Auditory affective processing and the role of personality

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Ethical review	Approved WMO
Status	Recruitment stopped
Health condition type	Other condition
Study type	Observational non invasive

Summary

ID

NL-OMON35067

Source
ToetsingOnline

Brief title
Auditory affective processing

Condition

- Other condition

Synonym
Not applicable

Health condition

Het onderzoek heeft niet direct betrekking op een aandoening: het betreft onderzoek met gezonde proefpersonen

Research involving
Human

Sponsors and support

Primary sponsor: Universiteit Leiden
Source(s) of monetary or material Support: Ministerie van OC&W

Intervention

Keyword: Auditory, Emotion, MRI, Personality

Outcome measures

Primary outcome

The primary study parameter is the difference in brain activity (as measured with fMRI) between the experimental conditions. More specifically the primary study parameter is (1) for prosody, the difference in brain activity between the emotional and non-emotional prosodic task and (2) for the musical affective priming tasks, the difference in brain activity between congruent and incongruent trials.

Secondary outcome

Concerning the role of personality, the magnitude of the standardized regression coefficients (beta weights) of the personality scores in predicting the difference in brain activity between the above mentioned experimental conditions, serves as the measure of effect.

Study description

Background summary

Research on how the brain processes emotional information in the auditory modality is relatively sparse. Two prominent carriers of emotional information in the auditory modality are speech-prosody and music. The goal of the proposed study is to examine how the brain processes emotional speech prosody and music.

How we say things can be more important than what we say in conveying an emotional message. This prosodic layer of speech uses a variety of acoustic cues such as pitch, rhythm and spectral balance to convey emotional as well as non-emotional (linguistic-) information. Previous research suggests that a bilateral temporofrontal network with relative rightward lateralization is involved in the perception of emotional prosody. Two important questions regarding the neural correlates of emotional prosodic perception remain unresolved. Firstly, previous studies have almost exclusively presented emotional prosody only. This raises the question whether the proposed bilateral temporofrontal network is specifically involved with the extraction of emotional prosody or with prosodic processing in general (including linguistic prosody). Therefore in the present study emotional as well as linguistic prosody will be presented while brain activity is recorded with fMRI. This allows us to investigate which neural network is specifically involved in the perception of emotional prosody. Secondly, there is discussion concerning the nature of the relative right hemispheric lateralization that has been found during emotional prosodic processing. Two hypotheses have been proposed. Acoustic lateralization hypotheses propose that lateralization of prosodic prosodic processing is driven by the acoustic nature of the prosodic material. The functional lateralization hypothesis on the other hand posits that lateralization of prosodic processing is determined by the communicative function of the prosodic material: emotional prosodic processing is more lateralized to the right cerebral hemisphere while linguistic prosodic processing is relatively left lateralized. Testing these two hypotheses requires that either the nature of the acoustic material is held constant while the communicative function is being varied or vice versa. Therefore, in the present study identical prosodic material will be presented while the communicative function is varied and brain activity is measured with fMRI. This manipulation allows us to directly test the two hypotheses of lateralized prosodic processing.

Music uses a variety of acoustic parameters such as mode and tempo to convey emotional information as well. Does affective music (despite its artificial nature) interact with other affective stimuli? The so called *affective priming paradigm* offers a means to investigate this issue. In this paradigm subjects evaluate affective valence (positive versus negative) of a target stimulus: the target is preceded by an affective prime that can be affectively congruent or incongruent with the target. If participants need less time to judge the affective connotation of a target (e.g., the word SUN) if it is preceded by an affectively related prime (e.g., the word LOVE) an *affective priming effect* is found. Two mechanisms have been proposed as an explanation of the affective priming effect. The 'spreading of activation account' proposes that processing of emotional congruent targets is facilitated by the prime because activation of the prime spreads through a network of interconnected affective concepts, pre-activating the target and hence facilitating performance in congruent trials. The response competition account on the other hand, posits that an affective prime automatically triggers a response tendency that corresponds to

