

Comparisons of Personality Dispositions and Genetic Inferences in Groups of Performing Artists

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Abstract

There are a number of innate and external factors that contribute to the success of performing artists. Search for these factors has resulted in attempts to profile performing artists based on genetic markers and personality types. The aim of this investigation was to examine select personality traits of performing artists and compare responses to previous research. Personality traits of student and professional musical theatre performers were measured with the Tellegen Absorption Scale (TAS; $N = 30$) and the Cloninger Tridimensional Personality Questionnaire™ (TPQ™; $N = 28$) and compared to a previously published study of dancers ($N = 85$) using one-sample t -tests. The TAS score of the current study ($M = 22.90 \pm 6.47$) was not significantly different to that of the dancers ($M = 21.05$; $p = .128$). However, the TPQ demonstrated significantly higher and lower differences, respectively, in musical theatre performers compared to dancers on the subscales of Harm Avoidance (HA) and Reward Dependence (RD), but not Novelty Seeking (NS). Findings suggest both similarities and significant differences between student and professional performers, with potential genetic associations. Pedagogical considerations and future research recommendations are discussed.

Keywords: Absorption; Dancers; Gene Expression; Musical Theatre; Performing Artists.

1. Introduction

A complex interaction of genetic predispositions, personality traits, environment, personal history, and fortune go into the making of a professional musical theatre performer. A career in the performing arts requires no degree or credential of formal training as an absolute necessity. However, most performers in musical theatre study music, voice, acting, and dance in higher education to become what is known as a triple threat: a performer who can dance, sing, and act. According to Broadway World (2013), there are 91 colleges in the United States offering degree programs in musical theatre (A.A., B.A., B.M., or B.F.A.). Performers who specialize in musical theatre are like their fellow performers (e.g., dancers) who choose to develop only one of the three components of musical theatre, but they differ from those other artists in their need to pursue excellence in all three areas simultaneously. Investigators in molecular neuroscience and genetics have begun to consider the traits that characterize the performing artist on different levels, from studies of genetic phenotypes to psychological assessments.

1.1 Genetic Expression and Performing Arts

The possibility of a molecular genetic predisposition toward professional dance ability was first examined by Bachner-Melman and colleagues (2005).

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Genetic studies using musicians (Zatorre & McGill, 2005) and athletes (MacArthur & North, 2005; Scott, Wilson, Goodwin, Moran, Geogiades, et al., 2005; Wolfarth, Bray, Hagberg, Perusse, Rauramaa, et al., 2005) were already underway, and research into the neuroscience of music, especially the interplay between genetics and environment (Gregersen, Kowalsky, Kohn, & Marvin, 2001), also provided a foundation for the study of dancers.

The social communications aptitude measured by Cloninger's Tridimensional Personality Questionnaire (TPQ™) indicates an association between AVPR1a (a receptor for arginine vasopressin) and the TPQ™ Reward Dependence scores, which measures need for social contact as well as openness to communication. Vasopressin is known to be involved in vertebrate courtship behavior where elements of song and dance are found (Hammock & Young, 2004; Williams, 2001). In humans, vasopressin also plays a role in courtship, fidelity, and romance (Bartels & Zeki, 2004; Ebstein, Knafo, Mankuta, Chew, & Lai, 2012). Bachner-Melman et al. (2005) concluded that "the two genes identified with dancing in humans are likely involved in the emotional side of dance rather than in the sensorimotor mechanics of this complex phenotype" (p. 400). Singers have also been the topic of studies into the presence or absence of the AVPR1a and SLC6A4 polymorphisms. Gene association with choral singing has been documented (Morley et al., 2012). Researchers have also found evidence of association between tests of musical aptitude and the AVPR1a haplotypes (Ukkola, Onkamo, Raijas, Karma, & Järvelä, 2009). Musicians have been provisionally observed to have an association between the AVPR1a and the SLC6A4 genes and scores on Cloninger's TPQ™ (Granot, Frankel, Gritsenko, Lerer, Gritsenko, Bachner-Melman, et al., 2007).

