Investigating the Music in our Heads – a One Day Symposium at Goldsmiths

InMI as an unconditioned response: exploring the possibilities

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Contributing Factors for InMI

- Williamson et al (2011) categories
  - Exposure (recent, repeated)
  - Memory triggers (association, recollection, anticipation)
  - Affective states (mood, stress, surprise)
  - Low attention states (dreams, mind wondering)
- Schizotypy behaviour: systematic failure in mental control (Beaman and Williams, 2010, 2013)
- Neuroticism Personality traits (Floridou, 2012)

Increased earworms in musical individuals (Williamson, 2011; Liikkanen,2012, Bailes, 2008)

Byron and Fowles, 2013, familiarity predicts InMI

Definitions

	Definition	Reasoning/ Main factors	Other
Liikkanen (2009; 2011)	InMI	music activities/playing	women more prone
Williamson et al (2011)	InMI / earworms	recent exposure and memory triggers	also low attention /affective states
Floridou et al (2012)	InMI / earworms	Personality/ neuroticism	
Bailes (2007)	musical imagery	recent exposure	To musicians
Byron & Fowles (2013)	InMI	repetition and recency	
Wammes & Baruss (2009)	Spontaneous musical imagery	personality	negative to musically engaged individuals
Beaman & Williams (2010 , 2013)	Earworms/ InMI	musical as being important Personality	negative-repeated- annoying Schizotypal personality
Halpern & Bartlett (2011)	Earworms	triggers	Mostly pleasant experience

Definition of InMI

- Earworms loop: ‘tune comes unbidden and repeated’
- Pop-ups : ‘music playing in the background’

All InMI is taken into consideration.

Role of training in daily life

Music listening : Systematic music listening, with specific uses of music (Krause & North, 2014)

Music association: Madeleine effect

Training effect

- To what extent is InMI a product of training through music listening habits?

