgroups ranked from genre exclusive to inclusive in the following order: pop, dance, rap, metal, rock, classical, country, folk, jazz, and indie. Intriguingly, this ranking is consistent with previous literature indicating that individuals who prefer jazz and folk music rank highly in the Big Five factor of openness, which has been linked to genre inclusivity. Those who are high in openness also tend to avoid genres like pop; pop-heads were found to be the most genre exclusive. Therefore, study 1.1 results preliminarily hinted at links between genre exclusivity and aspects of personality.

In Study 1.2, pairs of x-head subgroups were compared based on their consumption of one another's main genre. Some x-head subgroup pairs were mutually inclusive of one another (H-H), while others were mutually exclusive (C-C). Remaining x-head pairs consumed each other's main genres unequally (H-C).

4. STUDY 2

Study 2 examined links between genre exclusivity and the Big Five personality factors. Our measures of genre exclusivity (median SD per x-head subgroup per country) were correlated with measures of Big Five personality factors that had previously been associated with certain genres from Zweigenhaft (2008) [19].

Zweigenhaft had subjects complete the NEO-PI and a version of the STOMP (Short Test of Music Preferences), [16]. Measures of Big Five personality and music preference were then correlated. We used the correlation values between Big Five factors and genres from Zweigenhaft (2008), and correlated them with levels genre exclusivity from Study 1.1 (14 country values per x-head subgroup).

4.1 Results

A significant, negative correlation existed between genre exclusivity and genres associated with openness (Figure 5: $n = 140$; $r = -0.37$; two-tailed, $p < 0.001$) and agreeableness (Figure 6: $n = 140$; $r = -0.32$; two-tailed, $p < 0.001$). That is, genre-openness associations and genre-agreeableness associations in Zweigenhaft (2008) predicted genre inclusivity in x-head subgroups. There were no significant correlations between extraversion, conscientiousness and neuroticism with genre exclusivity.

Figures 5 and 6 show relationships between openness and agreeableness with genre exclusivity. The horizontal-axes display degree of genre exclusivity for x-head subgroups (median SD of x-heads' music collections based on genre). Each x-head subgroup (listed down the right legend) is represented with a different shade of grey. Horizontally positioned markers with the same shade are the median SDs per x-head subgroup for each of the 14 countries included in the study. The height of the markers cor-
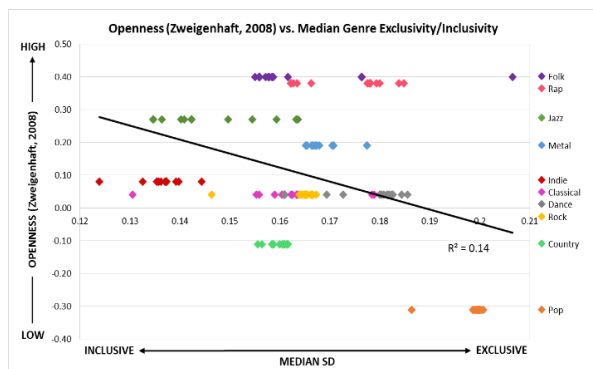
Figure 5. X-head genre exclusivity against genre-openness associations in Zweigenhaft (2008).
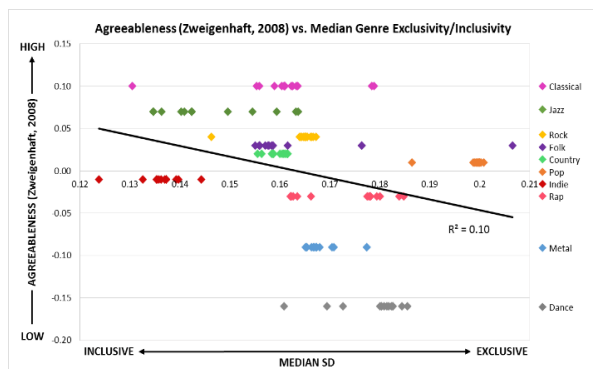

Figure 6. X-head genre exclusivity against genre-agreeableness associations in Zweigenhaft (2008).

responds to the degree of openness and agreeableness for each genre in Zweigenhaft (2008), shown on the y-axes.

4.2 Study 2 Conclusions

Genre-openness and -agreeableness associations from Zweigenhaft (2008) predicted genre inclusivity in x-head subgroups; if you score high in openness and/or agreeableness you are likely to have more genres within your music collection. Conscientiousness, extraversion and neuroticism are not predictors of genre exclusivity.