The AVPR1a and SLC6A4 genes are not the only genetic predictors of artistic ability. Genetic researchers expanded on the work of Bachner-Melman and colleagues (2005) to compare performing artists (theatre, dance, and music) with non-artists (novices). Their preliminary study ($N = 94$) considered the roles of the DRD4 receptor gene and the COMT, two genes associated with the dopaminergic pathway and, hence, the mediation of "reasoning, reward, pleasure, motor processing, and perseverance" (Berens, Nelson, Petitto, & Dunbar, 2008). Bachner-Melman et al. (2005) had earlier indicated a need for further research into the DRD4 in her group's study of creative performance in dance. Performing artists were significantly more likely to exhibit the long/short allele on the DRD4 bp 120 gene and the Val158Met allele on COMT.

In addition to genetic testing, Bachner-Melman and her group (2005) also compared dancers with athletes using psychosocial instruments, the TPQ™ and the Tellegen Multidimensional Personality Questionnaire (MPQ™), finding highly significant differences on the Absorption subscale of the MPQ™ ($ES = 0.72$ SD units) and the Cloninger Reward Dependence subscale ($ES = 0.68$ SD units). Absorption, according to Tellegen (1995, p. 1), represents a "disposition to enter under conducive circumstances psychological states that are characterized by marked restructuring of the phenomenal self and world. . . . They may have a 'sentient' external focus, or may reflect an inner focus on reminiscences, images, and imaginings." Based on the higher scores of dancers ($n = 85$, 3 males and 82 females) on these two instruments, the researchers looked closely at the genetic tests they had completed, finding an association between the AVPR1 and SLC6A4 genes and the results on the Absorption subscale. The researchers hypothesized that individuals with this polymorphism might be predisposed to "a greater ability for imagery and attention to stimuli (especially to musical stimuli)" as well as heightened spirituality, altered states of consciousness, and mystical or visionary experiences (Bachner-Melman et al., 2005, p. 399).

1.2 Psychological Traits and Performing Arts

Dancers, singers, and actors are specifically trained in the use of imagery, sense memory, and mental focus. Those most skilled in the ability to invest themselves totally in the experience of their performance (e.g., absorption) are often rewarded with success in the arts. In a highly competitive profession, those performers having the personality trait of absorption to a high degree may have an innate professional advantage because they can easily immerse themselves in characters and use imagery to add artistic depth to movements and gestures while using sensory memory in an environmental matrix of a created, learned and imagined world of theatre. Absorption may be a key factor in the ability of a performer to produce a believable performance through a sort of self-hypnosis in the moment of performance. The technique of renowned acting teacher Constantin Stanislavski relies heavily on a "true inner creative state, action and feeling," for example (Stanislavski, 1924).

The early literature on absorption was reviewed by Roche and McConkey (1990), who noted the importance of the trait to subjective experiences, and described the absorption in terms of "(a) hypnosis and hypnotizability, (b) imagery, daydreaming, and consciousness, and (c) attentional processing and psycho physiological responding" (p. 91).

Others interpreted absorption as “a state of ‘total attention’ during which the available representation apparatus seems to be entirely dedicated to experience and modeling the attentional object” (Tellegen & Atkinson, 1974, p. 274). Kihlstrom (2012) notes an additional distinction in that absorption has also been linked to the more inclusive trait, openness to experience. Studies of twins further suggest that the factor of absorption is influenced by genetics (Tellegen, Lykken, Bouchard, Wilcox, Segal, & Rich, 1988).

The question, then, arises as to what sorts of psychological traits might be necessary or helpful to students who are willing to forego better prospects of steady employment in other careers in order to pursue a degree and possibly a career in musical theatre. The main question posed in the study was this: would TAS and TPQ™ scores of musical theatre performers differ from the scores of dancers in the Bachner-Melman et al. (2005) study? Therefore, in this study, the following hypothesis was tested: a group of musical theatre performers taking the TAS and TPQ™ will score differently than did the dance performers in the Bachner-Melman et al. (2005) study.