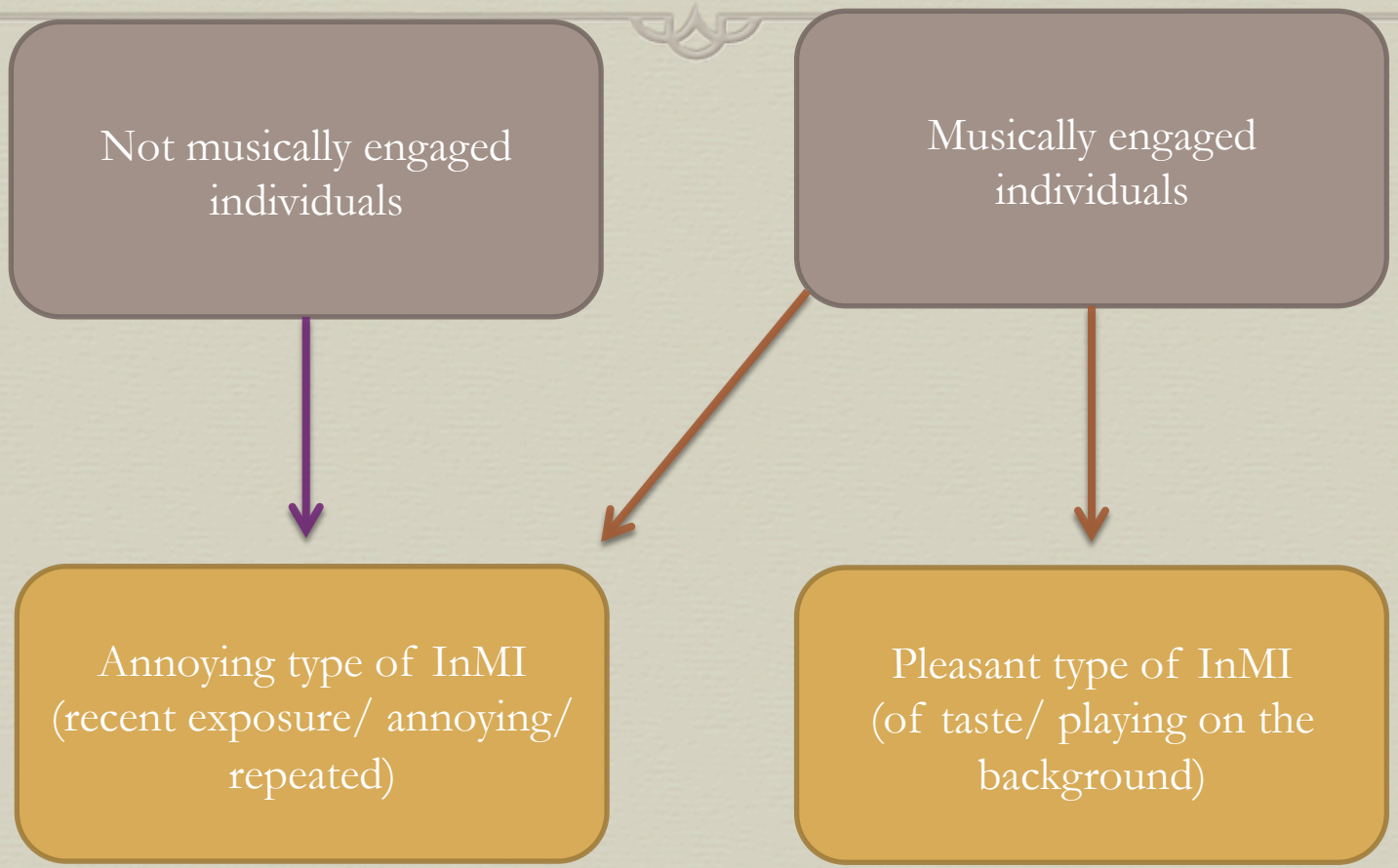
Hypothesis

InMI is the Unconditioned Response of the conditioning through music experience

Predictions:

- InMI experience will depend on music listening behaviour/ habits of each individual.
- Musically engaged individuals→ mainly InMI of their taste
- Non musically engaged individuals→ mainly stuck in mind tunes (out of recent/repeated exposure)

Hypothesis



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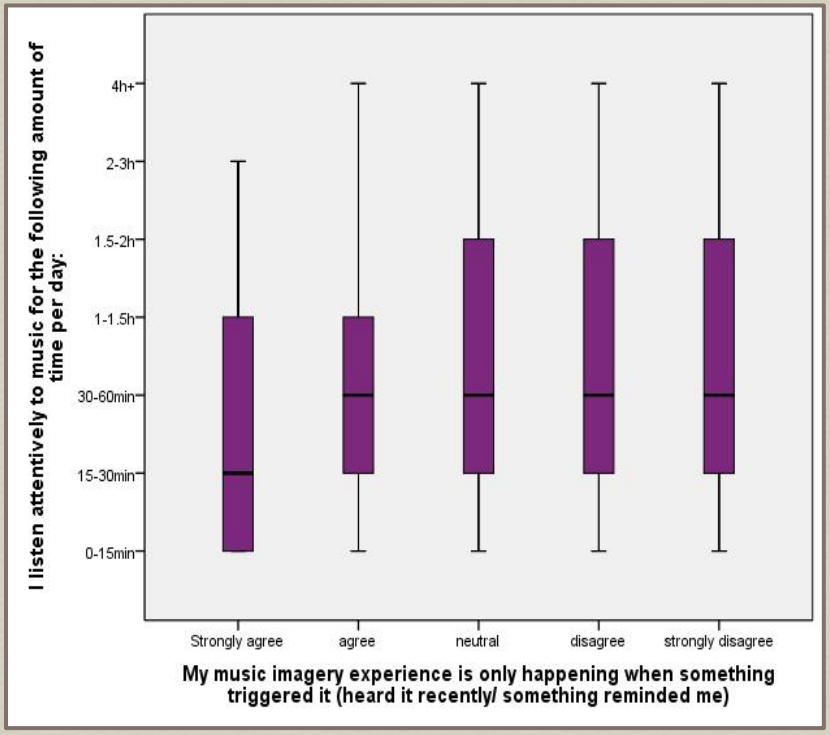
Previous study



- Data from 2013 study (*N*=401)

Online questionnaire (*N*=401)

- InMI when want to listen to music, 60.75%
- InMI affected by music listening, 73.89%, *N*=360

