

# Designing nonverbal utterances by nonhuman characters

*How clearly can emotions and characteristics be conveyed?*

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## **Abstract**

This research seeks to explore the concept of voice design, specifically voice design for non-human characters that do not communicate using words. The idea was to mimic the vocal contours of human non-verbal vocal expression with a synthesizer to achieve emotional clarity, as well as make it sound less like a machine and more like a fleshed-out character. The background investigates how humans can communicate emotions with non-verbal vocal expressions along with principles for sound design for Human-Robot interaction and methods for voice design/processing in film. This to build an idea on how to proceed when designing a non-verbal character voice. A listening test was conducted where participants would rate valence and energy levels in emotional utterances made by humans and emotional utterances that had been created using a synthesizer. As well as provide insight on what type of character could be creating the sounds made with the synthesizer. The results suggest that although the synthesized sounds lacked emotional clarity, they were still enough to give the participants an idea of a character.

## **Acknowledgments-**

I would like to thank my supervisor, Nyssim Lefford, for the support and directions given during this work. Without her this study probably would not have been finished.

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## **1. Introduction**

Non-verbal characters have been a reoccurring trope in fantasy and sci-fi media for some time. When creating voices for these types of characters sound designers have lamented that creating characters that have a personality and are emotionally expressive is one of the more time consuming and difficult parts of sound designing for non-verbal characters. (Andersen, 2015; Star Wars 2014). Sound designer Ben Burt who worked with sound on Star Wars (Lucas, 1977) and created the voice for R2-D2 solved this by mixing his own voice with sounds from a synthesizer (Star Wars, 2014). This study will take a similar approach to designing non-verbal voices as Ben Burt, by mixing and mimicking the vocal contour of non-verbal vocal expressions made by humans with mechanical sound samples in order to create a voice for a non-human character.

### **1.1 Non-verbal vocal expression**

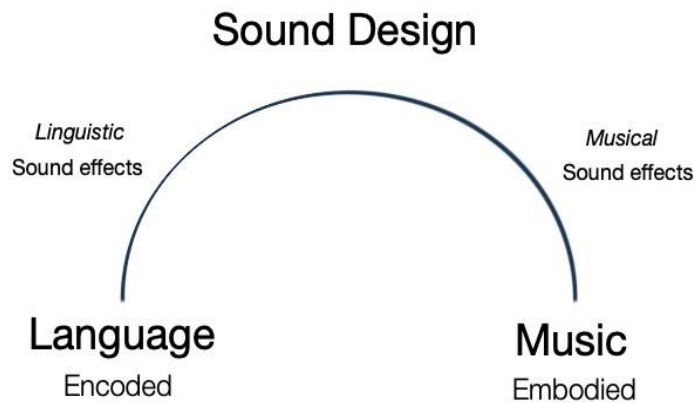
Non-verbal vocal expression is an important source of emotional information for social interactions, sounds like laughter, sobs, sighs, and screams provide information to discriminate between emotional categories. It has been shown that people are good at recognizing the emotions these sounds when expressed in non-verbal sounds even without a context. Lima et al (2013) has investigated this by compiling a corpus of 121 nonverbal vocalizations conveying eight different emotions: Achievement/triumph, amusement, anger, disgust, fear, relief, sadness, and sensual pleasure. The sounds were tested on a group of 40 people and were on average correctly recognized 86% of the time. Along with the 121 sounds Lima et al. (2013) also presents an acoustic analysis of the sounds, measuring major voice cues related to temporal aspects, intensity, fundamental frequency, and voice quality. 12 acoustic parameters were measured in the sounds: duration (ms), intensity mean and standard deviation (dB), number of amplitude onsets, frequency (Hz) mean, standard deviation, minimum, maximum and range, spectral center of gravity (Hz) and harmonics-to-noise-ratio (dB). Lima et al's. (2013) acoustic analysis of sounds showed a correlation between the emotion perceived and different acoustic cues. The specific cues were also unique for each emotion, showing that listeners rely on different acoustic profiles to identify different emotions. Specific cues therefore seem important in identification of specific emotions in nonverbal vocalizations. A summary of Lima et al's. (2013) findings follows:

- Achievement/triumph: Increased intensity mean and standard deviation, as well as in frequency mean, and a low harmonics-to-noise-ratio (decreased noise in the vocalization).
- Amusement: High intensity and a high number of amplitude onsets.
- Anger: High intensity mean and harmonics-to-noise ratio as well as a low number of amplitude onsets and frequency mean.
- Disgust: High standard deviation in frequency and spectral center of gravity and a low frequency mean.
- Fear: High standard deviation in intensity and frequency mean, short duration, and a low standard deviation in frequency.
- Relief: Long duration, a high frequency mean and low number of amplitude onsets, spectral gravity center and harmonics-to-noise-ratio,
- Sadness: High frequency mean and number of amplitude onsets, low intensity means.
- Sensual pleasure: High harmonic-to-noise ratio and a low number of amplitude onsets.

## **1.2 Film sound design as a basis for the sound of social robots**

The acoustic features presented by Lima et al. (2013) appears to align with practices regarding sound design for non-verbal characters (NVC) that's has been used in films (and video games). For example, the synthesized beeps, whistles, and bops of the robotic character R2-D2 from Star Wars (Lucas, 1977) along with Ben Burtt's vocalization creates a sound that becomes somewhat akin to spoken language. This creates a scenario in which the characters appear relatable, humanized, and understandable for the audience. (Whittington, 2007 p. 110-111). R2-D2 along with Ben Burtt's other famous sound design for a robot character in a film, Wall-E (Stanton, 2008), are so successful at conveying emotion that they are often cited as the basis and inspiration for designers working on sound designs for social robots (Jee et al., 2010; Read & Belphaeme., 2016; Robinson et al., 2022). When it comes to research on non-human voices and especially non-human voices that do not communicate using words, the vast majority of research is from human robot interaction (HRI) and social robots. The theories, principles, and ideas regarding sound design for social robots offer lessons for sound design of NVC.

Along with Ben Burts work Robinson et al. (2022) also cites sound designer Walter Murch and his conceptual spectrum of sound as an inspiration and a way of thinking that can be



**Figure 1.** *O w t e j ø u " e q p e g r v w* Adapted from Murch w o ' (2005)

applied to designing sounds for social robots. Murch (2005) places film sound in a one-dimensional spectrum with language (encoded sound) in a one end and music (embodied sound) in the other end. This spectrum is illustrated in figure 1.

Robinson et al. (2022) describes Murch (2005) concepts of encoded and embodied sounds as: encoded sounds are sounds whose meaning has to be extracted and embodied sounds are sounds whose meaning is experienced directly. Hybrid forms of these are described as linguistic and musical sound effects, examples of this: a knock on the door is linguistic whereas a musical sound effect is something like a musically embellished nature soundscape. Robinson et al. (2022) proposes that Murch's conceptual spectrum of sound should be used as a tool to create a soundscape that can accompany HRI. To think about HRI as something to be scored in the same way a film scene is scored.

### 1.3 Principles of Sound designs for Social Robots

Robinson et al. (2022) proposes nine core principles for sound designing social robots, that each fit into five different themes. The principles are based on interviews with sound designers, Ben Gabaldon, Connor Moore, and Jeshua Whitaker whom all worked with designing the sounds of different social robots. Not all of these principles are relevant for the sound design of NVCs in media and will therefore not be included. The themes introduced by Robinson et al. (2022) that will be included are fiction, source, scope, and content production.

#### 1.3.1 Fiction-

When designing sounds for a social robot it first of all needs to have a clearly *defined character* and personality. This to ensure the designed sounds are in line with the "core



fiction”<sup>1</sup> (Robinson et al., 2022, n.p) of the character. Robinson et al. (2022) encourages designers to think about the core fiction of the characters they’re designing, its history and its personality traits. How can this be communicated through utterances, the sound of its movements and any other types of sounds it might contain? What sounds would contradict the core fiction of the character? Second of all it needs to be a *believable physical object* a complete picture of the visible and hidden characteristics, such as size, shape and materials are important. How the characteristics are communicated through sound is also important to keep in mind, for example using a high-pitched voice for a character to indicate that a character is tiny. Or perhaps sound can communicate something different for example using metallic sounds for the movements of a robot made out of plastic. Indicating that although the physical object is plastic the character it represents is made out of metal.

