ABMR

The Applied Business & Management Review (ABMR) | Vol. 1, No. 1, 2025
ISSN: *In-Progress* (Online) | https://abmr-journal.org

EXPLORING IDENTITY AND POSSIBLE SELVES ACROSS ENSEMBLE MUSICIANS

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ABSTRACT

This article draws on the concept of possible selves (Markus & Nurius, 1986) to better understand the relationship between cognition, motivation, and identity among professional ensemble musicians. The study aims to illuminate how self-identity is constructed, communicated, and reshaped across time (past–present–future) in connection with personal "horizons" of experience, aspiration, and perceived attainability. The theoretical framing integrates several complementary perspectives: self-identity as a cognitive and socially situated construct; the performative self (Goffman, 1959); relational and non-relational self-expansion models (Aron & Aron, 1986; Mattingly & Lewandowski, 2013, 2020); and the notion of horizons as the breadth of perception and understanding in interpretation (Gadamer, 2004).

Methodologically, the study relies on an online convenience sample of 39 professional musicians, primarily residing in the Houston, Texas area. The questionnaire comprises six sections Association, Emotional Attachment, Conviction, External Factors, Goals, and "The Ensemble & Me"with items derived from prior literature to support cross-validation. Internal consistency is strong (Cronbach's alpha = .8536). Descriptive analyses indicate a high level of identity attachment to music, with several items showing pronounced negative (left) skew, reflecting frequent endorsement of high Likert responses. To explore inter-item structure, Spearman correlations suggest substantial associations across multiple statements. Given the complexity of the correlation matrix, clustering analyses (including agglomerative hierarchical clustering) identify two main clusters, and principal components analysis indicates that the first two components capture much of the overall variance.

To examine a proxy for self-identity "The first thing I think about when describing myself to others is that I am involved in music" the authors estimate an ordered logit model and two Bayesian ordered logit models using weakly informative priors. Results are directionally consistent across approaches: being persistently mentally engaged with music and feeling confident relative to peers predict higher self-identity salience, whereas frequent participation in activities outside music predicts lower salience. The article concludes that findings are exploratory and calls for survey refinement, a substantially larger sample, and the development of empirically grounded priors to strengthen future Bayesian inference.

Keywords: Professional identity; possible selves; ensemble musicians; horizons; musical attachment; Bayesian modeling..

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1 INTRODUCTION

The concept of "possible selves," is used most commonly in psychological studies to better understand the relationship between cognition and motivation. It encompasses understandings of self-identity, horizons, and draws together a coherent structure of navigating the story between our past, present, and future selves (communication). The purpose of this study pertains to better understanding the minds of ensemble musicians; to draw better understanding of the relationship between all concepts above and to provide valuable insights into how one can enhance the individual and collective artistic performance and experience.

Pan, Lu, Wang, and Chau (2017, p. 76) point out, "In psychology, self-identity is defined as a cognitive construct of the self that answers the question "who am I?". Self-identity is highly individualized, creating distinct separation between others. Social categories such as groups, relationships and personal characteristics also play a critical part in shaping one's self-identity and self-perception; to the extent that people use them to define themselves. It is an underlying position of this article that however complex, through behavior, self-identity is implicitly or explicitly communicated.

Referencing self-identity, behavior communicates to other people and groups. Such communication can have critical implications for recognition. For example, a leading musician can demonstrate excellence by exhibiting specialized performance techniques to an attentive audience. This is implicit communication. Alternatively, that same musician can stand before a group of students and explain her self-identity as a leader by verbally expressing many years of hard work and sacrifice. This research asks,

Q: What empirical evidence is indicated concerning self-identity based on, the six section survey administered for this research?

Naturally, the question requires understanding of the intended meaning of horizons and self-identity. The context for this research is music, or more specifically, discussions with professional musicians. Initial interest in the subject of this article came about because of interest in the much broader subject matter of interpretation in the performing arts. Margolis and Rockmore state,

In the second half of our century, interpretation has been accorded an increasingly. Prominent role in the perception and understanding both of physical and cultural reality and of our own role in both. The sources of this accommodation may be traced to the following themes at least: (1) the questionable status of neutrality in the physical sciences and the cognate recovery of objectivity (without neutrality) as a critical "construction" of some sort; (2) the intentional, significative, or semiotic nature of the entire artifactual world of human culture, intrinsically apt for interpretation and essential to the work of human self-understanding; (3) the inseparability of our unique cognitive abilities in understanding the natural world and ourselves; and (4) the social formation of self-interpreting selves, the congruent formation of their conceptual powers, and the enormously puzzling fact that the exercise of those powers changes human nature and changes those powers in significant and discernable ways. (Margolis and Rockmore, 2000).

Further, seeds of interest in the topic of this article can be found in earlier research related to artist self-profiling. Briefly, the framework represents dimensions of skills and knowledge that relate to the development, maintenance, and enhancement of performance. For example, Williamon, Clark & Küssner (2017) and Cartwright, Küssner & Williamon (2021), implement a profiling framework that allows partial insight into artist identity. The primary focus is on dynamic interplay between (a) performers' current levels of skills and knowledge in each dimension; (b) the overlap and interplay between dimensions; and (c) the relative importance (or weight) of each in the context of the performer's experience, level of expertise, typical performance situations/environments and career goals. Issues related to self-identity and horizons are prevalent in the academic literature focusing on social psychology and organizational behavior (Day & Shin,

2009; Kwok, Hanig, Brown, & Shen, 2018; Markus & Nurius, 1986; Oyserman, Bybee, Terry, & Hart-Johnson, 2004).

Wanting to focus more specifically on artist identity, the authors revisited Goffman's classic work (1959). Goffman's framework divides the individual into two parts: the individual is seen as a performer and as a character. The performed self corresponds to an image. As a character, the self-on-stage and in-character attempts to convince others (the audience) to accept that image. Owing to the dependence on others, this self is not organic, and it is subject to interpretation. In other words, "-this self- is "a product of a scene that comes off and is not a cause of it" (Goffman, p. 245).

Alternatively, the self as performer derives from the possessor (Goffman's word). The individual has capacities to learn, and dream as well as to experience psychobiological elements such as elation and fear. Understanding the self-as-performer, allows for the introduction of mental experiences such as fantasizing, or daydreaming, as well as the objects of those experiences.