its valence. This leads to response facilitation (and hence superior performance) for targets with the same valence as the prime and to response competition if the valence of the target is different from the valence of the prime (i.e., a Stroop-like interference process). Note that the main difference between these two accounts is that the spreading of activation account assumes interaction of affective primes and targets at a conceptual level, while the response competition account assumes interaction at the response level. Using the affective priming paradigm a recent study claims to have found evidence for interaction between affective music and language on the conceptual level. Visually presented emotional words were presented and followed 200 msec later by chords that either sounded pleasant (positive) or unpleasant (negative). Participants had to judge whether the target chords were pleasant or unpleasant. An affective priming affect was found and contrasting incongruent with congruent conditions revealed activation in the superior temporal sulcus (STS) of the right hemisphere. Although the authors suggested that this affective priming effect and accompanying activation in the STS was the result of interaction of language and music on the conceptual level, note that response competition as an alternative explanation cannot be excluded. Therefore, in the present study two affective musical priming tasks will be used that present identical stimulus material but vary the possibility of response competition to occur while brain activity is recorded using fMRI This manipulation allows us to directly test which of the two proposed mechanisms is responsible for musical affective priming effects.

Although the primary goal of the proposed study is to examine the neural underpinnings of general affective information processing (that is stable between individuals) it is known that there are individual differences in affective processing. A better understanding of how personality traits modulate affective processing on the neural level could have implications for the prevention and treatment of affective disorders and is the secondary goal of the proposed study. A problem with previous research on this subject is that most studies have focused on the modulatory influence of only one personality trait on the neural mechanism of affective processing. This raises the question whether modulation of affective processing that has been found in earlier studies is trait-specific. Therefore the present study examines how three personality traits modulate affective processing on the neural level: trait-anxiety, pessimism and alexithymia.

Study objective

The primary goal of the proposed study is to examine the neural correlates of affective processing in the auditory modality. Specifically, the primary goal is to (1) examine which neural network is specifically involved in the perception of emotional prosody and how this network is lateralized and (2) investigate which mechanism underlies affective musical priming.

The secondary goal is to examine how personality traits modulate affective

processing on the neural level.

Study design

The proposed study uses a experimental within subjects design: every subject will participate in every experimental condition of the experimental tasks in random order while brain activity is recorder using (event related-) fMRI.
The role of personality will be examined by correlating scores on personality questionnaires with the brain activity elicited by the experimental tasks.

Study burden and risks

Functional magnetic resonance imaging (fMRI) is a non-invasive technique that has been used for decades without negative health consequences: there are no known risks involved in participating in a fMRI-study.

The only burden that is placed on the subjects is a two hour investment of their time. This time investment consists of a single 2 hour visit to the LUMC. The two hours will be spent on practice of the experimental tasks outside the scanner (15 minutes), performing the tasks in the scanner (one hour) and filling in the personality questionnaires (30 minutes). Subjects will be compensated for their efforts with 10 euros per hour .

Contacts

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age
Adults (18-64 years)
Elderly (65 years and older)

Inclusion criteria

Adult (18-35), right handed, native speakers of Dutch are eligible for participation.

Exclusion criteria

Participant with a neurological disorder, current psychiatric disorder, hearing disorder or contra-indications for the participation in MRI-research will be excluded

Study design

Design

Study type:	Observational non invasive
Intervention model:	Other
Allocation:	Randomized controlled trial
Masking:	Open (masking not used)
Control:	Active
Primary purpose:	Other

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	01-10-2010
Enrollment:	24

Type:	Actual

Ethics review

Approved WMO Date:	07-06-2010
Application type:	First submission
Review commission:	METC Leids Universitair Medisch Centrum (Leiden)

Study registrations

Followed up by the following (possibly more current) registration

No registrations found.

Other (possibly less up-to-date) registrations in this register

No registrations found.

In other registers

Register	ID
CCMO	NL31549.058.10