When designing NVC sounds for film the same principles about the core fiction of the character applies. The sound design however doesn’t just need to be in line with character but also the fiction of the narrative it appears in. For example, R2-D2 and his sound design fits in great within the fiction of Star Wars, but if a character like R2-D2 were to appear in another sci-fi movie with a darker and grittier narrative, ex. Blade Runner (Scott, 1982) it probably wouldn’t work and feel somewhat jarring for the audience.

### **1.3.2 Source-**

The second theme presented is source, what is causing the sound and where is it coming from? Deliberately attributing sounds to a specific source means to consider the causes of the sounds. If the robot is supposed to be speaking it might emit from one place, but if it’s a sound caused by external factors ex. receiving a message or the artificial sound of the robots’ movements, it might make more sense for those sounds to emit from somewhere else. (Robinson et al., 2022)

### **1.3.3 Scope-**

Robinson et al’. (2022) asks sound designers to verify if there are parts of the robot’s fiction that is not being communicated through the sound. Are there actions not supported by the sound? The action not supported by implemented sound, what do they currently sound like? Is

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<sup>1</sup> Core fiction- the most important facts that make up the character, personality, history, material it’s made of.

the current sound of them still in line with what should be communicated? Could sound be a distraction from characteristics that's not supposed to be emphasized?

#### **1.3.4 Content production-**

The last theme presented is *Content production*, with this Robinson et al. (2022) means how audio assets are created and evaluated and the two most important principles within this according to Robinson et al., (2022) being *Emotion display* and *Audio parameter control*. Emotion display is the most common application of semantic-free sound in HRI research. (Yilmazyildiz et al., 2016). Sound can be a very clear way to communicate emotion according to Robinson et al., (2022), Robinson et al. (2022) therefore, think sound designers should consider the emotional content of the sound and what the desired effect on the listener is. Robinson et al., (2022) proposes that the path towards a successful emotion display with sound in these cases seems to be a careful creation of the sounds, a meticulous iterative evaluation, as well as to just have a small number of simple emotions that should be displayed. The reason only simple emotions are recommended is that more nuanced and complex emotions such as sarcasm is much harder to identify. This is supported by findings made by Read and Belpaeme (2016) who's research shows that humans tend to categories robot utterances and when doing so keep to simple classifications of emotions. Robinson et al. (2022) however raises the question if accurate emotional display always is necessary for successful human-robot interaction, or if more ambiguous emotions can be used to create a deeper and more interesting character.

Audio parameter control is how sound designers can process and shape the characteristics of the sounds they're working with. Audio parameters are a quite obvious part of a sound design process, robot sounds however have more specific requirements according to Robinson et al. (2022). If a robot is supposed to react to its environment a control of some audio parameters is required. It's therefore important to maximize the control over pitch, timbre, and tempo in the sound design. When it comes to content production the needs of social robots and NVCs in films obviously differs. A social robot needs to be able to constantly adapt its sounds to its interaction and environment in order to be engaging, it therefore needs to be programmed for this. (Robinson et al., 2022). A NVC however only needs to be adaptable for the runtime and narrative of the film it appears in, it's therefore maybe more relevant to compare the emotional display needed of a NVCs to the emotional display needed of an actor. In order to

create an engaging and understandable character for a film a conscious choice and intent in how emotions are supposed to be communicated needs to be made, a complete control of the sounds made by a NVCs is therefore needed.

## **1.4 Voices in film and their sound design**

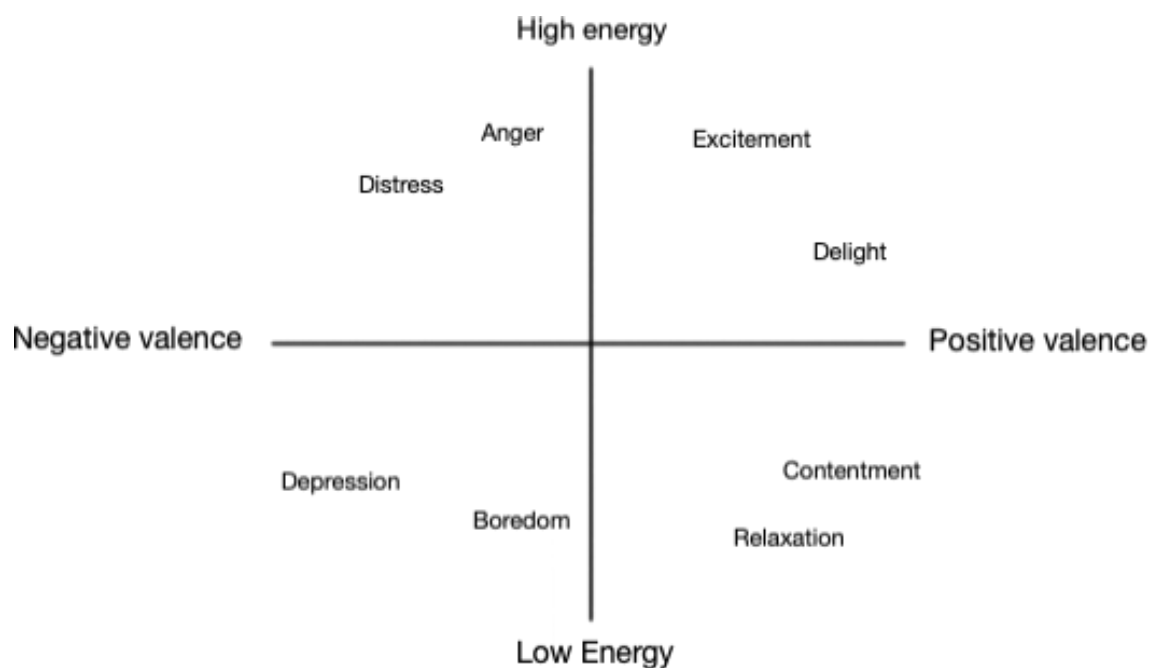
Just like sound designers for social robots work to create utterances that fit the fiction of the robot, sound designers in film work with the actors or synthesized voices in order to achieve a voice sound that not only fit the character in the film but also the narrative in which they appear. The voice is one of the most heavily manipulated and processed sounds in film, and while intelligibility and lip synchronization are important parts of the voice, they by themselves is not enough to create a voice that's appropriate for the character and the film they're in. (Pauletto, 2012). Like Robinson et al., (2022) brings up the importance of having a clearly defined fiction for the robot as well as the importance of having the robots' utterances support it and not contradict it, Pauletto (2012) brings up the importance of the voice being appropriate for the body producing it, the actions of the character, their emotions, and the space they inhabit. Gillian Dodders in an interview with Pauletto (2012) brings up an example of this when she had to pitch down an actor's voice for an entire performance in a film. Visually he looked the part of the character, but his voice sounded too young, a lower pitched voice fitted more with the sort of manly character that he was supposed to portray. Another example given by Dodders is when she removed every 'mm' sound made by an actor in order to make him sound less unsure and more assertive, stretching out 's' and 't' sounds also can also make a sentence sound surer and more assertive. The examples given by Dodder in how she goes about editing voices in order bring out the right emotions and characteristics are supported by Lima et al's. (2013) findings e.g., certain acoustic characteristics in voices are associated with certain emotions. It is therefore quite logical that processing a voice recording and editing out certain sounds in a voice would change the emotion or characteristics of the speaker. In the same way it would be logical that emulating human prosody with non-human sound can create a character voice that's display emotion in an understandable way even if it doesn't use words or human sounds.

The ideas presented by Pauletto (2012) goes hand in hand with the some of the principles introduced by Robinson et al. (2022). The idea that the 'voice' carries information about

emotional state, personality and characteristics is present in both papers which is again supported by Lima et al's. (2013) research. The similarities found in the process of working with voices in film and the designing of sounds for social robots is not very surprising considering that many sound designers working with social robots draw inspiration and ideas from sound design in films both from character voices and from sound effects and music. It would therefore not be very odd to in turn draw inspiration and ideas from the sound designs of social robots when designing the voices and sounds of non-verbal characters in media.

## 1.5 Classification of emotion

When it comes to classification of emotions one common way to do it is along two dimensions, valence (negative-positive or misery-pleasure) and energy level (Russel, 1980). For example, an emotion like anger would be considered to have high energy and a negative valence whereas an emotion like contentment is considered to have low energy and a positive valence. Example on how different emotions can be charted on a X and Y axis of valence and energy can be seen in figure 2.



**Figure 2.** Valence-energy chart. Adapted from Russel (1980)

## **1.6 Research Question:**

Designing non-verbal utterances by non-human characters, how clearly can emotions and characteristics be conveyed?

