



# Musical Anhedonia

German Version of the Barcelona Music Reward Questionnaire (dtBMRQ):  
A validation study and associations with other personality traits.

## INTRODUCTION

### Definiton „Musical Anhedonia“

„a selective lack of pleasure from music“ (Belfi & Loui, 2019)

measurement possible with BMRQ (Mas-Herrero et al., 2013)

### Undertaking

translation + validation of German version of BMRQ  
associations with personality traits  
(OCEAN-model, Behavioural Inhibition + Activation System)

### Relevance

- cognitive, social, emotional functions of music, f.e. emotional regulation
- possible constraints of people with musical anhedonia?
- emotional compensation with other strategies possible?
- caused by **organic diseases**, f.e. brain lesions; normally not included in diagnostics
- association with/reason for **psychiatric diseases**, f.e. depression?
- **necessary foundation** for further German research & clinical use: German measuring

## METHODS

### Questionnaire Development

forward translation (EN > GER) by two German native speakers

backward translation (GER > EN) by one English native speaker

comparison original vs. backward translated items  
aim: sufficient congruence

### Data Acquisition

- online via SoSci-Survey
- survey parts:
  - consent form, conditions of participation
  - instructions
  - demographic questionnaire (age, gender, socioeconomic status, (musical) education, language)
  - BIS/BAS: 24 items (Strobel et al., 2006)
  - OCEAN: 10 items (Gosling et al., 2003)
  - dtBMRQ: 20 items on Likert-scale 1 to 5 (1: fully disagree; 5: fully agree)
- no monetary compensation

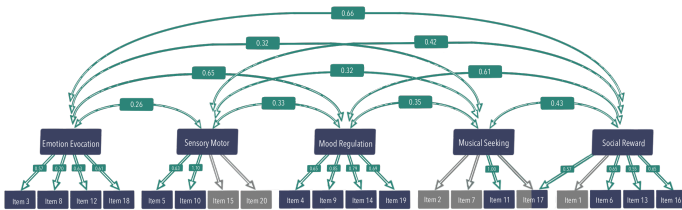
### Item examples

- Ich höre mir gerne emotionale Musik an. (emotional evocation)
- Musik sorgt oft dafür, dass ich tanze. (sensory motor)
- Musik hilft mir, mich zu entspannen. (mood regulation)
- In meiner Freizeit höre ich kaum Musik. (-) (musical seeking)
- Musik verbindet mich mit anderen Menschen. (social reward)

### Sample

- sample size: n = 471
- criteria for participation:
  - C2-level/native German speakers,
  - minimum of 18 years old,
  - no brain lesions
- age: M=24.72, SD=9.34, MIN=18, MAX=71
- gender: 16.4% male, 81.75% female, 1.9 various
- language: 100% German
- home country: 98.1% Germany, 1.9% other
- musician:
  - 39.1% non-musician, 55.4% amateur, 5.5% professional
  - education: 0.2% secondary school, 79.4% high school, 7.2% bachelor, 5.5% master, 2.6% diploma, 5.1% other

## Model Structure



## LITERATURE

Gosling, S. D., Rentfrow, P. J. & Swann, W. B. (2003). A very brief measure of the Big-Five personality domains. *Journal Of Research In Personality*, 37(6), 504-528. [https://doi.org/10.1016/s0092-6566\(03\)00046-1](https://doi.org/10.1016/s0092-6566(03)00046-1)

Hair, J. F. (2009). *Multivariate data analysis*. (7th ed.). Prentice Hall.

Mas-Herrero, E., Marco-Pallarés, J., Lorenzo-Seva, U., Zatorre, R.J., & Rodríguez-Fornells, A. (2013). Individual Differences in Music Reward Experiences. *Music Perception*, 31, 118-138. <https://doi.org/10.1525/mp.2013.31.2.118>

Strobel, A., Beauducel, A., Debenar, S., & Brocke, B. (2006). Eine deutschsprachige Version des BIS/BAS-Fragebogens von Carver und White. *Zeitschrift für Differentielle und Diagnostische Psychologie*, 22(3), 216. <https://doi.org/10.1024/0170-1789.22.3.216>

ten Berge, J. M., Kumar, V., & Groenen, P. J. F. (2021). Some new results on correlation-preserving factor scores prediction methods. *Journal of Multivariate Analysis*, 180, 104649.