2. Method

2.1 Participants

Male and female students aged 18 to 22 years old enrolled in a pre-professional musical theatre major program at an upstate New York university and self-selected volunteers from the professional world of musical theatre participated in this study. Some of the college students had begun professional careers, mainly working in summer stock musical theatre productions in the United States. The participants for the study were solicited via handouts in musical theatre major classes, flyers posted near musical theatre classrooms, postings on social media, and postings at Broadwayworld.com, a site catering to theatre professionals and aspiring professionals.

2.2 Measures

Tellegen Absorption Scale (TAS; Tellegen, 1974)

The TAS is a part of the Tellegen Multidimensional Personality Questionnaire (MPQ)™, an unpublished test copyrighted in 1995 and 2003. The original TAS is a dichotomous true/false scale containing 34 questions. Population normative studies have not been done for the TAS (Herbert, 2011; Kihlstrom, 2012). However, Kihlstrom (2012) notes that experience with college student samples, it appears the average score on the dichotomous version is 20 (SD ~ 6).

As measured by Tellegen, the following nine content areas are identified: “(a) is responsive to engaging stimuli, (b) is responsive to “inductive” stimuli, (c) often thinks in images, (d) can summon vivid and suggestive images, (e) has “crossmodal” experiences (e.g., synesthesia), (f) can become absorbed in own thoughts and imaginings, (g) can vividly re-experience the past, (h) has episodes of expanded (e.g., ESP-like) awareness, and (i) experiences altered states of consciousness” (Kihlstrom, 2012, pp. 2-3).

The TAS was administered to participants as a pilot study in a musical theatre class in November, 2012, and musical theatre students were found to score significantly higher on the instrument ($p < .05$, $df = 1$, $L = 10.48$) than did the professional dancers in Bachner-Melman’s 2005 study.

Tridimensional Personality Questionnaire (TPQ™; Cloninger, 1990)

The TPQ™ is a personality test that measures the dimensions of and is thought to reflect the neurotransmitter activity of (a) Novelty Seeking (dopaminergic system), (b) Harm Avoidance (serotonergic system), and (c) Reward Dependence (noradrenergic system). There are 100 true/false items on the paper and pencil version TPQ™ (Bagby, Parker, & Joffe, 1992; Cloninger, Przybeck, & Svrakic, 1991).

Due to the time required for scoring and reporting and the expense of licensing and scoring the TPQ™, that instrument was only used in the main study and not the pilot study.

2.3 Procedures

Solicitation of participants was made via flyers and in-class announcements for the musical theatre students, and professional performers were solicited via BroadwayWorld.com bulletin boards. Some professionals heard about the survey from others and wrote to ask if they could take the survey.

Professional credits were checked against resumes to ensure that professionals had a minimum of five years' experience as a professional musical theatre performer. Participants were given the choice of taking the surveys online through Select Survey or in person. All participants chose to complete the surveys online. Basic demographic data (status as musical theatre student or professional performer, gender identity, and racial identity) was gathered for use in analysis. The surveys were divided for ease of analysis, with IP addresses used to link respondents from survey to survey. The data were entered into SPSS 19 for analysis (see Data Analysis, below). In the case of the TPQ™, which must be scored offsite, online results were coded (as were the other survey responses) to preserve anonymity, exported to an Excel spreadsheet, and sent for scoring. The order of the surveys was TAS followed by the TPQ™.

2.4 Data Analysis

The Bachner-Melman (2005) study of dancers published mean scores for the TAS and for the three difference dimensions of the TPQ™ (Bachner-Melman et al., 2005, p. 397, Table 4). A one-sample two-tail *t*-test was used to compare the means of the results of the TAS and TPQ™ portions of the Bachner-Melman et al. (2005) study with the means of the sample of musical theatre performers as a whole. A one-sample two-tail *t*-test was also used to compare the Bachner-Melman et al. (2005) results with professional performers and with students as distinct groups. To compare the mean scores of musical theatre students with those of the professional musical theatre performers, a two-tail *t*-test was used. The confidence level throughout the analyses was set at 95%.