## **1.7 Aim and purpose**

The aim of this research is to delve deeper into the concepts of voice design and how to convey emotion without relying on languages. The focus will be on valence and energy and how to design synthetic emotional utterances that can convey the intended energy and valence level. Hopefully this research can contribute to understanding what makes up emotional qualities in voices and how one can reproduce them when designing character voices.

## **2. Method**

### **2.1 Overview**

A listening test was conducted where test subjects listened to eight different non-verbal vocal expressions, four consisting of recorded human utterances and four created with synthesizers. They were asked to rate these sounds based on what they perceived the energy level of the emotion behind the sound to be as well as the valence of it (how negative or positive).

#### **2.2 Creating the stimuli**

The human sounds were taken from the corpus created by Lima et al. (2013). The human sounds were supposed to convey the feelings: amusement, anger, pleasure, and sadness. The synthesized stimuli were created with the human sounds as a basis using Logic Pro's (Apple Inc, 2022). sample manipulation synthesizer Alchemy (Apple Inc, 2022). Alchemy allows for more than one sound source to be used when creating sounds and makes it possible to morph those sound sources together, creating something new. This function was used when creating the stimuli, morphing together one of the human sounds with either the samples of windchimes, gears turning or a bell chime. Resulting in a sound that followed the vocal contour of the human sound but had a mechanical characteristic to it.

The synthetic sounds were designed with the intention of conveying the following emotions:

1. Amusement, made with a windchime sample, supposed to emulate laughter.
2. Anger was made with the sound of gears turning, supposed to emulate a growl.
3. Pleasure, made with a bell chime, supposed to emulate someone humming.
4. Sadness, made with a windchime sample, supposed to emulate crying/sobbing.

One of Robinson et al. (2022) core principles when designing sounds for social robots is fiction and this was kept in mind while creating the sounds for the listening test. A complete fictional character was not created for the purposes of this study, but the basis of one was made. The basis for the character was a small rather dainty and magical robotic character with a very mechanical build, something that wouldn't feel out of place in a Steampunk setting, with a personality somewhat akin to Tinkerbell from *Peter Pan and Wendy* (Barrie, 1911). Before the main listening test, the stimuli were tested on three other audio engineer students at LTU. They were asked if they could identify the emotion conveyed and if the sounds worked for their intended purpose, e.g., as expressions for a character and as stimuli for a listening test.

## 2.3 Listening test

The listening test was conducted online using Go listen (Barry, 2021). An online test was chosen in order to reach a larger and more diverse test group. There was a total of 44 participants 20 women, 15 men and 9 participants with another gender identity. Participants were between 18–64 years of age. The task of the listening test was a rating task. The participants were asked to rate each sound based on what they perceived the energy level to be as well as the valence of the of it (how negative or positive) on 7-point scales, -3—+3 with -3 representing very low energy or very negative and +3 representing very high energy or very positive, with 0 representing neutrality. The reason a rating task was chosen was to avoid participants preexisting notion of how certain emotions tend to sound. E.g., participants might have different ideas of how for example happiness sounds. Valence and energy were the attributes chosen to be rated due the fact they are two common dimensions to measure emotion in. (Russel, 1980).

### **2.3.1 Questionnaire**

The questionnaire for listening test consisted of five parts including the following:

Part 1: Listen to the human sounds one at time and rate them based on perceived energy level.

Part 2: Listen to the human sounds one at time and rate them based on valence.

Part 3: Listen to the non-human sounds one at time and rate them based on perceived energy level.

Part 4: Listen to the non-human sounds one at time and rate them based on valence.

Part 5: Listen to all of the non-human sounds again and answer the open text questions:

1. Listening to the four non-human sounds again what do you imagine the size of the creature to be?
  2. Do you imagine the creature to be more animalistic or robotic? A combination? What materials is it made out of?
  3. Any other thoughts about the creature?\*
- \* This question was optional to answer

The order in which the participants listened to sounds for each part of the listening test was randomized.

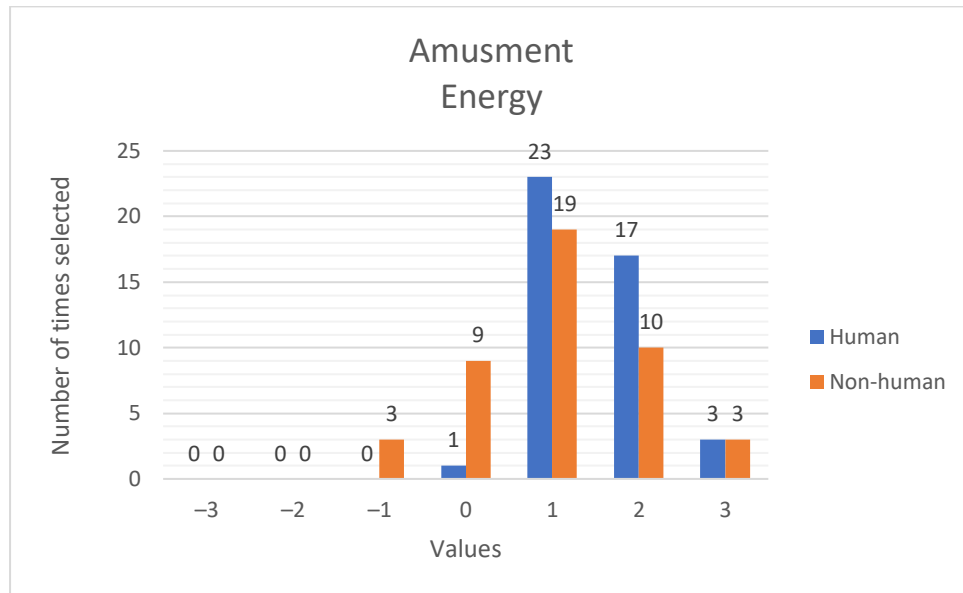
## **3. Results and Analysis**

First the results for energy levels will be presented, comparing the results for each human (H) made sound with its non-human (NH) counterpart. The same will also be done with the results for valence. The results for each non-human sound will also be compared with each other.

Where paired t-test were applied, a significance level of 0,05 was used. Excels T.test function was used to determine the P-value. A summary of the statistical analysis can be found in table 1-8 .

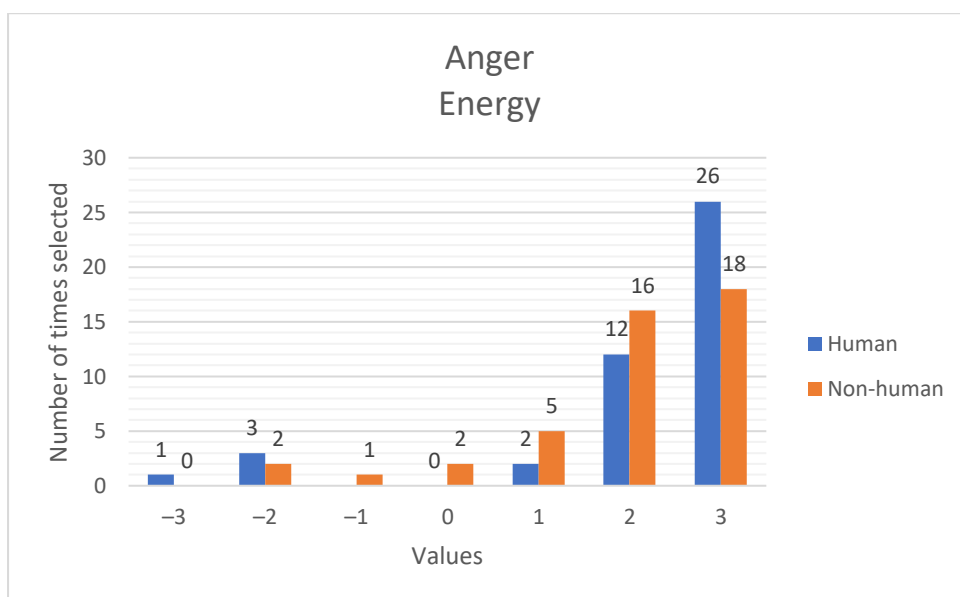
### 3.1 Energy: human compared to non-human.

Results for the ratings of energy for each emotion can be found in figure 3-6.