Following this introduction, the paper presents a clarification of concepts and a brief consideration of relevant literature. At the outset, efforts are made to clarify the intended meanings of self-identity and horizons beyond that which has been stated thus far. The context for this research, as previously stated, revolves around professional musicians of various ensembles affiliated with a recognized educational institution and/or local performing arts organization in Houston, Texas. The discussion of methodology, data and analysis follows. The final section of the paper presents a summary of findings and directions for future research.

2 CONCEPTS AND LITERATURE REVIEW

Before further examination of self-identity and horizons, there are critical assumptions the current research demonstrates concerning the individual. Markus and Nurius make it a point to demonstrate that "an individual is free to create any variety of possible selves, yet the pool of possible selves derives from the categories made salient by the individual's particular sociocultural and historical context and from the models, images, and symbols provided by the individual's immediate social experiences." (Markus, 1986).

The idea of self-reflection or more modernly referred to as "self-awareness," furthers the notion that not only does each individual possess the ability and capacity to have many possible selves, but that all can easily reflect upon this. Whether the possible selves are objectively achievable, when it comes down to psychology based on preferences and decision making, Kaheman and Tversky (1982) have suggested that in making all decisions about the future, people run mental simulations by constructing vivid scenarios of what could be. This is also known as daydreams. The same theories also point out the factors involved in our decision-making pertaining to possible selves are linked to; levels of self-esteem, and personal biases tendances one has to naturally "...distort information or events so as to verify or sustain the prevailing view of self (e.g., Greenwald, 1980).

This is and remains legitimate concerning both recent and classic literature. Such ideas are also linked and supported to various behavioral theories and their close relationship to self-concept (how someone thinks about themselves). The basis for behavioral theory is explained by the simple phrase "if we want to change behavior, we need to change the self-concept." This is the underlying basis for Cognitive Behavioral Therapy (CBT); explaining that behavior is related to our pattern of thoughts about the self (NHS, 2022). In conclusion, to change behavior, one must first change these targeted thoughts. The thoughts can also be influenced and maintained by the current environment, social influence, and social change. (Kwasnicka & Dombrowski, 2016).

As previously indicated, the work of E. Goffman (1959) bears relevance to this research. Given that an image corresponds to the performed self, the person on stage and acting in character tries to persuade the audience to agree with their portrayal. This self is not organic. As to the self as performer, this self is the organic self. The person is capable of learning, dreaming, and experiencing psychobiological aspects like joy and terror. Understanding self as a performer appears to consider life experiences, but also allows for the objects of those experiences. As an example, suppose one experiences fear. The fear is of something such as a dark or a ferocious animal. Following along similar lines, a person looking into their future might experience excitement and that powerful emotion might be associated with the thought of achieving a certain level of competence and recognition in their field.

Two considerations are worth mentioning. First, it is necessary to account for the likelihood that both versions of self are active at any point in time and surely the two must interact. Second, concerns the dynamics, which are particularly relevant for this research. Before discussing horizons per se, take the example of a young boy experiencing excitement over his future exclaiming, "When I grow up I want to be a firefighter!" Five years later, this same boy joyfully declares, "After college, I want to be a surgeon!" Here, there are dynamics in the sense of an elapsed time (five years) as well as an ambiguous view toward the future.

Another approach to identity is to consider the self-expansion model (Aron and Aron, 1986). An individual has experiences over the course of their lifetime. Some experiences are inconsequential, while other experiences alter the collective set of beliefs that the individual has about themselves. According to the self-expansion model, individuals are motivated to broaden their sense of self or identity through self-development including learning new capabilities, nurturing new relationships, or pursuing new goals and objectives. Initial research on the self-expansion model focused on relational expansion, which is how individuals come into interpersonal relationships by way of inclusion of others in the self (IOS). Conceptually, one can envision a Venn diagram in which two circles representing the two selves overlap or intersect indicating the extent to which senses of selves become cognitively linked to one another. IOS is one mechanism through which self-expansion can occur. In this case, self-expansion is relational.

More recent research has focused on non-relational self-expansion (Mattingly & Lewandowski, 2013, 2020). In the context of a non-relational self-expansion model any activity that is found to be challenging should result in self-expansion accompanied by intrapersonal benefits. Experiments by Mattingly and Lewandowski (2013, 2020) confirm this to be the case. Individuals taking more difficult and challenging tasks have been found to demonstrate a higher level of intrapersonal achievement.

Along the lines of this research, there is a considerable literature in social psychology related to temporal self-evaluations referred to as possible selves defined as representations of the self in the past and future (Markus & Nurius, 1986; Markus & Ruvolo, 1989; Carver, Reynolds, & Scheier, 1994; Oyserman, Bybee, & Terry, 2006). Following Markus and Nurius (1986), there are three types of possible selves: the expected self, the hoped for self, and the feared self. Of course, there are a range of factors that can influence the content of any category.

For this research, expected selves are of primary importance as they are "selves" that an individual believes he or she can or will become. Moreover, as pointed out by Carver, Reynolds & Scheier (1994), "they serve as the focus point for one's energies in striving for the future." Additionally, the authors note that when an expected self is positive it is perceived as a realistic goal. However, when an expected self is negative, it is taken as an unlikely wish. For this research, the authors find that the relational and non-relational expansion models as well as the ideas behind possible selves are particularly relevant.

Turning now to horizon(s). Fundamentally, one can understand horizon as found in a dictionary. For example, Merriam-Webster's Collegiate Dictionary (MWCD) offers several alternatives two of which are relevant to the present discussion: "c: range of perception or experience d: something that might be attained" (MWCD, p.

558). Horizons take on significant meaning in multiple disciplines. Horizons are of importance to philosophers and phenomenologists. Much of what has been written is quite dense and beyond the immediate scope of this research. However, in applying hermeneutics to the process of interpretation, Hans-Georg Gadamer (2004) talks of a 'horizon' as a way to conceptualize understanding. Your horizon is as far as you can see or understand. Gadamer states that: "the concept of horizon suggests itself because it expresses the superior breadth of vision that the person who is trying to understand must have. To acquire a horizon means that one learns to look beyond what is close at hand – not in order to look away from it but to see it better" (Clark, p. 58).