Correlations:

- Music in combination with activities ~ InMI while doing these activities ρ = .23, *N*=344, *p*<.001
- Pleasantness of the InMI ~ musical engagement, ρ = .23, *N*= 401, *p*<.001
- InMI only upon trigger ~ musical engagement, ρ= -.12, *N*=401, *p*<.05

Diary (*N*=11)

- InMI relation with activities
- InMI act as a substitute for music
  - Matching moods

(Filippidi,2013)

Research questions

- Conditioning through everyday music listening.
  - Uses of music and InMI
- Investigate the link between certain activities/ situations and music/ InMI
- Create the environment for such an association

Experimental design 1

3x Training: 3 activities are coupled with 3 'sonic environments'

Material: Music  , Podcast  , Silence, all 1'33"

Activities: Puzzle, Socks, Yarn

1x Test: 3 activities are done in silence

Test: Are music or podcast imagined in respective activity?

Methods

- *N*=30
- Musical Background information was obtained
- 2 consecutive days: 3 training sessions and 1 test session
- After each task, brief questionnaire and break.
- The aim of the study was masked as "music and activities", and there were extra questions on the questionnaire, so to prevent bias, as much as possible.
- Same pair for each participant, different order of presentation.
- Different pairings across participants, randomized order of presentation.

Experimental set up

Participant 1	Day 1	Music+ Yarn	Silence+ Socks	Podcast+ Puzzle
		Silence+ Socks	Music+ Yarn	Podcast+ Puzzle
	Day 2	Podcast+ Puzzle	Silence+ Socks	Music+ Yarn
		Yarn	Puzzle	Socks
Participant 2	Day 1	Podcast+ Socks	Silence+ Yarn	Music+ Puzzle
		Silence+ Yarn	Podcast+ Socks	Music+ Puzzle
	Day 2	Music+ Puzzle	Podcast+ Socks	Silence+ Yarn
		Socks	Puzzle	Yarn

Expectations

- InMI related to music from session more in the activity previously paired with music, than in the other activities.
- No internal representation of Podcast (InPod).
- Possible correlation with music listening/ InMI of individual
  - Musically engaged individuals will experience more InMI

Results: Attention to auditory environment, InMI, or InPod

Music test condition: More InMI and acoustic environment than InPod

$Q = 10.5$, $df = 2$, $p = .005$, $N = 30$

Music Test	No	Yes
InMI related to session	20	10
InPod related to session	30	0
Attention to auditory env	22	8

Silent test condition: More acoustic environment and InMI than InPod

$Q = 8.8$, $df = 2$, $p = .012$, $N = 30$

Silent Test	No	Yes
InMI related to session	24	6
InPod related to session	29	1
Attention to auditory env	19	11

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Results: Attention to auditory environment, InMI, or InPod

Podcast test condition: No difference between types of attention/imagery

$Q = 2.2$, $df = 2$, $p = .336$, $N = 30$

Music Test	No	Yes
InMI related to session	25	5
InPod related to session	27	3
Attention to auditory env	23	7

Results: Imagery in music, podcast and silence condition

InMI in music, podcast and silence condition

Q= 4.2, df= 2, p= .122, N=30

InMI	No	Yes
Music test	20	10
Podcast test	25	5
Silence test	24	6

Attention to acoustic environment in music, podcast and silence condition

Q= 2.4, df= 2, p= .307, N=30

Attention to acoustic env.	No	Yes
Music test	22	8
Podcast test	23	7
Silence test	19	11

Results: Imagery in music, podcast and silence condition

InPod in music, podcast and silence condition

$Q = 3.5$, $df = 2$, $p = .174$, $N = 30$

InPod	No	Yes
Music test	30	0
Podcast test	27	3
Silence test	29	1

Discussion

- Small sample for a subtle effect
- Instrumental music- no lyrics
- Training sessions not enough to create an effect
  - Pilot was for 3 days→ more repetition.
  - Call back participants for another session (one day).
  - Case study with fewer participants and more repetitions (in more days)
  - Check back association (Byron and Fowles, 2013) with email after some days.

Implications on testing hypothesis.

Further exploration

Mood & listening

- InMI & mood

Thank you.

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