**Figure 3.** Perceived energy for human and non-human amusement

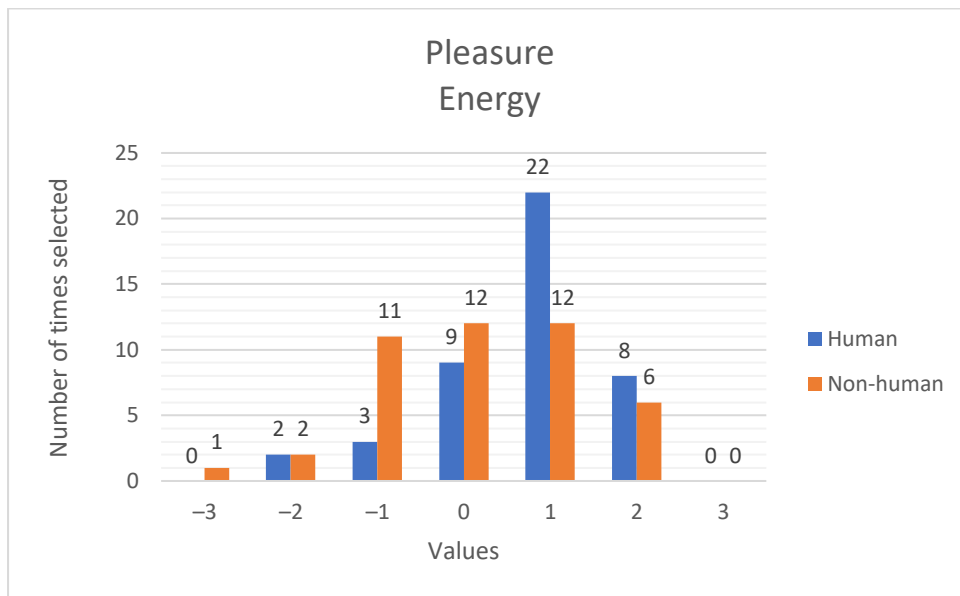
A paired t-test was performed to test if there were a significant difference between the results of energy levels for the human amusement and the non-human amusement sounds. The t-test showed a statistically significant difference in the results.



**Figure 4.** Perceived energy for human and non-human anger

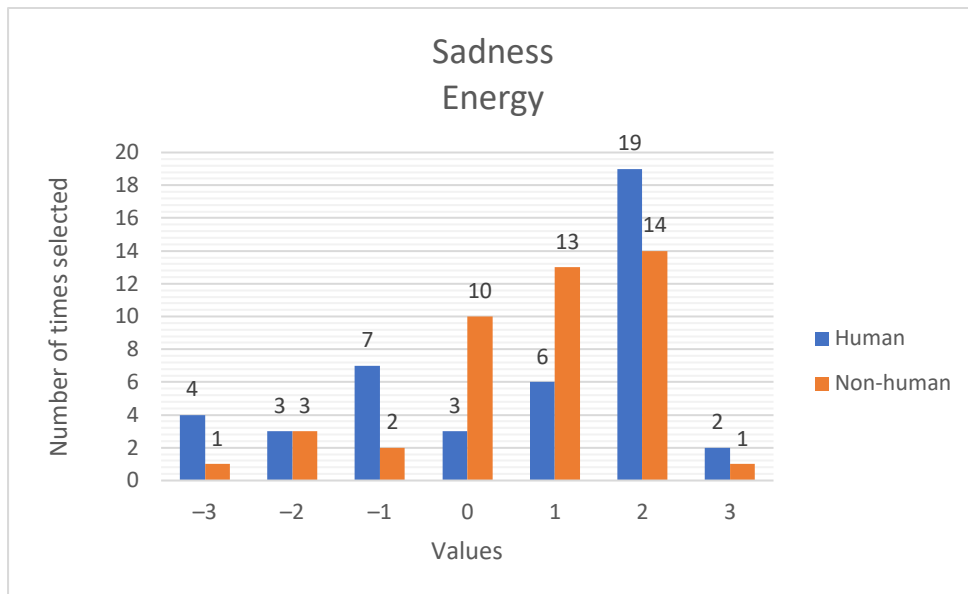


A paired t-test was performed to test if there were a significant difference between the results of energy levels for the human anger and the non-human anger sounds. The t-test showed no statistically significant difference in the results.



**Figure 5.** Perceived energy for human and non-human pleasure

A paired t-test was performed to test if there were a significant difference between the results of energy levels for the human pleasure and the non-human pleasure sounds. The t-test showed a statistically significant difference in the results.



**Figure 6.** Perceived energy for human and non-human sadness

A paired t-test was performed to test if there were a significant difference between the results of energy level for the human sadness and the non-human sadness sounds. The t-test showed no statistically significant difference in the results.

**Table 1.**

*Mean, mode value and standard deviation of the energy levels of the human sounds.*

Human Sound	Mean Energy	Mode Energy	Standard deviation Energy
Amusement	1,50	1	0,66
Anger	2,16	3	1,52
Pleasure	0,70	1	1,00
Sadness	0,57	1	1,80

**Table 2.**

*Mean, mode value and standard deviation of the energy levels of the non-human sounds.*

Non-human Sound	Mean Energy	Mode Energy	Standard deviation
Amusement	1,02	1	1,00
Anger	1,95	3	1,29
Pleasure	0,14	1	1,21
Sadness	0,75	2	1,33

**Table 3.** Results of t-tests for the energy ratings of the human and non-human sounds

Sounds	p-value
Amusement	0,016*
Anger	0,41
Pleasure	0,001*
Sadness	0,57

*Note:* \*  $p < 0,05$ .

### 3.2 Energy: Non-human compared to non-human

The results for the ratings of the non-human sounds energy levels were also compared to one and another using paired t-tests. This to test out if the sounds were rated differently enough to argue that the participants were able to discriminant between the sounds and recognize that the sounds were supposed to communicate different things. Results of the t-test can be seen in table 4.

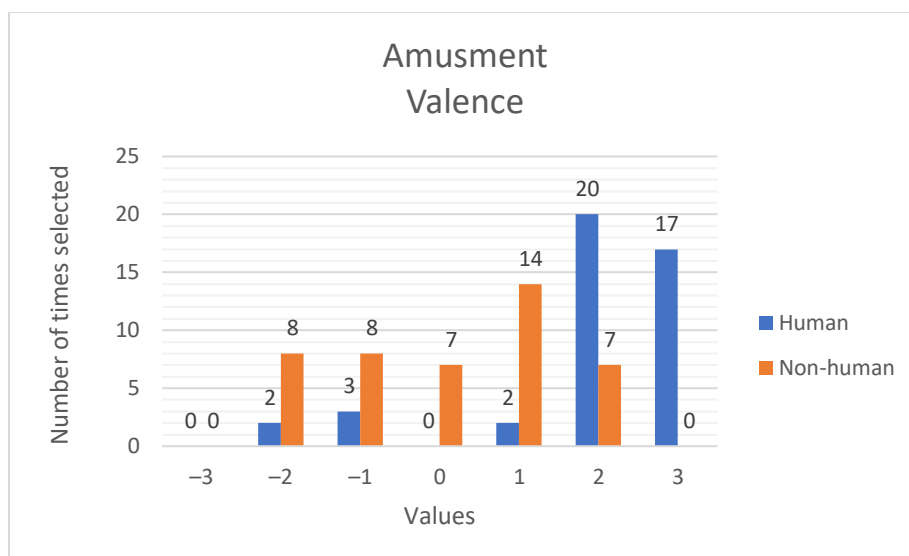
**Table 4.** Results of t-tests for the energy ratings of the non-human sounds

Sounds (NH)	p-value
Amusement & Anger	0,0005*
Amusement & Pleasure	$p < 0,0001$ *
Amusement & Sadness	0,09
Anger & Pleasure	$p < 0,0001$ *
Anger & Sadness	$p < 0,0001$ *
Pleasure & Sadness	0,01*