Oyserman, Bybee, & Terry (2006) address horizons in the context of possible selves, expectations and "concerns about the future." In laboratory experiments, Coats, Janoff-Bulman, & Alpert (1996) show that shifts in goals, personal strivings, or self-motivation clearly influence mood, behavior, and outcomes. In natural settings it has been pointed out by Oyserman, Bybee, & Terry (2006) that possible selves, goals, and objectives may not be well-defined. Hence, regulated behavior is necessary in the sense that the self-concept must be associated with strategies about the behavior that will lead to the desired outcome. Further, goals, strivings, and possible selves may serve functions other than self-regulation. They can facilitate optimism and belief that change is possible because they provide the sense that the current self is mutable (Markus & Nurius, 1986).

Considering research related to the performing arts, in his qualitative study related to participants in the Rochester New Horizons Band program, Dabback (2008) reports evidence that identities emerge from and are shaped by ensemble social interactions. Furthermore, encouragement and support from ensemble members serves to reinforce musical identities. Social interaction within the group context is a means for negotiating personal identity. Willard & Lavallee (2016), examined the retirement experiences of elite professional ballet dancers. Emphasis was placed on the influence of self-identity and social support on the quality of adjustment to retirement in elite ballet dancers. The authors found that dancers adopted a combination of coping strategies. Predominantly retirement planning and redefinition of self. With respect to the developing ballet dancer, Yurow (2016) states, "… dancing becomes part of their (student's) identity as well. Here, dance teachers and exceptional dancers in the class or in a company become role models of sorts, from senses of style, behavior, and physical prowess. Being a "ballerina" goes from an occupation or a hobby to an identity. Norton (2013) states, "….poststructuralist theory has led me to define identity as the way a person understands his or her relationship to the world, how that relationship is constructed across time and space, and how the person understands possibilities for the future." Further, Norton points to the relevance of imagined communities and imagined identities. Imagined communities refer to those groups with whom one associates, and which exists outside of the person's direct access. One's imagined identity is often associated with hopes for the future. For example, in the context of performing arts education, it is not unusual to hear a student hope to become one day a widely recognized musician, dancer or theatrical. performer, although in fact, that student might not achieve such recognition or be associated with a leading company.

Finally, Roston's (2011) research "A Study of the Development of Young Artists: The Emergence of an Artistic and Creative Identity" studied thirty-nine children, ranging in age from 8 to 11 and enrolled in a private after-school art enrichment class. This study clearly shows the qualitative changes in skill associated with aging and the participants' understanding of what it means to be an artist and what it means to be creative. An interesting course for research is to investigate dynamics of changing identities amongst performing artists during their careers. The authors have interest in further investigating what happens when present horizons change and move to a new horizon.

There is an emerging area of research that are of particular interest to the authors, concerning changing horizons and the generation of new possible selves in the later stages of life. Since the majority (51.3%) of our survey group consists of individuals of the ages 45-64+ it would be particularly interesting to draw our

conclusions and compare them to those found in, for example, "The role of musical possible selves in supporting subjective well-being in later life", reported by Creech, Hallam, Gaunt, Pincas, McQueen & Varvarigou (2013). Key takeaways from this body of research include the following: 1) music-making is a joyful and creative activity that all humans, regardless of age, and 2) engagement with music continues to contribute to quality of life throughout these latter stages of the life-course, regardless of cognitive capacity (Bailey, Nilsson and Cohen, 2002) or musical background (Hays and Minichiello, 2005). Identity often is challenged, molded, and readjusted during times of transition. This serves to strengthen the notion that possible selves are dynamic. One often assumes that older generations lack continued expansion in learning and development in life.

However, when considering important life transitions one faces later in life, we know this to not be true. For example: the approaching question and/or action of retirement, changing roles in the family structure (widowhood, becoming a parent, or grandparent), sudden illness or physical injury, enduring and overcoming grief (Cross and Markus, 1991). In the context relating to our survey group (Orchestral Ensemble Musicians) this is specifically alluring, since there is a significant number of professionals who, unlike many other professions, continue to play into late adulthood, and maintain favorable health. This is also supported by research done by (Frost, 2000) stating it is found that "most orchestral musicians…retired for reasons that were neither medical nor related to difficulty playing…[and] most retired older than the mean retirement age, which is between 61 and 62 years old". When considering professional musicians, it seems the most common goal is the same; that they will or would hope to continue engaging in music until it is physically and/or cognitively impossible, and not by choice pertaining to other possibilities.

To further add support to this research, Niarchou, , Lin et al.(2021), show that substantial evidence in literature shows health (related to neural plasticity, cognition, speech, and hearing) in older musicians are in better shape than their non-musician peers and that this act of "disentangling causation versus correlation of these relationships between music engagement and health is becoming the focus of many new studies." Therefore, further developments into this can hopefully be concluded by this article and what it has to add to already existing research.

Continuing back to research done by Creech et. all, (2007), they first ask questions such as: 1) Do older people rediscover or generate possible positive musical selves when actively engaging in making music with others? And 2) Does the generation of positive possible musical selves relate to the enhancement of self-reported well-being? From gathering self-reporting data (N=398) and reviewing three case studies from the United Kingdom, they provide positive results stating "...there is a growing body of compelling evidence that…[amateur and semiprofessional] participation in music [at all stages of life] may provide a source of enhanced social cohesion, enjoyment, personal development and empowerment". They also state support in their literature review and conclusion from Bailey, Nilsson, and Cohen (2002) and Hays and Minichiello (2005), reporting that engagement with music continues to contribute to quality of life throughout these latter stages of the life-course regardless of cognitive capacity or musical background.

A key difference in this research could be that only 11% of their survey group answered strongly that "music played a central part of my life". Whereas this was much higher in our group (61.5%). It would be interesting to see how this current research could apply to the context of aging professional musicians and how this relates to their occupational sense of possible selves and vice versa. Since findings pertaining to this group could differ, self-identity and attachment to occupation would be assumed different (supported by our data listed above). Moreover, differences could be linked to important developmental distinctions between professional versus amateur musician status, such as in the professional musician; they begin training at a young age, possesses high levels of education backed in music and performance, upholds expert level mastery and skill of their instrument and acquires the majority of their income and professional experience from music performance.

More on how this directly correlates to self-identity will be further explored in this paper. Lastly, to our current knowledge this would be adding research to an already limited literature base dedicated to looking at possible selves and self-identity, within an occupational setting of music as a leading profession.