The results of the TAS were also analyzed using two-tail *t*-tests comparing students to professionals on Tellegen's (1995) Subscale 1 (Sentient, 11 items) and Subscale 2 (Prone to imaginative and altered states). The students and professionals were further compared on the basis of six more specific factors: (1) Responsiveness to engaging stimuli (7 items); (2) Synesthesia (7 items); (3) Enhanced cognition (7 items); (4) Oblivious/dissociative involvement (6 items); (5) Vivid reminiscence (3 items); and (6) Enhance awareness (4 items; Tellegen, 1995).

3. Results

All participants took the surveys online. Not all participants completed all three surveys, and a small number of participants declined to provide demographic information. An overwhelming 97% of those who answered the question of racial identity identified themselves as White/Caucasian. Only one student participant (3%) identified herself as Hispanic/Latina. As shown in Table 1, for each survey, roughly two-thirds of responses came from women, and on average, 57% of responses were from professionals.

Table 1. Participant Career Status and Gender Identity

Status	TAS	TPQ	Grit Scale
N (male/female)	30 (11/19)	28 (10/18)	26 (9/17)
Student (male/female)	12 (2/10)	12 (2/10)	11 (1/10)
Professional (Total)	18	16	15
Professional 5-10 yrs.	5	4	3
Professional 11-20 yrs.	6	6	6
Professional 21+ yrs.	7	6	6
Duplicate (deleted)	1	1	1

3.1 Tellegen Absorption Scale (TAS) Statistical Analyses

The mean score ($n = 30$) on the TAS was 22.90 out of a possible 34. The students in this study scored higher on the TAS ($M = 26.00$, $n = 12$) than did the professionals ($M = 20.83$, $n = 18$). Before testing the hypothesis, the results were analyzed further to determine whether the professionals and students in the study constituted a statistically homogenous group. The differences between the groups were statistically significant ($p < .05$).

3.1.1 Evaluation of Hypothesis for the TAS

The researcher then compared the study group as a whole to the result obtained in the Bachner-Melman (2005) study of professional dancers, in which the mean score on the TAS was 21.05. Using a one-sample *t*-test and the mean TAS score of this study's participants (22.90 ± 6.47 ; $p = .128$, $d = .27$).

When students' scores were separated from those of professionals, however, the students' scores ($M = 26.00 \pm 6.05$) were statistically significantly higher than those in the Bachner-Melman (2005) study ($p = .016$, $d = .76$). Therefore, as far as the TAS is concerned, the hypothesis is partially supported (with a large effect size) if students are considered as a separate group, but it is not supported if the entire study group of musical theatre performers is compared with the dancers of Bachner-Melman's (2005) sample.

3.1.1.1 Further Investigation of TAS Results

Having determined that partial significant difference exists between the dancers in the Bachner-Melman (2005) study and the musical theatre performers of this study, another possibility was considered. Further investigation into the data revealed some differences between the students and professionals which might be found in the subscales and factors of the TAS results. Two-tailed t -tests were used to compare means of those populations on both Subscale 1 (Sentient) and Subscale 2 (Prone to Imaginative or Altered States), as well as on six factors: (1) Responsiveness to engaging stimuli; (2) Synesthesia; (3) Enhanced cognition; (4) Oblivious/dissociative involvement; (5) Vivid reminiscence; (6) Enhanced awareness.

On Subscale 1 (Sentient), no significant difference was found between the students ($n = 12$, $M = 7.11$) and the professionals ($n = 18$, $M = 8.67$). However, the results of Subscale 2 (Prone to Imaginative or Altered States) indicated that students scored significantly higher ($M = 13.83$) than did professionals ($M = 10.67$, $p = .025$).