*Note:* \*  $p < 0,05$

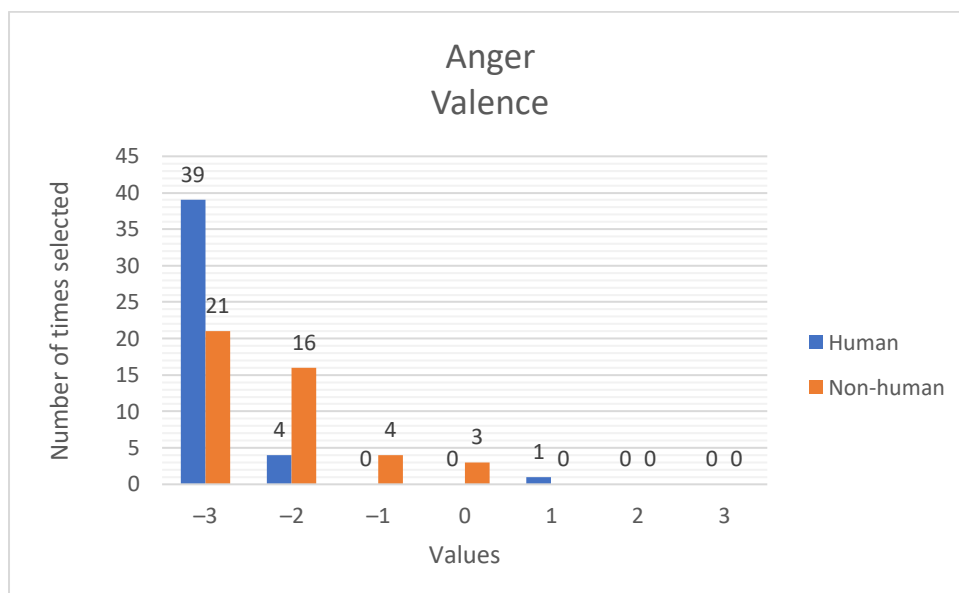
### 3.3 Valence: human compared to non-human.

Results for the ratings of valence for each emotion can be found in figure 7-10.



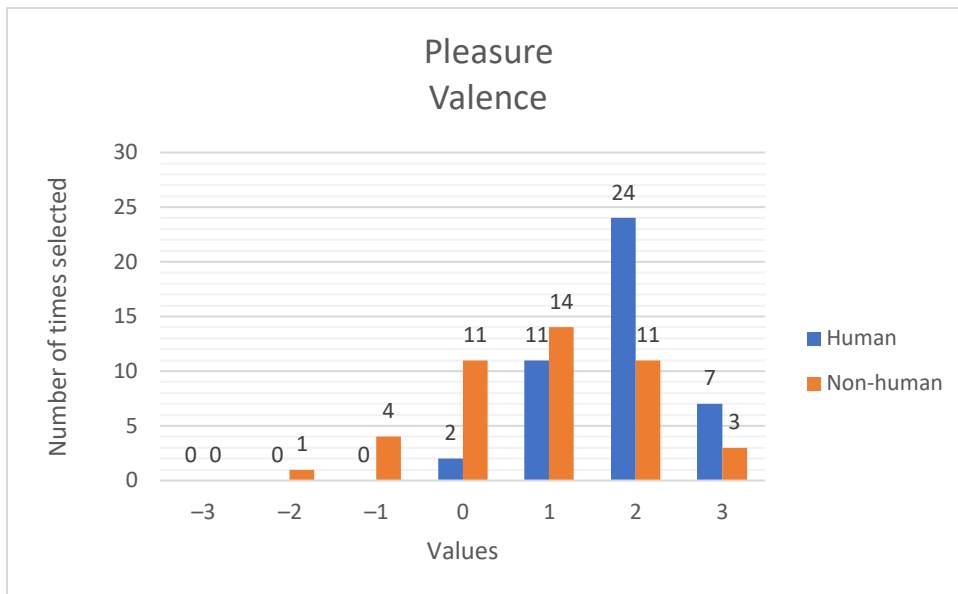
**Figure 7.** Perceived valence for human and non-human amusement

A paired t-test was performed to test if there were a significant difference between the results of valence for the human amusement and the non-human amusement sounds. The t-test showed a statistically significant difference in the results.



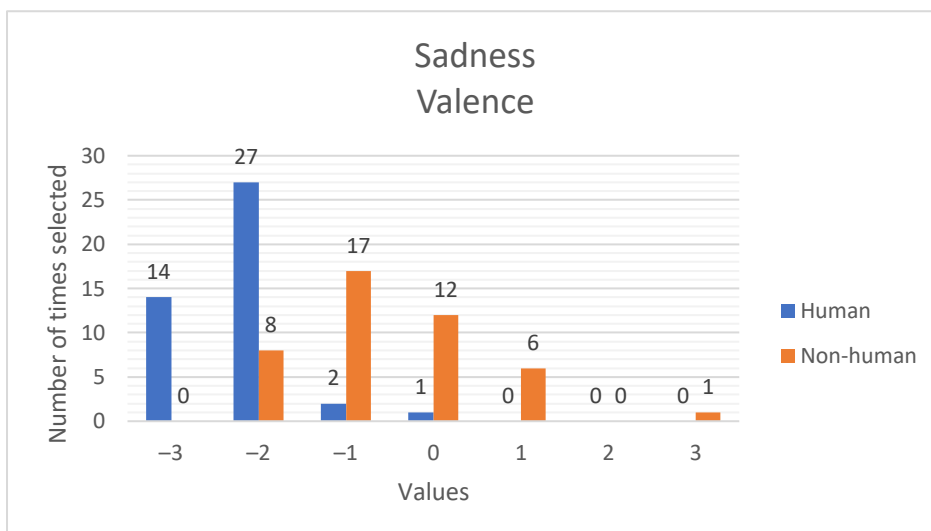
**Figure 8.** Perceived valence for human and non-human anger

A paired t-test was performed to test if there were a significant difference between the results of valence for the human anger and the non-human anger sounds. The t-test showed a statistically significant difference in the results.



**Figure 9.** Perceived valence for human and non-human pleasure

A paired t-test was performed to test if there were a significant difference between the results of valence for the human anger and the non-human anger sounds. The t-test showed a statistically significant difference in the results.



**Figure 10.** Perceived valence for human and non-human sadness

A paired t-test was performed to test if there were a significant difference between the results of valence for the human anger and the non-human anger sounds. The t-test showed a statistically significant difference in the results. A summary of the statistical analysis can be found in table 5-7.

**Table 5.** Mean, mode and standard deviation of the valence of the human sounds.

Sound Human	Mean Valence	Mode Valence	Standard deviation
Amusement	1,95	2	1,35
Anger	-2,82	-3	0,66
Pleasure	1,82	2	0,76
Sadness	-2,23	-2	0,64

**Table 6.** Mean, type value and standard deviation of the valence of the non-human sounds.

Sound Non-Human	Mean Valence	Mode Valence	Standard deviation
Amusement	0,09	1	1,38
Anger	-2,25	-3	0,89
Pleasure	0,89	1	1,17
Sadness	-0,55	-1	1,09

**Table 7.** Results of t-test for the valence ratings of the human and non-human sounds

Sounds	p-value
Amusement	$p < 0,0001^*$
Anger	0,0004*
Pleasure	$p < 0,0001^*$
Sadness	$p < 0,0001^*$

Note: \*  $p < 0,05$

### 3.4 Valence: Non-human compared to non-human

The results for the ratings of the non-human sounds valence were also compared to one and another using paired t-tests. This to test out if the sounds were rated differently enough to argue that the participants were able to discriminate between the sounds and recognize that the sounds were supposed to communicate different things. Results of the t-test can be seen in table 8.

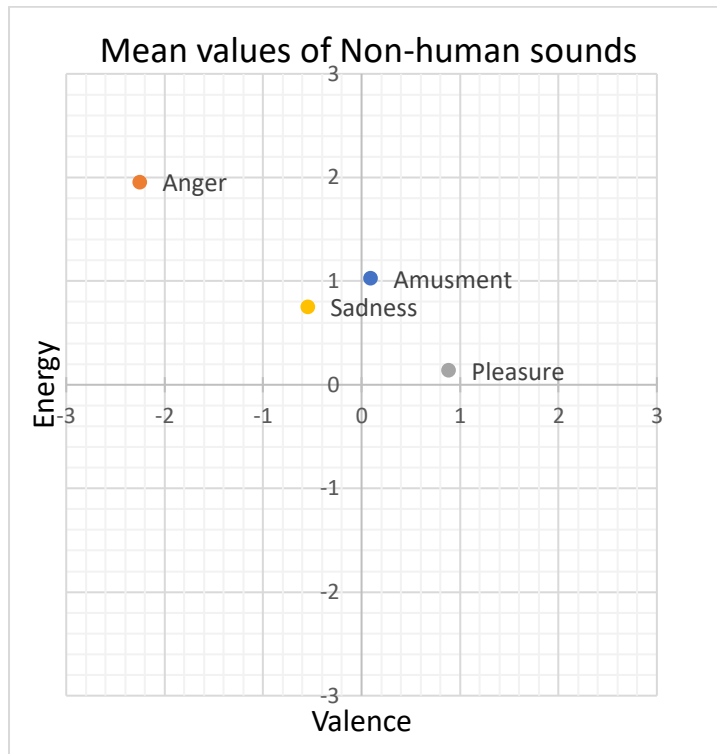
**Table 8 .** Results of t-test for the valence ratings of the non-human sounds