Rosset, Baumann, and Altenmüller (2022) state in their study, Mental Health and Health-Related Attitudes Among Music Students elaborate on patterns that music performance students in particular ; have strong identity attachments to music, experience low levels of self-esteem and low levels of self-concept, taking any criticism harshly and strongly latching onto any notions of praise. Factors influencing identity attachment include individuals often start their professional training from adolescence and childhood, the act of music engagement is linked to pleasure, strong emotions and identity, students often work at their physical and emotional limits, strong societal pressures from performance, stigma, peers, and teachers.

This phenomenon of high attachment to metier and self-identity related to music is also shown to be significantly higher in music performance students (with a goal of pursuing music professionally) than amateur musicians. To add, music students showed "worse general health and worse physical health than amateur musicians and worse general health than university students of other disciplines," (Rosset et. al, 2022). The study points out that as students transition into professional levels of music engagement, self-esteem and negative self-concept begin to ameliorate themselves, however this gives possible insight into how self-concept, horizons and possible selves shapes itself over time throughout different stages of life. Better understanding of this timeline might allow for recommendations to music schools and professional institutions based on how to allocate resources, education on health management, crisis management and adaptation of skills.

To further explain with examples, for the more senior performer, education from teachers on how to manage physical health and mental stamina as preservation would address horizons of the ones who desire to play well into their sixties or beyond. For younger musicians, educators could use this information as indicators on how to better address performance anxiety and depression in first year students. This is a significant factor in shaping the horizons of first year music students (Rosset et. al. 2022). Hopefully, it will be possible to mitigate targeted health challenges for the short- and long-term goals of performing artists.

3 METHODOLOGY

Following Leedy and Ormrod (2001), the descriptive research approach is a basic research method that examines the situation in its current state and involves identification of attributes of a particular phenomenon based on an observation or correlation. For this research, the authors entertain working hypotheses. A working hypothesis is understood in the sense of Oppenheimer and Putnam's well-known publication, Unity of Science as a Working Hypothesis (1958). Paraphrasing Oppenheimer and Putnam, given the force of reason, a working hypothesis is that which can be accepted assuming that further work can be done without declaring its validity or denying that truth may be unattainable (Oppenheimer and Putnam, 1958). The working hypotheses can subsequently be rigorously tested by confirmatory data analysis. Confirmatory data analysis is structured, and rigorous, exploratory data analysis can be open-minded and speculative (Tukey, 1980).

The authors have taken a Bayesian approach to address the research questions. There are many philosophical differences between how data and parameters are considered between the Bayesian and frequentist frameworks, namely that Bayesian methods consider that all parameters are random (and therefore have distributions) and that the data are fixed. Conversely, frequentists consider all parameters to be fixed and that the data are random. As a result, each framework approaches statistical inferences from very different perspectives. With small sample sizes, the goal of obtaining trustworthy estimates are likely to be questioned. with ML estimation (the primary frequentist estimation method is known to have desirable properties such as

consistency (the parameter estimates are unbiased on expectation as sample size approaches infinity) and asymptotic normality (which is the foundation for frequentist confidence interval calculations). However, notice that both properties require large samples to take effect.

Due to their differential theoretical underpinnings, Bayesian methods do not rely on large samples. Recall that Bayesian methods consider the data to be fixed while the parameters are random. With sampling-based Bayesian methods such as Markov chain Monte Carlo (MCMC), which is becoming increasingly synonymous with Bayesian estimation in empirical studies, this means that the quality of inference is controlled not by sample size approaching infinity, but rather by the number of samples taken approaching infinity.

The following analysis presents key descriptive statistics. Second, owing to the considerable number of survey statements, correlation, clustering and data reduction techniques, principal components and factor analysis are discussed. Results from the modeling exercise follow.

3.1 Data and Descriptive Analysis

Data have been collected from an online convenience sample of professional musicians residing for the most part in the Houston, Texas area of the United States. Thirty-nine complete surveys were returned to the researchers. The statements included on the questionnaire are categorized as Association, Emotional Attachment, Conviction, External Factors, Goals, and the Ensemble & Me. The statements have been derived from existing literature (e.g., Burland et al., 2022) for purposes of cross-validation and comparison.

The sample is relatively balanced for female (38.5 percent) and male (61.5percent) respondents. The 18-24 and 55-64 age categories are the most heavily populated. Only five respondents were aged 65 or older. Most of the participants had college-university educations at the undergraduate (18) or graduate levels (11). Cronbach's Alpha coefficient of .8536 was achieved, which is statistically very good.

Table 1 indicates the categories of statements and number of statements per category. Table 2 shows selected statistics for questions in the Association category. The statements are evaluated based on a 5-point Likert scale and on the basis of the mean, median and modal values, the results are quite consistent indicating a strong attachment to individual identity attachment to music. The relatively low mean on statement two is also consistent indicating that respondents did not "often think of careers outside music." Recall that the acceptable range of skewness and kurtosis for normal distribution of data is between -1 and +1 for skewness and between -3 and +3 for kurtosis. However, according to Hair et al. (2010) and Bryne (2010), data is deemed normal if the skewness is between -2 and +2 and the kurtosis is between -7 and +7. For advanced or modelling analysis, the authors call attention to the pronounced negative or left-skewed distributions on statements 1, 3, and 4.

Table 1. Categories in questionnaire with numbers of statements.

Category	Number of Statements
Association	7
Emotional Attachment	6
Conviction	4
External Factors	3
Goals	2
The Ensemble & Me	4

Table 2. Selected statistics for survey statements Association (1 – 7).

Question	Mean	Standard Deviation	Median	Mode	Modal Frequency	Skewness (Pearson)	Kurtosis (Pearson)
1	4.308	1.127	5.0	5.0	24	-1.743	2.140
2	2.872	1.260	3.0	3.0	11	0.164	-.930
3	4.308	.950	5.0	5.0	21	-1.579	2.457
4	4.436	.754	5.0	5.0	22	-1.274	1.239
5	3.949	1.191	4.0	5.0	17	-.942	-.034
6	3.692	1.398	4.0	5.0	15	-.783	-.650
7	4.282	.944	5.0	5.0	22	-.967	-.317

Table 3 shows selected descriptive statistics for statements EA8 through EM26. EA, C, EF, G and EM denote Emotional Attachment, Conviction, External Factors, Goals, and the Ensemble & Me, respectively. Based on the hyper-distributions of the responses to statements, the However, distributions are negligibly to negatively skewed negatively skewed and kurtosis is outside of the suggested -3/+3 range for EM26 alone.