As for the analysis of the factors, t -tests of the student and professional population means for factors two (Synesthesia), three (Enhanced cognition) and five (Vivid reminiscence) revealed no statistically significant differences. Students scored significantly higher on the other three factors.

3.2 Tridimensional Personality Questionnaire (TPQ™) Statistical Analyses

The structure of scales and subscales of the TPQ™ is outlined below. For this study, special attention was paid to the means in the overall Novelty Seeking (NS), Harm Avoidance (HA), and Reward Dependence (RD) scales, but also to RD2, the subscale that measures persistence versus irresoluteness. Since the TPQ™ itself could not be reproduced under the license that permitted the researcher to use it for this study, the descriptions below help to describe the test categories and contextualize the results.

Furthermore, as noted in the review of the literature, gender differences have been noted in the TPQ™, with men scoring higher in NS and lower in HA and RD (Cloninger et al., 1991, p. 1051). The U.S. norms for Caucasians by gender are included in Table 2.

Table 2. TPQ™: Comparison Scale and Subscale Means from Three Studies

	Current Study		Bachner-Melman et al., 2005*		Cloninger et al., 1991**	
	$n = 30$ (11 m, 19 f)		$n = 85$ (3 m, 82 f)		$n = 676$ (326 m, 350 f)	
	$p < .05$		$p < .0001$		$p < .01$	
	M	SD	M	SD	M (male)	M (female)
NS	17.50	± 6.06	16.73	± 4.64	13.70 ± 5.20	13.00 ± 4.90
HA	16.83	± 5.92	13.33	± 5.87	10.60 ± 6.00	12.90 ± 6.10
RD	13.87	± 4.23	15.79	± 2.73	18.50 ± 4.30	20.10 ± 3.80
RD2	6.07	± 1.29	6.11	± 1.89	5.60 ± 2.00	5.60 ± 2.00

Note. *Adapted from "AVPR1a and SLC6A4 Gene Polymorphisms Are Associated with Creative Dance Performance," by Bachner-Melman et al, 2005, *PLoS Genetics*, 1(3), p. 0397. Copyright 2005 Bachner-Melman et al. **Adapted from "The Tridimensional Personality Questionnaire; U.S. Normative Data," by C.R. Cloninger, T.R. Przybeck, and D.M. Svrakic, 1991, *Psychological Reports*, 69, p. 1051. Copyright 1991 Psychological Reports.

To compare the average scores of musical theatre performers to the average scores of the dancers in the Bachner-Melman (2005) study on these three scales and subscale RD2, a series of one-sample *t*-tests was conducted. No statistically significant difference was found in the Novelty Seeking Scale results. For Harm Avoidance, however, musical theatre performers scored significantly higher than did the dancers in the Bachner-Melman (2005) study ($p = .003$, $d = -.59$). When separated into student and professional groups, the musical theatre students were not found to be significantly different from the dancer sample, but the mean of the musical theatre professionals was even higher ($M = 18.28 \pm 6.33$, $p = .004$).

Musical theatre performers scored lower, on average, than did the dancers ($p = .019$, $d = .55$) on the Reward Dependence Subscale. No significant differences were found between dancers and musical theatre performers on the RD2 subscale measurement of perseverance.

3.2.1 Evaluation of Hypothesis for the TPQ™

With no statistically significant difference shown between musical theatre performers and dancers in the Novelty Seeking Scale, but significant differences apparent in the Harm Avoidance and Reward Dependence Scales, the null hypothesis is partially rejected insofar as this sample demonstrates.

1. Discussion

The purpose of this study was to collect psychological data about the personality traits of American professional and pre-professional musical theatre performers, to compare specific survey results from the TAS and TPQ™ to the results previously gathered on a study of dancers (Bachner-Melman et al., 2005), and to consider possible inferences to genetic markers that may be present in musical theatre performers based on the findings. Genetic testing was beyond the scope of the current study due to limited resources. The data obtained from the psychological tests should be of value to researchers and educators who, heretofore, have not had access to scientific psychological data on artists in this branch of the performing arts.