Sounds (NH)	p-value
Amusement & Anger	$1E-13^*$
Amusement & Pleasure	0,009*
Amusement & Sadness	0,005*
Anger & Pleasure	$3E-16^*$
Anger & Sadness	$4E-10^*$
Pleasure & Sadness	$6E-7^*$

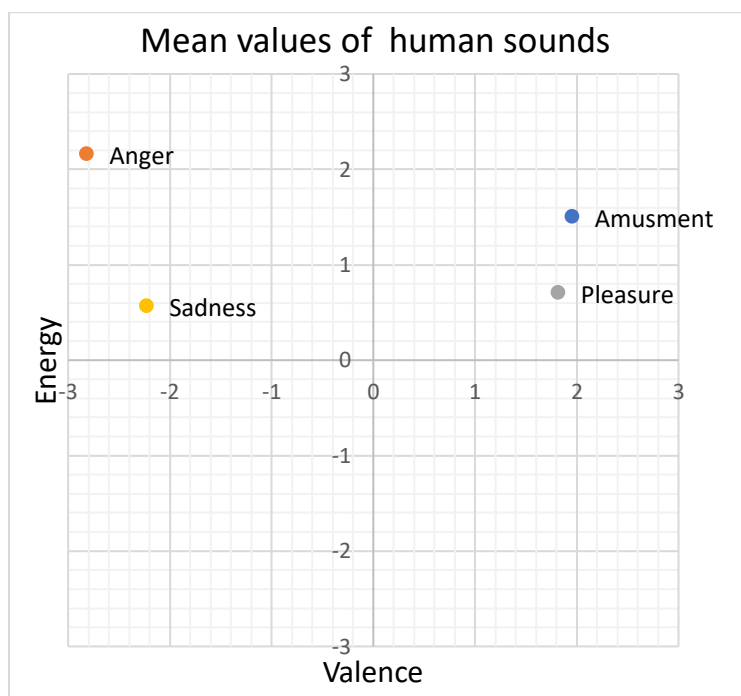
Note \* $p < 0,05$

### 3.5 Valence/Energy Charts

The mean results of the ratings for each non-human sound can be seen charted on a X/Y axis in figure 11. The mean result of the ratings for each human sound can be seen charted on a X/Y axis in figure 12.



**Figure 11.** Chart of the mean results for non-human sounds



**Figure 12.** Chart of the mean results for human sounds

## 3.6 Qualitative data

### 3.6.1 Size

A thematic analysis was used to analyze the answers to the question:

Listening to the four non-human sounds again what do you imagine the size of the creature to be?

The answers were first divided up based on whether the participant had answered the question as each sound being produced by the same creature or four different creatures. Three answers were not relevant to the question and has therefore been removed. One answered with what emotion they thought each sound communicated, another wrote that they did not understand the question and the third answered with four words that in no way indicated size. The removed answers can be found in appendix A marked as A2, A24 and A40.

Out of the 41 remaining answers 32 answered as if it was one creature making four different sounds and nine answered as if it were different creatures. The nine answers that described the sounds as coming from different creatures were not put through a thematic analysis but can be found in Table 9.

**Table 9.** Words used to describe the size of the sound source when thought of as different creatures.

Participant	Amusement	Anger	Pleasure	Sadness
A1	Small	big	middle	small
A7	small, insect	bigger than the others	very small bug	small, insect
A12	small	large	large	small
A13	small	A bit larger, but not necessarily large	A bit larger, but not necessarily large	small
A25	Bird size	Dinosaur size	small	Big bird/Hyena
A36	Smaller ant-like or cat sized	Larger bird to big cat	Small to medium sized dog	Smaller ant-like or cat sized
A38	A small Pippi	Big bird	No answer	A small Pippi
A41	tiny	40 kg	small	3 kg
A44	Mouse size	Large as a tractor wheel	Delicate, large as a water droplet or flower	A rat herd



The themes used to divide the remaining 32 answers were: *Small or smaller than a human*, *Medium or human sized* and *Large or larger than a human*. The themes were chosen due to being common indicators of size. The result of the thematic analysis can be found in table 10. Some of the answers have been translated from Swedish to English, the original answers can be found in appendix A.

**Table 10.** Themes used to describe size of the sound source when thought as one creature.

Small or smaller than a human	Medium or human sized	Large or larger than a human
Small	Medium size.	Slightly larger than a human
raccoon-sized; smaller than big carnivores but larger than insects or rats	medium?	As a car
small spider	Medium size?	
The size of a chimpanzee	The size of a sheep?	
Small		
Smaller than a man.		
1 and a half metre high		
Pretty small		
Tiny		
about 1 meter tall		
About "half a human" somewhere around 80-100cm		
Small		
Cat-size		
The creature is about 30 cm long han t-rex arms and big legs! With a litte cute tail, nearly like a rat.		
Small, maybe 30 cm tall		
Wall-E or R2 D2 sized. The size of a hobbit, like 1.0 - 1.20m tall, but about as stout or wide as a normal-sized person.		
about the same size as a 10 year old		
Not more than 1m tall, half that in width, but it levitates a good meter off the ground		
Size if a medium to large dog		
It seems to be a rather small creature. Around 4 feet		

Small or smaller than a human
The sounds indicate, I think, a small creature despite the sound 2 which I thought of as being larger or, at least, different. Also, for each sound I imagined a different creature. It never occurred to me that they were the same creature.
like r2d2
Small and wide
Small, maybe like up to my knees
smaller than the average human
0,5 m at most

Due to the vast majority of the answer falling into the theme *Small or smaller than a human*, this theme was divided up in subthemes. The subthemes chosen were *Spider (0,5-99mm)*, *cat sized (30-50cm)*, *half a human (80-110cm)*, *Slightly smaller than an average adult (120-150cm)*, *Smaller than a human without specifying how much smaller* and *Small without specifying how small*. The subthemes were chosen based on the answers that had been given. The results of the thematic analysis can be found in table 11.

**Table 11.** *U w d v j g oogcun"nq"hq"tō"uu o c n n g t " v j c p " c " j w o c p ö*

Spider (0,5-99mm)	Cat size (30-50cm)	Half a human (80-100cm)	Slightly smaller than human (120-150cm)	Smaller than a human (No indication of how much smaller)	Small (no indication of how small)
small spider	<p>Cat size</p> <p>Small, maybe 30 cm tall</p> <p>The creature is about 30 cm long han t-rex arms and big legs! With a litte cute tail, nearly like a rat.</p> <p>raccoon-sized; smaller than big carnivores but larger than insects or rats</p>	<p>about 1 meter tall</p> <p>About " half a human" somewhere between 80-100cm</p> <p>Not more than 1m tall, half that in width, but it levitates a good meter off the ground</p> <p>Small, maybe like up to my knees</p> <p>0,5 m at most</p>	<p>The size of a chimpanzee 1 and a half metre high</p> <p>Wall-E or R2 D2 sized. The size of a hobbit, like 1.0 - 1.20m tall, but about as stout or wide as a normal-sized person.</p> <p>Like r2d2</p> <p>about the same size as a 10 year old</p> <p>It seems to be a rather small creature. Around 4 feet</p>	<p>Smaller than a man.</p>	<p>Small</p> <p>Small</p> <p>The sounds indicate, I think, a small creature despite the sound 2 which I thought of as being larger or, at least, different. Also, for each sound I imagined a different creature. It never occurred to me that they were the same creature</p>

	Slightly smaller than human (120-150cm)	Small (no indication of how small)
	Size if a medium to large dog	Small and wide  Pretty small

### 3.6.2 Materials/Type of creature

A thematic analysis was used to analyze the answers to the question:

Do you imagine the creature to be more animalistic or robotic? A combination? What materials is it made out of?

Six participants answered as if it was different creatures making the sounds these answers were not used in the thematic analysis and can be found in table 11.