Given the nature of this research, it is necessary to clarify that the empirical work is presented as purposeful for generating working hypotheses in the sense of Oppenheim and Putnam (1958), and more recently, Tukey (1980). While intuitive relationships between the statements have been considered, such a priori hypothesis must not be confused with the more rigorous standards associated with hypothesis testing in confirmatory quantitative research. Examples of working hypotheses relevant to this paper appear in Table 4.

Table 3. Descriptive statistics for survey statements

Statistic	G21	G22	EM23	EM24	EM25	EM26
Number Obs.	39	39	39	39	39	39
Frq of Min=1	7	1	3	6	4	2
Frq of Max=5	4	20	8	6	3	24
Mean	3.462	4.256	3.359	3.051	3.051	4.359
Stand Dev (n)	.913	.880	1.224	1.317	1.050	1.063
Skewness (Pearson)	-.200	-.755	-.278	-.095	-.241	-1.953
Kurtosis (Pearson)	-.815	-.659	-.876	-1.108	-.168	3.264

Statistic	EA8	EA9	EA10	EA11	EA12	EA136	C14	C15	C16	C17	EF18	EF19	EF20
Number Obs.	39	39	39	39	39	39	39	39	39	39	39	39	39
Frq of Min=1	1	1	1	1	4	3	2	1	1	1	3	3	1
Frq of Max=5	9	23	29	24	22	9	21	9	8	21	8	19	17
Mean	3.513	4.487	4.667	4.462	4.256	3.308	4.333	3.923	3.718	4.205	3.359	4.256	4.103
Stand Dev (n)	1.167	.721	.662	.790	1.019	1.280	.869	.900	.999	1.056	1.203	.910	1.046
Skewness (Pearson)	-.283	-1.450	-2.284	-1.334	-1.135	-.135	-1.184	-1.167	-.698	-1.232	-.261	-1.164	-1.184
Kurtosis (Pearson)	-1.074	2.040	5.455	.991	.020	-1.118	.617	1.782	.076	.779	-764	.596	.793

Table 4. Examples of a priori hypotheses for assessing cross-statement relationships*

Survey Statement	1. The first thing I think about when describing myself to others is that I engage in music. (Association)	9. Being involved with music gives me immense satisfaction. (Emotional Attachment)	10.I feel emotionally connected to music. (Emotional Attachment)	11. I feel Energized by music. (Emotional Attachment)
Correlations	a	b	c	D
11				
EA9	Ha: ρ > 0			
EA10		Ha: ρ ≥ 0		
EA11			Ha: ρ > 0	

*Default null hypothesis Ho: ρ = 0. Correlations significant at the .05 level or better shown in bold.

Table 5 shows Spearman's correlation coefficients for statements D1 to EM26. Given a choice between Pearson's and Spearman's correlation coefficients, the latter has been selected on grounds that it is more robust to outliers. Recall that statistical significance, indicates associations and not causal relationships.

Based on a visual inspection of Table 5, there is a preponderance of significant correlation coefficients suggesting the possibility extreme collinearity (Belsely, Kuh, Welsh, 1980). To get some understanding of the extent of collinearity, STATA command collin was applied. The collin command does not need to be run in connection with regress, however, it does require that only independent or predictor variables be included in the analysis. Therefore, statements 1A through 7A were deleted from the analysis based on the a priori presumption that these statements are candidates for dependent variables in the analysis following below. The results do not reveal cause for concern as the VIFs are well below 10, or alternatively, the Tolerance values are well above .1.

Nevertheless, given the large number of statements, the correlation matrix is difficult to study and interpret properly. There are too many pairwise correlations between the variables to consider. A clustering exercise was undertaken, aggregating similar data points together to reveal underlying groups or clusters of statements. Application of K-means clustering resulted in two clusters, however, evolution of the inertia and silhouette score raised some ambiguity, so as an alternative, agglomerative hierarchical clustering (AHC) was applied. The results from the AHC algorithm are shown in Figure 1 as a dendrogram. The algorithm confirmed the K-means application of two clusters.

Apologies to the reader for the miniscule labeling, however, statements are identified in the appendix. The dendrogram is considered useful in providing a visual understanding of the variables and how they might well be structured in the context of the modeling exercise to follow. It is encouraging that the demographic information is contained within Cluster 1 (blue). Further, it is interesting that of the set of statements referenced as Association, all but statement two are included in Cluster 2 (red). Recall that a working hypothesis is that the statements in the Association group (1A-7A) are candidates for dependent variables in modeling. Obviously, this is one guidepost at best.

Finally, based on the analysis thus far, variable reduction was considered. The two most common variable reduction techniques are principal components analysis (PCA) and factor analysis (FA).

Table 5. Correlation matrix. Spearman's correlation coefficient estimates, D1 – D6 and A1 – EM26

Statement	D1	D2	D3	A1	A2	A3	A4	A5	A6	A7	EA8	EA9
D1	1.0											
D2		1.0										
D3		.389	1.0									
A1				1.0								
A2				-.380	1.0							
A3			.411	.389	-.354	1.0						
A4			.332	.521	-.399	.700	1.0					
A5			.334	.494		.336	.453	1.0				
A6						-.320	-.327		1.0			
A7				.636						1.0		
EA8				.476		.412	.443				1.0	
EA9			.318	.393	-.413	.472	.624	.519				1.0
EA10	-.461						.443					.447
EA11							.484					.370
EA12				.336			.614	.465				.644
EA13				-.377	.321	-.343			.345			
C14											.391	
C15				.408				.349				
C16											.408	
C17												
EF18												
EF19												
EF20				-.369	.378		-.362		.383			
G21												
G22	-.421											
EM23	-.318											
EM24						.321	.364				.341	
EM25												
EM26			.340			.337	.380				.575	.335