Personality traits of American student and professional musical theatre performers were studied using the Tellegen Absorption Scale (TAS; $N = 30$) and the Cloninger Tridimensional Personality Questionnaire™ (TPQ™; $N = 28$) subscales of Novelty Seeking (NS), Harm Avoidance (HA), and Reward Dependence (RD). The scores on the TAS and TPQ™ were compared to the results of a previous study of dancers (Bachner-Melman et al., 2005; $N = 85$) using a series of one-sample *t*-tests. The TAS score of this study's participants ($M = 22.90 \pm 6.47$) was compared to that of the dancers ($M = 21.05 \pm 6.99$; $p = .128$, $d = .27$). No statistically significant difference was found in the NS subscale comparison. For HA, musical theatre performers scored significantly higher than did dancers ($p = .003$, $d = -.59$). Musical theatre performers scored lower than dancers ($p = .019$, $d = .55$) on the RD subscale. No significant differences were found between dancers and musical theatre performers on the RD2 subscale measurement of perseverance.

The musical theatre performers in this study scored differently than the dancers in the Bachner-Melman et al. (2005) study, but only in some populations or some parts of the tests. In the TAS, the results only indicated a difference if students were separated from professionals, and when they were different, the musical theatre students scored higher than the dancers. Students also scored higher than professionals on the Prone to Imaginative and Altered States subscale as well as in three smaller factors: 1) Responsiveness to Engaging Stimuli, 2) Oblivious/Dissociative Involvement, and 3) Enhanced Awareness.

In the TPQ™, the largest difference between dancers and musical theatre performers was found in the HA dimension, wherein musical theatre performers (particularly professionals) scored higher than did the dancers. No statistical difference was found between dancers and musical theatre performers in the NS dimension, but dancers scored higher than did musical theatre performers on RD dimension. When considering only the subscale measuring perseverance versus irresoluteness, there was no difference between dancers and musical theatre performers. The high scores of students on the TAS may indicate the presence of a short SLC6A4 promoter polymorphism, which the literature indicates can result in altered serotonin levels (Bachner-Melman et al., 2005, p. 399). Only a future study with genetic testing would be able to add more insight. However, the fact that the scores of the musical theatre performers are not significantly different from those of the dancers is a preliminary indication that the genetic marker SLC6A4 may well exist in musical theatre performers. The lower scores of musical theatre performers on the RD dimension of the TPQ™ could point toward a more complex level of genetic manifestation.

If social communication is part of the genetic arginine vasopressin transmission sites, there may be an interesting connection to the most basic difference between the dancer and the musical theatre performer: the use of the voice. There are dances that use vocalizations and text, but the majority of dance performances do not include the use of the dancers' voices.

The higher scores of musical theatres (compared to dancers) on the HA subscale of the TPQ™, indicating high levels of worry, fears, and shyness, may seem counterintuitive to those who associate musical theatre performers with extroverted natures. However, formal (Stacey & Goldberg, 1953) and informal anecdotal evidence indicates that many professional actors are shy, and the speculation is that a script and direction removes social obstacles and awkwardness while allowing a performer to become the character.

The fact that high scores on the HA dimension were not also found in dancers, however, sets forth an intriguing question relative to the relationship to the courtship behaviors Bachner-Melman et al. (2005) speculated were at the base of the tendency of dancers to exhibit specific genetic markers correlating to personality traits (p. 400). It may be that the musical theatre performers would exhibit specific neural pathways linked to dopamine, such as the COMT, the DRD4, or the DRD5 genes, exposing further connections such as those found by Berens et al. (2008). According to those researchers, dopamine is part of the motivation and reward (or reinforcement) cycle, and is also linked to attention and memory. There is no way to know without further genetic testing related to personality psychometrics such as the TPQ™.