Wang, J., Xu, M., Jin, Z., Xia, L., Lian, Q., Huiyang, S., & Wu, D. (2023). The Chinese version of the Barcelona Music Reward Questionnaire (BMRQ): Associations with personality traits and gender. *Music Science*, 27(1), 218-232. <https://doi.org/10.1177/10298649211034547>

## RESULTS

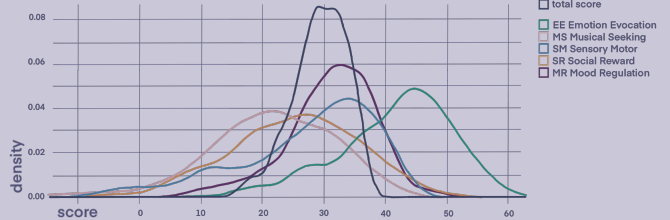
- data analysis in R-Studio (version 2024.04.2+764)

### Confirmatory Factor Analysis for dtBMRQ

- omitting of **missing values** for data quality + feasibility
- data **suitability** for CFA tested with Kaiser-Meyer-Olkin-test: 0.88 (acceptable)
- CFA with adopted structure (Mas-Herrero et al., 2013), **fit indices: not satisfactory**
  - > modification with suggested modification indices
- exploratory factor analysis
  - > **omitting of 4 items** with inadequate factor loading (<0.45) (Hair et al., 2009)
- second CFA with adjusted structure, **better fit indices**
- power: omitting of **cross-loading item 2**
- variance explanation: 44.62%**
- factor loading of 5 factors in interval [0.40|0.88]**

### dtBMRQ Values & Density Distribution

factor values:	M	SD
- calculated with method suggested by ten Berge et al. (1999)	total	
- averages: in interval [21.56 53.23]	- weighted	29.33 4.40
(lowest Musical Seeking, highest Emotion Evocation)	- unweighted sum	78.11 11.82
<b>total value:</b>	MS	21.56 10.31
- weighted total value, M = 31.68, SD = 4.83	EE	41.49 9.40
- possible categorization of person as musically	MR	31.15 7.34
anhedonic (< 31.68-4.83) / hedonic (> 31.68+4.83)	SM	27.18 11.33
→ <b>15.71%</b> of sample classified as <b>anhedonic</b>	SR	25.28 10.67



### Validation for dtBMRQ

- internal consistency:**
  - Cronbach's Alpha acceptable
  - EE:  $\alpha=0.71$ ; SM:  $\alpha=0.82$ ; SR:  $\alpha=0.82$ ;
  - MS:  $\alpha=0.68$ ; SB:  $\alpha=0.68$
- convergent validity:**
  - average variance extracted/AVE with mixed results
  - EE: 0.392; SM: 0.810; SR: 0.540; SB: 0.348
  - no result for MS (2 items necessary)
- composite reliability/CR:**
  - EE: 0.613; SM: 0.617; SR: 0.691; SB: 0.68

### Correlations with BIS/BAS / Big Five

	BAS 1	BAS 2	BAS 3	BIS
<b>total</b>	0.10	0.25***	0.31***	0.11
MS	0.05	0.20***	0.18***	0.09
EE	0.07	0.04	0.26***	0.17**
MR	0.02	0.04	0.10	0.06
SM	0.10	0.16**	0.07	0.03
SR	0.00	0.14*	0.16*	-0.07

	O	C	E	A	N
<b>total</b>	-0.06	0.15**	0.19***	0.10	-0.05
MS	0.00	0.19***	0.12	0.05	0.03
EE	-0.02	0.05	0.05	0.05	-0.05
MR	-0.12	0.02	-0.07	-0.07	0.10
SM	-0.01	0.03	0.07	0.07	-0.13
SR	-0.03	0.06	0.24***	0.11	-0.03

### T-Test for Genders

men vs. women  
significant result (men more musically anhedonic)

O - Openness  
C - Conscientiousness  
E - Extraversion  
A - Agreeableness  
N - Neuroticism  
BAS 1 - Drive  
BAS 2 - Fun Seeking  
BAS 3 - Reward Responsiveness

### Fit Indices for BIS/BAS questionnaire & final dtBMRQ

- CFI = 0.841, RMSEA = 0.064, SRMR = 0.069
- already validated (Strobel et al., 2006) > acceptable fit indices
- internal consistency, AVE, CR not satisfactory
- CFI = 0.926
- RMSEA = 0.067
- SRMR = 0.052

## DISCUSSION

- similarities with Chinese version (Wang et al., 2013)  
(no replication of factor structure (Mas-Herrero et al., 2013))
- acceptable **quality criteria**, satisfactory **construct validity**
- variance explanation (44.62%) higher than other validation studies
- differences between **cultures**, **genders** found
- **BIS/BAS**: no evidence for integration in model
- **Big Five**: significant correlations for extraversion, conscientiousness
- further **research opportunities**:
  - replication of factor structure
  - **distribution** of musical anhedonia and its factors for more representative sample
  - differences between **cultures**, **genders**, correlations with **OCEAN-variables**
  - associations with **psychiatric disorders**, e.g. Major Depression
- **methodical basis** for research in German areas established
- **first classification guide value**