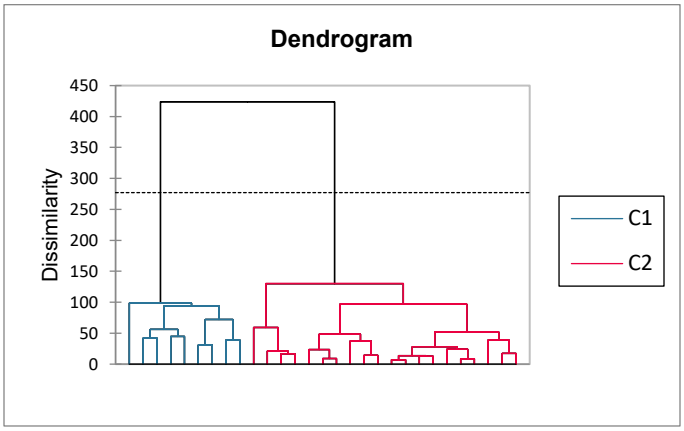
*Values in bold are significant from 0 with a significance level α=.05 or better

Table 5. Correlation matrix. Spearman's correlation coefficient estimates, D1 – D6 and A1 – EM26

Statement	EA10	EA11	EA12	EA13	C14	C15	C16	C17	EF18	EF19	EF20	G21	G22	EM23	EM24	EM25	EM26
D1																	
D2																	
D3																	
A1																	
A2																	
A3																	
A4																	
A5																	
A6																	
A7																	
EA8																	
EA9																	
EA10	1.0																
EA11	.661	1.0															
EA12	.588	.695	1.0														
EA13				1.0													
C14					1.0												
C15					.724	1.0											
C16		.352			.568	.500	1.0										
C17				.511				1.0									
EF18						.347		.348	1.0								
EF19				.527				.471	.452	1.0							
EF20				.557				.507		.681	1.0						
G21		.327			.344	.429	.655	.534				1.0					
G22		.366					.331						1.0				
EM23	.462	.334	.324											1.0			
EM24														.378	1.0		
EM25																1.0	
EM26				-.328										.355			1.0

*Values in bold are significant from 0 with a significance level α=.05 or better

Figure 1.. Dendrogram, agglomerative hierarchical clustering (ACH)



Recall that the solution to the PCA involves the eigenvalues and eigenvectors of the variance-covariance matrix associated with the vector of variables. The estimated principal components are defined using the eigenvectors as the coefficients associated with the variables. The objectives are to 1) retain only the first k principal components explaining most of the overall variation, and 2) avoid loss of information, the proportion of variation explained by the first k principal components should be as close to 1.0 as possible. The Scree plot and PCA contributions are shown in Figures 2 and 3, respectively. The PCA analysis indicates most, or the variation is captured by the first two principal components.

Figure 2. PCA Scree Plot

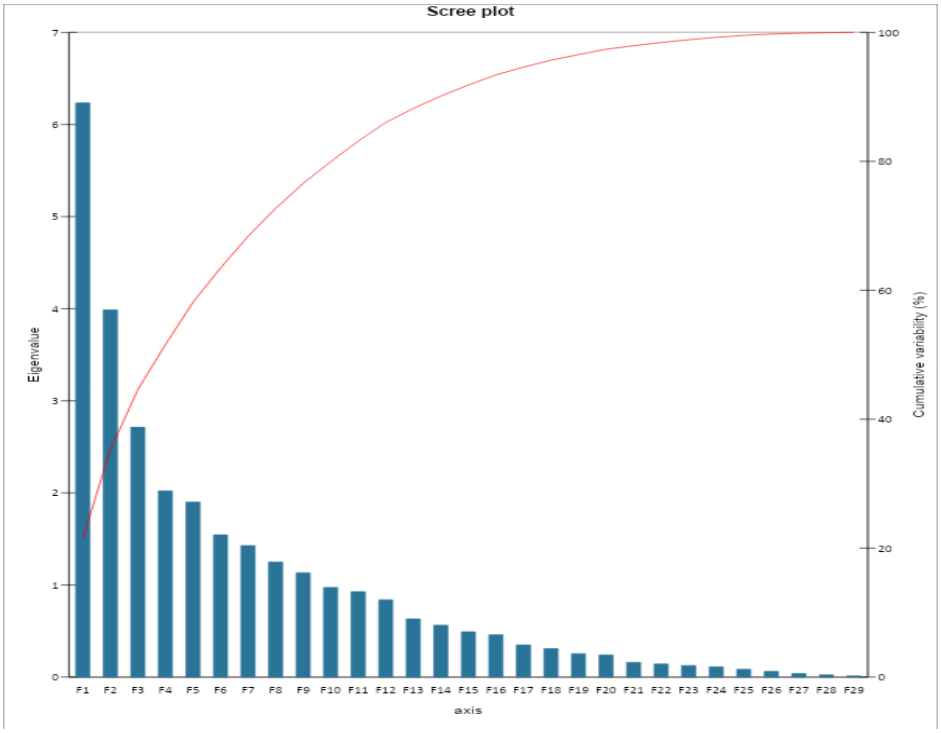
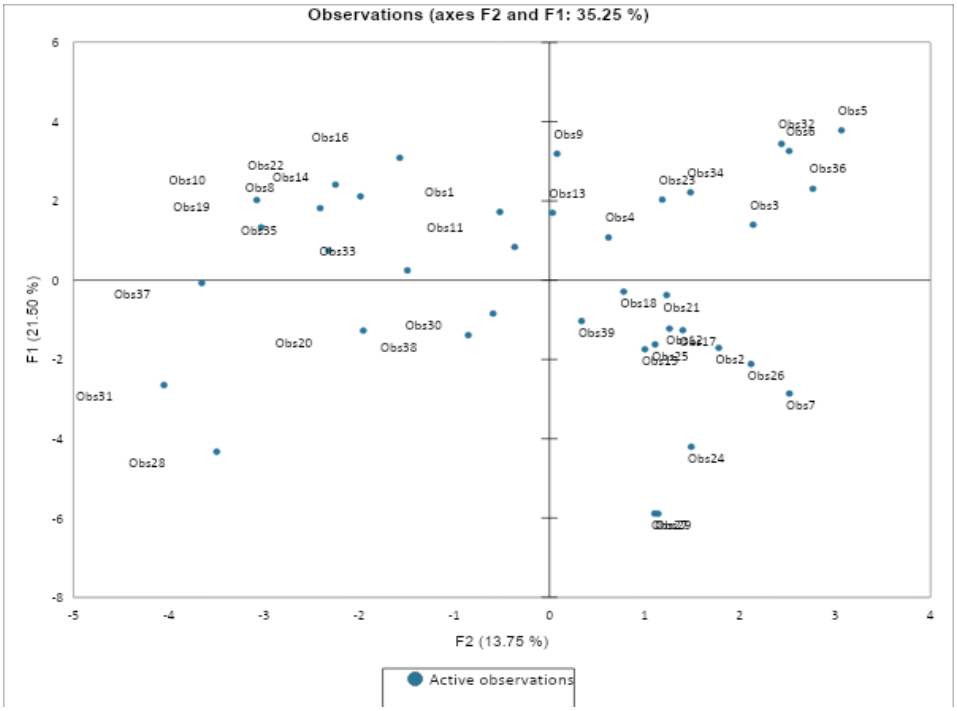