The fact that the musical theatre performers also tested lower than the general population on the TPQ™ RD subscale (measuring sentimentality, perseverance, sensitivity, and attachment) points to several possible explanations. Performers have a low incidence of success in the audition process, a need to be able to take sometimes harsh criticism, an often nomadic lifestyle, and a life normally filled with temporary relationship situations as the performer moves from show to show. It makes sense that they would be better adapted to rejection, criticism, and life on the road if they have a weaker tendency toward strong emotional bonds. It is unclear whether different types of AVPR1a gene, or another performance-related gene might be correlated to musical theatre performers' scores on the RD scale of the TPQ™.

4.1 Pedagogical Considerations

In practical terms, there are immediate and possible future applications of the results. For example, one of the factors of the TAS is Factor 4, Oblivious/Dissociative Involvement. This was one of the factors in which student musical theatre performers scored high, even higher than did professionals (perhaps because professional performers are faced with issues of everyday living from which students are relatively insulated). Maintaining the inner focus that feeds the capacity for absorption may be possible using exercises such as those described in Cameron's (1992) *The Artist's Way: A Spiritual Path to Higher Creativity*. This researcher regularly trains younger musical theatre performers using a distraction game to test and improve their ability to dissociate from performance distractions (such as falling chairs and crying babies). Students who may be lacking in Factor 5 of the TAS (Vivid Reminiscence) may be helped by Stanislavski's sense memory exercises or by imagery exercises such as those in Franklin's (1996) *Dance Imagery for Technique and Performance*.

A better awareness of the TPQ™ traits of musical theatre performers may give faculty who work with musical theatre performers more insight into the fears and unique character of this population. For example, a commonly used technique in acting classes is the inclusion of trust exercises, designed to induce a feeling of safe space for performers. However, if those types of exercises are used only as ice breakers at the beginning of a course and trust training does not continue, some students may not adequately overcome fears that inhibit their ability to perform in intimate settings like the typical acting studio. Knowing that many musical theatre majors likely are prone to shyness, professors may do well to continue to include confidence-building exercises into the curriculum in a logically developed sequence. Training and encouraging musical theatre performers to maintain their passion and capacity for perseverance can partially be accomplished within musical theatre programs.

Teaching students to set short- and long-term goals and to engage in reflective self-evaluation of their progress is an important part of their education and can help them develop better habits of persistence. However, there are more subtle motivational energies at work in an educational performing arts program. Peer acclaim, being cast in shows, and achieving good grades in musical theatre classes can enhance motivation and boost persistence in the major, but students also need to be taught to capitalize on the opportunities and challenges brought about by failure. The findings in this study indicate that musical theatre performers are, in fact, persistent, so finding ways to nurture and maintain that personality quality should be part of comprehensive education for a career in musical theatre.

4.2 Recommendations for Future Research

The results of this study lay groundwork for a rich vein of potential studies on musical theatre performers. These practical applications based on the research are just a few of the ways in which the theory and data can help practitioners and theoreticians understand the broader topic of somatic connections in the performing arts. Whether the topic is pursued at the abstract or practical level, at the student or professional career phase, or from the point of view of genetics or psychology, the dearth of information must be acknowledged.

Two logical next directions in this research are suggested by the results of this study in the context of the previous studies in the psychology of artists, and the presence or absence of genetic markers that appear to correlate with those tests. One possible research path would be to administer the revised TPQ™ to musical theatre performers, to see whether the P scale of that instrument would give different results for perseverance. A second avenue of research would require genetic testing for different types of the AVPR1a gene or other artistic performance-related genes. The goal of that study might be to see if the presence or absence of such genetic markers correlated to musical theatre performers' scores on the TPQ™.

So little research has been done on the personality characteristics of musical theatre performers that opportunities for basic and applied research are abundant. The gathering and disseminating of information about this population can continue to inform pedagogical practice, lifelong support systems, and appreciation for the elusive spark that ignites the musical theatre performer.

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