5. DISCUSSION

Study 1 explored overall genre exclusivity of x-head subgroups. Study 1.2 revealed the pairwise relationships between x-head subgroups. Some of these relationships were one-sided; only one of the two x-head subgroups consumed music from the-other's main genre. While others were more equitable; both x-head subgroups consumed each-other's main genre equally.

Study 2 revealed links between genre exclusivity and personality; openness and agreeableness predicted preference for a wide range of genres. Breaking down openness and agreeableness based on their traits reveals possible reasons for their relationship with genre exclusivity. Openness is a general willingness to encounter new experi-

ences, and different musical styles certainly constitute new experiences. If someone is open to new experiences, they also seem to be open to new musical genres. Those high in openness tend to break from the rules of social boundaries [5] and may not fear venturing outside of Western-cultured musical norms. Those high in openness often dislike ubiquitous genres like pop [19], tending, instead, to explore less commercial musical styles. Moreover, they use music for cognitive and rational purposes, such as intellectual stimulation, and focus more on the quality, complexity and performance [1]. Exploration of numerous genres may satisfy their desire for these musical properties.

The ability of agreeableness to predict genre exclusivity was unanticipated–few studies have found this factor to be a reliable predictor of musical preference. However, agreeableness encompasses traits such as compliance [19], so perhaps those who are agreeable may also be "compliant" to various musical genres. To test this theory, associations between traits of agreeableness and genre exclusivity would have to be examined.

5.1 Limitations

Given that our data were derived predominantly from mobile-phone users, it may be problematic to generalize our findings to those who acquire music from other sources. Moreover, Studies 1 and 2 were restricted to European countries, again, limiting result generalizability. Since personality [17] and musical preferences [16] vary between countries, our results may not be globally consistent.

A second population-based limitation relates to socioeconomic variance between individuals and countries. The users in the MixRadio database are biased to those who can afford a Nokia mobile phone. Despite this, Nokia has historically made a range of models to appeal to different market sectors. Therefore, although the self-selected users in our study may not be fully representative, it is assumed that they are relatively widely distributed throughout the populations of the countries within our study.

A third limitation arises when associating genre-personality correlations from Zweigenhaft (2008) with measures of genre exclusivity: the subject group tested in Zweigenhaft (2008) are not the same as the MixRadio user population. However, without gathering personality information directly from MixRadio users, genre-personality correlations were the most suitable measure to associate with genre exclusivity.

Additionally, given that pop is the commonest genre, it is perhaps not surprising that most pairwise relationships with pop are asymmetrical and that pop is the most popular genre for non-pop-heads. However, despite this limitation the method adopted (as shown in Figure 1) does at least indicate instances where x-head subgroups consume different amounts of another genre relative to one another. For example, relatively speaking, pop-heads consume less country than jazz-heads.

A possible methodological complication relates to the way in which x-heads are defined based upon most downloaded genre. That is, we assume that users' genre distri-

butions represent genuine musical preferences, which, although likely to be the case, is not known for certain. In other words, our notion of genre popularity could be a misrepresentation of musical tastes.

5.2 Implications

Information about x-head genre exclusivity is a valuable resource in music marketing and recommender systems. For example, a MixRadio user purchased a large quantity of country songs. For example, based on results from Study 1.2, country-heads would appear to be susceptible to pop, although, given the asymmetrical relationship between these genres, the reverse seems not to be the case (country-heads consume pop, but pop-heads do not consume country). Understanding each side of x-head relationships could be useful in avoiding misguided recommendations.

Moreover, understanding the link between personality and genre consumption may prove useful in music marketing. If a user were to complete a Big Five personality questionnaire upon signing up with a music service, information concerning openness and agreeableness could be factored into recommendations; e.g. wide range of obscure genres for those open and/or agreeable, and vice versa.

5.3 Future Studies

The reasons underpinning genre inclusivity or exclusivity can be examined further. For example, perhaps certain genres are downloaded in tandem due to similar acoustic properties such as tempo, key, instrumentation, or metrical structure. Feature analysis and genre preference will be a target of future studies.