Figure 3. Contributions of PCA Factors F1 and F2



3.2 3.2 Bayesian Ordered Logit Analysis

There are positive and negative arguments for and against Bayesian and frequentist methods. It is not that frequentist methods are necessarily poor with small samples or frequentist methods outperform Bayesian methods ipso facto (McNeish, 2015). The authors recognize that Bayesian methods do not alleviate small sample problems, however, Bayesian methods have properties that make them more conducive to modeling small sample data conditional on the choice of prior distributions. Bayesian inference presupposes constant data and random parameters for all unknown parameters. The Bayesian approach is interested in the probability of the parameter given the available data set y.

The Bayesian framework considers three essential components for parameter estimation: the prior distribution, the likelihood function, and the posterior distribution. The prior distribution represents the prior belief that each possible parameter value is true before analyzing new data. Based on prior research or professional opinion, the antecedent belief can be specified. The likelihood function is the probability of parameter values based exclusively on each study's collected data. This is the same probability that was maximized in the conventional method using Maximum probability. The posterior models the probability that each possible parameter value is true, given the prior and likelihood. The posterior probability distribution is mathematically derived using Bayes' Theorem by combining the prior and the likelihood.

In Bayesian inference, prior information can be informative or non-informative. A prior is said to be informative if there is scientifically valid external information about the distribution of the parameter of interest, whereas non-informative priors are used when there is no such information. When evidence indicates that certain parameter values are more likely to be true than others, it is appropriate to employ an informative prior. Instead of assigning equal credibility to all values a priori, an informative prior can be used to give greater credibility to values found in the literature or considered more reasonable by experts.

This study employs non-informative priors as a starting point due to a paucity of solid, scientifically sound prior information regarding the variable of interest. We choose a mean of zero and a standard deviation of one hundred. Such a wide distribution lends nearly equal credibility to all possible (and inconceivable) parameter values. The posterior distribution is used for estimation following the specification of a prior and the combination of its information with the likelihood. Point and interval estimates are derived from the posterior distribution.

The parameters of the fixed and random components were estimated using Markov Chain Monte Carlo (MCMC) simulation techniques with Metropolis–Hastings sampling. The posterior distribution is sampled multiple times to generate a distribution of sampled values. The samples are then used to generate a posterior distribution. Beginning with a singular value, the sampling procedure converges iteratively to the posterior. Multiple initial values are used to produce distinct "chains" of resampling. These sequences are then combined following thousands of iterations. With sufficient samples, the empirical posterior will approximate the mathematical posterior.

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Based on the preceding descriptive analysis and extensive conversations with informed colleagues, the model is specified in general terms as A1: The first thing I think about when describing myself to others is that I am involved in music as a function of Age, EA8, C15, EF20 and EM26 where,

EA8: Performing music is always on my mind.

C15: I feel good about my abilities compared to my fellow musicians.

EF20: I frequently participate in activities outside of music.

EM26: I think I will play in a music ensemble throughout my life.

All are evaluated of the Likert sequence {1,2,3,4,5}

As there are no generic characteristics of the alternatives varying over the observations, the first model estimated is the frequentist multivariate ordered logit model using STATA ologit.

Table 6. Model 1: Ordered Logistic Regression

Ordered logistic regression Number of obs = 39

LR chi2(5) = 24.43

Prob > chi2 = 0.0002

Log likelihood = -30.456963 Pseudo R2 = 0.2862

Statement A1	Coefficient	Std Error	z	P>|z|	[95% conf. interval]
Age	-.4119604	.3014295	-1.37	0.172	-1.002751 .1788306
EA8	1.679175	.5483849	3.06	0.002	.6043602 2.753989
C15	1.039637	.523927	1.98	0.047	.0127586 2.066515
EF20	-1.404446	.5997623	-2.34	0.019	-2.579958 - .2289334
EM26	-.7028758	.5353939	-1.31	0.189	-1.752228 .3464768
Cut1	-4.839369	3.197489			-11.10633 1.427594
Cut2	-3.823797	3.178129			-10.05282 2.405221
Cut3	-3.10992	3.210186			-9.40177 3.181929
Cut4	-.9434856	3.205261			-7.225682 5.338711

Recall that the interpretation of the coefficient for a one unit increase in the predictor, the response variable level is expected to change by its respective regression coefficient in the ordered log-odds scale while the other variables in the model are held constant. A one unit increase in EA8 would result in a 1.68 unit increase in the ordered log-odds of being in a higher A1 category while the other variables in the model are held constant. Similarly, concerning C15, a one unit increase in C15 would result in a 1.04 unit increase in the ordered log-odds of being in a higher A1 category while the other variables in the model are held constant. The negative coefficient estimate for EF20 indicates that the ordered logit for EF20 being in a higher A1 category is 1.40 less when the other variables in the model are held constant.

Cut points on the latent variables are used to differentiate low A1 values from and higher A1 when values of the predictor variables are evaluated at zero. The 95% confidence interval states 95% confidence that the "true" population regression coefficient lies in between the lower and upper limit of the interval.

Table 7 reports results of the first Bayesian ordered logistic regression. The model uses STATA default normal priors, N~ (0, 10000), for regression coefficients and flat (uniform) priors for cut points.