*Table 11. Words used to describe the type of character and its material when thought of as different creatures.*

Participant	Amusement	Anger	Pleasure	Sadness
B12	Robotic	Robotic	Animalistic	Robotic
B13	Mechanic	Robotic	Animalistic	Animalistic
B25	Combination, metal	Robotic, metal	Animalistic, Jelly	Combination, Metal
B36	Robotic, metallic	Animalistic	Combination, lives under water	Robotic, metallic
B41	Robotic metal	Robotic, metallic springs	Robotic, Wood	Robotic, metallic
B44	Cartoon Rodent	Workshop item	Character in Comic with human traits	Metal

Due to the question asked technically being two questions, both if the creature was thought to be more robotic or animalistic and what materials it appeared to be made out of, two thematic analyses were conducted. One to categorize what type of creature it was and one for what materials it was made out of. The themes used to categorize what type of creature were:

*Robot, Combination of robot and animal, Animal, Robot with animal shape and Alien.* For

material the themes were: *Metal*, *Organic* and *Combination of metal and organic*. Results of the thematic analyses can be seen in table 12 and table 13.

**Table 12.** Themes used to describe the type of creature when it was thought to be one creature.

Robot/android	Combo	Animal	Robot with animal shape	Alien
Robotic and futuristic. A bit like a spaceship. Mostly steel  It feels rather robotic. I'd imagine the creature is made up of mostly some sort of metallic material  Mechanical. I imagine it to be some kind of alien droid. Metallic.  Somewhat robotic. Sounds metallic, reminds me of Sprak from Mysteriet på Greveholm  Steel, robotic  More Robotic. Made of metal  robotic. made out of metal	Combination  A combination, more towards the animalistic material  Robotic cat-demon, scrapmetal and polyesterfleece  a combination - a mix of electronic and biological body parts; for electronic the material is hard as iron  Cyborghamster  Robotic / bat  A combination, flesh, metal, plasma	Animalistic, probably made of flesh  More animalistic, some kind of jungle creature that can make fucked up sounds. And its made out of flesh and bone	springs and cogs, robotic with animalistic shape  More like a robot, but it feels like different animals. Made from metal	Alien like, kind of insect looking, similiar to a beetle, black/dark and shimmering  Combination. o uterworldly alien, materials hard to describe
Robotic. Steel and fur.  Robotic, made out of metal  Robotic  More robotic, at least some parts made of metal  Robotic  Humanoid robot made of metal  Robotic				

<b>Robot/android</b>
A robotic creature! Metallic with a matt finish
Robotic. Made out of many small parts, like a clock. Many cogs and whirring little metal things.
Robotic

**Table 13.** Themes used to describe the material of the creature when it was thought to be one creature.

<b>Metalic</b>	<b>Organic</b>	<b>Combination</b>
robotic. made out of metal	A combination, more towards the animalistic material	A combination, flesh, metal, plasma
Mainly metal, maybe with some gases trapped inside	Animalistic, probably made of flesh	a combination - a mix of electronic and biological body parts; for electronic the material is hard as iron
Mechanical. I imagine it to be some kind of alien droid. Metallic.	More animalistic, some kind of jungle creature that can make fucked up sounds. And its made out of flesh and bone	
Robotic. Steel and fur.		
Robotic, metallic, like Wall-E in the Disney movie		
Steel, robotic		
More Robotic. Made of metall		
Robotic and futuristic. A bit like a spaceship. Mostly steel		
Somewhat robotic. Sounds metallic, reminds me of Sprak from Mysteriet på Greveholm		
Robotic, made out of metal		
Scrap metal		
More robotic, at least some parts made of metal		
It feels rather robotic. I'd imagine the creature is made up of mostly some sort of metallic material		
Humanoid robot made of metal		
more robotic, metal		
It is more robotic than animalistic. It is made out of metal.		

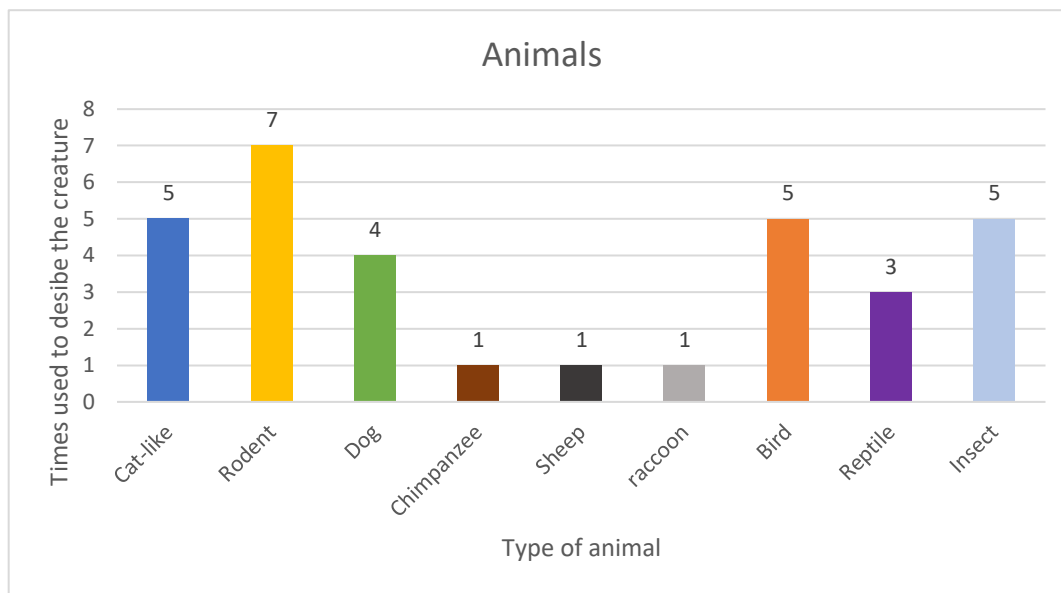
<b>Metalic</b>
Robotic cat-demon, scrapmetal and polyesterfleece
More like a robot, but it feels like different animals. Made from metal
Robotic. Made out of many small parts, like a clock. Many cogs and whirring little metal things.

### 3.6.3 Words used to describe the creature.

Looking through the answers for all three of the open text questions asked, there are certain words that reoccur when the participants were describing the creature. A thematic analysis was conducted using the themes: *Animal*, *Malicious*, *Cute*, and *Fantasy/Sci-fi creature*. The themes were chosen based on how often certain words were used by participants. The results of the thematic analysis can be found in appendix D. Due to the nature of the answers some of them fit in to more than one theme. The theme *Animal* were divided into subthemes, the results of that can be found in appendix E. The subthemes used were: *Cat-like*, *Rodent*, *Dog*, *Bird*, *Reptile*, *Insect*, and *Other animal*. A summery of the themes that appeared can be found in table 14 and a summery of the subthemes used is shown in figure 15. Other than the themes mentioned, an already existing character was used to describe the creature a total of six times. These include Wall-E (Stanton, 2008), R2-D2 (Lucas, 1977) and Sprak 2020 from Mysteriet på Greveholm (Zethraeus, 1996).

**Table 14.** Themes used to describe the character (that appeared more than once).

Theme	Number of times used	Other comment
Animal	32	
Variation of mean/evil/scary etc	9	Sometimes used in combination with cute or humoristic.
Cute	4	Sometimes in combination with evil/mean/scary.
Fantasy/Sci fi creature	7	



**Figure 13.** *Animals used to describe the creature.*

### 3.6.4 Summary of qualitative data

Looking through the results of the qualitative data there are patterns to be observed. For one most of the participants agree that the creature is small (see table 10), exactly how small differs. The results also point to the participants thinking of the creature as being robotic and being made out of metal (see table 12 and 13) but having animalistic attributes (see appendix D). Very few answers contained anything about the creature’s personality, this might be because the participants were never directly asked about it. The few answers that did contain thoughts about personality however pointed either at it being somewhat malicious, cute or both (see appendix D).

## 4. Discussion

### 4.1 Ratings of emotion

Looking at the results of the quantitative data and the t-tests it’s not statistically supported that the participants thought the human sounds and their non-human counterparts communicated the same thing. The exception being the rating of energy for anger and sadness, where the t-

test showed  $p > 0,05$  when the human and non-human sounds were compared. But just because there is not a statistically supported difference doesn't mean that there is a statistically supported similarity. However, looking at the results there is still trends to be seen. Of the human sounds anger is the sound that is rated with the highest energy and the most negative valence, and out of the non-human sounds anger is also the sound with the highest energy rating and the most negative valence rating. So, with in each of their contexts they somewhat trend towards the same emotion.