Our new-found links between the Big Five and genre exclusivity mark the beginning of explorations on personality and music consumption. Other types of exclusivity relationships may also be linked to personality traits, including artist exclusivity (the number of artists in a user's collection), tempo exclusivity (variety of tempos in a user's collection), or release-date exclusivity (the era from which a musical collection stems). We hope to examine these factors, other factors, and their possible links to personality.

6. CONCLUSION

By analyzing a subset of mobile phone music-download data, the current study revealed information concerning musical-genre consumption. Genre-defined subgroups of users acquired music in unique and distinctive ways, with varying degrees of acceptance for other musical styles. Overall, genre exclusivity was most consistently associated with the Big Five personality factor of openness, which supports similar research in existing music-personality studies. Genre exclusivity was also linked to agreeableness, adding a new finding to the music-personality literature. Overall, the more open or agreeable you are, the more genre inclusive, or heterogeneous, your musical tastes.

The current study introduced a novel big-data methodology to music-personality studies, which we will continue

to utilize. With access to ever-growing music-download databases, the predictive power of personality on genre exclusivity is an exciting and expanding field of music-consumption research.

7. REFERENCES

[1] T. Chamorro-Premuzic, and A. Furnham. Personality and music: Can traits explain how people use music in everyday life? *British Journal of Psychology*, 98(2): 175–85, 2007.

[2] P. T. Jr. Costa, and R. R. McCrae. *The NEO Personality Inventory Manual*, Psychological Assessment Resources, Odessa, 1985.

[3] P. T. Jr. Costa, and R. R. McCrae. Four ways the five factors are basic. *Personality and Individual Differences*, 13(6): 653–665, 1992.

[4] S. J. Dollinger. Research note: Personality and music preference: Extraversion and excitement seeking or openness to experience? *Psychology of Music*, 21(1): 73–77, 1993.

[5] S. J. Dollinger, L. A. Orf, and A. E. Robinson. Personality and campus controversies: Preferred boundaries as a function of openness to experience. *The Journal of Psychology*, 125(4): 399–406, 1991.

[6] T. Jehan, and B. Whitman. The Echo Nest. [Data set]. Retrieved from http://the.echonest.com/, 2005.

[7] O. P. John and S. Srivastava. Big five trait taxonomy: History, measurement, and theoretical perspectives. In L. Pervin & O. P. John (Eds.). *Handbook of personality: Theory and research (2nd ed.)* (pp. 102–138), Guilford, Berkely, 1999.

[8] R. Kaye. MusicBrainz Database [Data set]. Retrieved from http://musicbrainz.org/doc/MusicBrainz_Database, 2000.

[9] M. A. Lemburg. Python database API specification v2. 0. *Python Enhancement Proposal*, 249, 2008.

[10] W. McCown, R. Keiser, S. Mulhearn, and D. Williamson. The role of personality and gender in preference for exaggerated bass in music. *Personality and Individual Differences*, 23(4): 543–547, 1997.

[11] R. R. McCrae, and P. T. Costa, P. T. Validation of the five-factor model of personality across instruments and observers. *Journal of Personality and Social Psychology*, 52(1): 81–90, 1987.

[12] A. C. North, and D. J. Hargreaves. Music and adolescent identity. *Music Education Research*, 1(1): 75–92, 1999.

[13] E. Payne. Musical taste and personality. *The British Journal of Psychology*, 58(1): 133–138, 1967.

[14] J. L. Pearson, and S. J. Dollinger. Music preference correlates of Jungian types. *Personality and Individual Differences*, 36(5): 1005–1008, 2004.

[15] D. Rawlings, and V. Ciancarelli. Music preference and the five-factor model of the NEO personality inventory. *Psychology of Music*, 25(2): 120–132, 1997.

[16] P. J. Rentfrow, and S. D. Gosling. The do re mi?s of everyday life: The structure and personality correlates of music preferences. *Journal of Personality and Social Psychology*, 84(6): 1236–1256, 2003.

[17] D. P. Schmitt, J. Allik, R. R. McCrae, and V. Benet-Martinez. The geographic distribution of big five personality traits: Patterns and profiles of human self-description across 56 nations. *Journal of Cross-Cultural Psychology*, 38(2): 173–212, 2007.

[18] P. Weinberg, J. Groff, A. Oppel, and A. Davenport. *SQL, the Complete Reference*. McGraw-Hill, New York, 2010.

[19] R. L. Zweigenhaft. A do re mi encore. *Journal of Individual Differences*, 29(1), 45–55, 2008.