Table 7. Model 2: Bayesian Ordered Logistic Regression

Bayesian ordered logistic regression MCMC iterations = 12,500

Random-walk Metropolis–Hastings sampling Burn-in = 2,500

MCMC sample size = 10,000

Number of obs = 39

Acceptance rate = .2722

Efficiency: min = .003863 max = .0273

Avg = .009948

Log marginal-likelihood = -56.398164

Statement A1	Mean	Std Error	MCSE	Median	[95% conf. interval]
Age	-.5319024	.3565707	.028829	-.509623	-1.259567 .1418191
EA8	1.953524	.628169	.052037	1.933674	.0439952 2.453744
C15	1.220991	.5970221	.081286	1.209263	.0439952 2.453744
EF20	-1.762594	7386313	.118841	-1.628857	-3.444319 - .632048
EM26	-.7862118	.5657265	.034238	-.7855491	-1.940066 .2849971
Cut1	-6.587028	3.432881	.387372	-6.469322	-13.40685 - .3737735
Cut2	-5.212046	3.25111	.441457	-4.098265	-11.80377 .8695328
Cut3	-4.126658	3.291863	.434536	-4.098265	-10.87442 2.189882
Cut4	-1.656194	3.263519	.510568	-1.542235	-8.256475 4.742738

Comparison of Models 1 and 2 shows consistency with respect to sign and magnitude between approaches at least with respect to the coefficient values in Table 6 and the Bayes median in Table 7. Recall that the posterior median is the Bayes estimate associated to the absolute loss function.

Bayesian estimates are stochastic and, by default, are based on a 10,000-person Markov chain Monte Carlo (MCMC) sample. It is essential to confirm that the MCMC simulation has converged; if not, the Bayesian estimates cannot be relied upon. The simulation efficiencies listed in the estimation subheading table can be used as initial indicators of convergence issues. In STATA Minimum operational average efficiency is approximately 0.17.

Model 8 uses normal priors, N~ (0, 10), for regression coefficients and flat (uniform) priors for cut points. The model uses STATA default normal priors, N~ (0, 10000), for regression coefficients and flat (uniform)

priors for cut points. Table 9 shows the comparison between estimated coefficients (Model 1) and posterior medians for Models 2 and 3.

Table 8. Model 3: Bayesian Ordered Logistic Regression

Bayesian ordered logistic regression MCMC iterations = 12,500
Random-walk Metropolis–Hastings sampling Burn-in = 2,500
MCMC sample size = 10,000
Number of obs = 39
Acceptance rate = .212
Efficiency: min = .003133 max = .02683
Avg = .01112
Log marginal-likelihood = -46.163084

Statement A1	Mean	Std Error	MCSE	Median	[95% conf. interval]
Age	-.4391624	.3281532	.020034	-.4226628	-1.095893 .1831416
EA8	2.053329	.6227728	.046836	2.033121	.953036 3.301988
C15	1.058726	.5273982	.038609	1.046142	.0469727 2.117671
EF20	-1.363501	.5033108	.042461	-1.336506	-2.447373 .4931088
EM26	-.4847139	.4809681	.067179	-.4763115	-1.419524 .4194946
Cut1	-3.757104	2.609369	.309785	-3.640839	-8.850747 1.103179
Cut2	-2.120467	2.294939	.36643	-2.00505	-6.555521 2.04034
Cut3	-1.167038	2.284003	380012	-1.080334	-5.575697 2.935936
Cut4	1.486323	2.239499	.400112	1.602671	-2.762793 5.619463

Table 9. Comparison between estimated coefficients (Model 1) and

posterior medians (Models 2 and 3) *

Statement A1	Coefficient Model 1	Median Model 2	Median Model 3	Average Models 2 and 3
Age	-.4119604	-.509623	-.4226628	-0.4661429
EA8	1.679175	1.933674	2.033121	1.9833975
C15	1.039637	1.209263	1.046142	1.1277025
EF20	-1.404446	-1.628857	-1.336506	-1.4826815
EM26	-.7028758	-.7855491	-.4763115	-0.6309303

* A1: The first thing I think about when describing myself to others is that I am involved in music; EA8: Performing music is always on my mind; C15: I feel good about my abilities compared to my fellow musicians; EF20: I frequently participate in activities outside of music; EM26: I think I will play in a music ensemble throughout my life.

It is notable that relative to Model 1, the Bayes medians are comparable directionally, however, there are obvious differences with respect to magnitude. Those differences aside, the Bayesian the average ordered logit for Age being in a higher A1 category is 1.40 less when the other variables in the model are held constant. Further, a one unit increase in EA8 would result in a 1.98 unit increase in the ordered log-odds of being in a higher A1 category; a one unit increase in C15 would result in a 1.13 unit increase in the ordered log-odds of being in a higher A1 category; and for EF20 and EM26 the average ordered logit for Age being in a higher A1 category is 1.48 and .631 less, respectively assuming all other variables are held constant.

4 CONCLUSIONS AND DIRECTIONS FOR FUTURE RESEARCH

The study of self-identity and possible selves is important for at least two reasons. First, insight is gained into the possible decay of a particular self-identity over time with age. Second, the authors consider that there are implications for mental health given an individual's predisposition toward a given self-identity and changes brought on by time or sudden events such as injury.

As to the empirical results, the work thus far is certainly exploratory, and much work remains to be done. While the study suggests relationships and their importance for understanding self-identity, one must accept statement A1 as our best proxy statement for self-identity. The Bayesian approach is also of interest and more consideration needs to be given to the importance of the priors.

Based on this study, the empirical results when considered against "The first thing I think about when describing myself to others is that I am involved in music"

Age : Statistically insignificant at .05 level or better in OLA

EA8: Performing music is always on my mind => One unit increase would result in 1.68 unit increase in the ordered log-odds of A1 in a higher category

C15: I feel good about my abilities compared to my fellow musicians => One unit increase would result in 1.04 unit increase in the ordered log-odds of A1 in a higher category

EF20: I frequently participate in activities outside of music => The ordered logit of being in a higher A1 category is 1.40 less for a one unit increase in the predictor

EM26: I think I will play in a music ensemble throughout my life.

Statistically insignificant at .05 level or better in OLA.

As far as future research is concerned, we would like to revise the survey in accordance with suggested additions and deletions, extend the distribution of the survey to a much larger sample of professional performing artists using this paper as the basis for some scientific evidence useful for specifying data-based priors (other than normal or uniform).

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