#### **4.1.1 Results of the Non-human sounds compared to one another.**

Looking at the results of the t-tests when comparing the results for each non-human sound (see table 4 and 8) it shows that there is a statistically significant difference large enough to indicate that the sounds were perceived to communicate something different by participants. The exception to this being the ratings of energy for amusement and sadness that did not show a statistically significant difference. This could indicate that although it might be unclear what each of the non-human sounds communicated, it was still clear to the participants that each sound communicated something different.

## **4.2 Qualitative data**

A trend to be found in the qualitative data is that the majority of the participants thought the creature to be small, although within the category "Small" there was a rather large variation on how small it actually was. The size varying from small spider (a few millimeters) to a small human (about 1,5m) with some participants not specifying how small they thought it was. There is however an argument to be made that the exact size the participants thought the creature to be doesn't actually matter as long as they thought it to be small. Generally speaking, it's not actually the size of something that determines if it's considered large or small but the context it is presented in. For example, a mini horse is usually considered to be a small animal but if one saw a house cat in the size of an average mini horse it would be considered a very large cat, it is the context and the relation to other things that determines it. As the sounds are presented without a context it doesn't really matter what exact size the participants think the creature is as long as they think that in whatever context it exists in it is considered "small". If the exact size of the creature had been of interest a precise scale for the participants to rate the creature on would have been provided in the questionnaire. The



reasons that small was a common answer probably has to do with the fact that the non-human sounds are rather high-pitched and high-pitched voices are often associated with small statures.

A majority of the participants agree that the creature is in fact a robot and although it's a robot quite a few participants seem to think it has animalistic characteristics. The fact that robot was common was probably due to the fact that mechanical/metallic samples had been used to create the non-human sounds and that they had been made using synthesizers, ergo they did not sound very organic. Where the participants got the animal characteristic from in the sound is bit more unclear as it was not part of the intentions when the sounds were created. It could be due to the sounds being very simple in their expression implying that the creature is not an overtly intelligent one which could lead the participants to think of it as more animalistic. It could also have to do with the unfamiliarity of the sounds when faced with something unknown people tend to something they are familiar with to try and make sense of it.

The fact that the participants were never directly asked about the creatures' personality. But some of them still provided thoughts on it when answering the question "Any other thoughts about the creature?" along with the fact that four very short sounds with no context was enough for some people to invent a whole character could be of interest for sound designers. It shows that emotional clarity doesn't necessarily have to be the end goal for sound designers when creating voices for NVCs. Robinson et al. (2022) makes a similar point:

*"Is accurate emotion display a requirement for successful interactions or can more ambiguous emotions be used simply to convey a richer more engaging character."*

(Robinson et al., 2022, n.p). Robinson et als. point is about social robots, but there is an argument to be made that it is even more applicable to NVCs. NVCs has the advantage that they exist within an existing fiction (film, tv-series, video game), the fiction provides a context for the character that helps the audience understand it. Some can even just have another character translate everything the NVCs expresses for the audiences as in the case of Chewbacca and Han Solo in Star Wars (Lucas, 1977). This allows for sound designers to somewhat let go of the pressure of achieving emotional clarity with the voice of the NVCs and can instead focus more on creating complex character that fits both its own fiction and the fiction of the media it appears in.

### 4.3 Critique of method

There are some drawbacks with the method used. For one using different mechanical samples for the basis of the stimuli resulted in some of the participants being confused on whether or not it was supposed to be one character or not. Had the same mechanical sample been used it could have resulted in a more cohesive character. Continuingly testing the stimuli and receiving feedback on it while it was being created instead of just when it was considered done may have resulted in a more emotional clarity in the sounds and might have eased up the process of creating the sounds. There were also some drawbacks with the questionnaire, specifically the question: *Do you imagine the creature to be more animalistic or robotic? A combination? What materials is it made out of?*. As it is technically two questions in one which resulted in some participants only answering one of the questions. A better choice would have been to split the question in two, one for if they thought the creature to be animalistic or robotic and one for what material they thought it was made out of. Finally, some of the participants wrote that the creature reminded them of the character R2-D2 (Star Wars, Lucas, 1977). Due to the fact that R2-D2 was used to explain the concept of NVCs in the introduction of the listening test it is hard to tell if the sounds actually reminded the participants of this character or if they were already thinking about it because it had been mentioned in the introduction.

## 5. Conclusion

This study investigated how clearly emotions and characteristics could be communicated through synthetic emotional utterances, as well as how it could be relevant for sound designing Non-verbal characters in film. Looking at the results it is very clear that the human emotional utterances were a lot more understandable than the non-human versions. However, due to the nature of the results for the non-human sounds there is an argument to be made that something was still communicated through the sounds to the participants, even if that something was different things for some of the participants. There is also the fact some of the participants could imagine almost an entire character just from the four sounds, although they didn't imagine the same type of character some sort of personality and characteristics was still present in the sounds. Given a context and some familiarity with the creature and it could perhaps become more understandable. Although, there is also an argument to be made that a

nonverbal and nonhuman character isn't actually supposed to be completely understandable, it would somewhat defeat the point of a non-human character. A part of the charm of non-human and non-verbal characters like R2-D2 and Wall-E is the fact they're a bit unfamiliar and not always understandable, yet the audience still feel for and even relate to them.

## **5.1 Future research**

For future research it would be interesting to test out audiences' interpretation of NVCs in a more ecological valid situation. E.g., conducted a test where the participants not only listen to the sounds of a NVC but also see the context it exists in. This could for example be done by having the participants watch movie scenes which contain NVC. Questions a study like this could answer would be if context would help with communicating emotion and how NVCs are viewed by the audience. Another direction future research could be taken in is investigating what part of human non-verbal vocalization communicates emotional content and how to implement that in non-human voices. As this study has shown that simply mimicking the vocal contour of a human voice is not enough for a clear communication of emotion.

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## Appendix

### A

A1	1: small, 2: big, 3: middle, 4: small
A2	Happy 1 2 angry 3 pleased or pleased neutral 4
A3	Small
A4	small spider
A5	The size of a chimpanzee
A6	Medium size.
A7	1&4) the same small size, insect 2) bigger than the others 3) very small, bug
A8	medium?
A9	Small
A10	The size of a sheep?
A11	raccoon-sized; smaller than big carnivores but larger than insects or rats
A12	1 small, 2 large, 3 large, 4 small
A13	1: small, 2: a bit larger, but not necessarily large, 3: like no.2 4: small
A14	Slightly larger than a human
A15	Smaller than a man.
A16	1 and a half metre high
A17	Medium size?
A18	Ganska liten
A19	Tiny
A20	about 1 meter tall
A21	Ungefär "en halv människa" alltså nånstans kring 80-100cm
A22	Small
A23	As a car
A24	I don't understand the question? Is it one creature or four?
A25	1: Bird size, 2: Dinosaur size, 3: Small near size, 4: Big bird/hyena
A26	Cat-size
A27	The creature is about 30 cm long han t-rex arms and big legs! With a litte cute tail, nearly like a rat.
A28	Small, maybe 30 cm tall
A29	Wall-E or R2 D2 sized. The size of a hobbit, like 1.0 - 1.20m tall, but about as stout or wide as a normal-sized person.
A30	Not more than 1m tall, half that in width, but it levitates a good meter off the ground
A31	Size if a medium to large dog
A32	It seems to be a rather small creature. Around 4 feet
A33	The sounds indicate, I think, a small creature despite the sound 2 which I thought of as being larger or, at least, different. Also, for each sound I imagined a different creature. It never occurred to me that they were the same creature.
A34	about the same size as a 10-year-old
A35	like r2d2
A36	1 & 4 smaller ant-like or cat sized. 3 perhaps small to medium sized dog. 2 is intense but still rather high-pitched/screechy, so anywhere from a larger bird to big cat sized
A37	Small and wide

A38	1&4 A small Pippi, 2 a big bird, 3 a flera
A39	Small, maybe like up to my knees
A40	Gnid, symbol, rushkana, glas
A41	1:tiny. 2:40 kg. 3:small. 4:3 kg
A42	smaller than the average human
A43	0,5 m at most
A44	1: mouse size 2: stort som ett traktorhjul 3: delikat och stor som en vattendroppe eller blomma 4: en råttjord

## B

B1	Combination
B2	Robotic
B3	Robotic
B4	springs and cogs, robotic with animalistic shape
B5	Mechanical. I imagine it to be some kind of alien droid. Metallic.
B6	Robotic. Steel and fur.
B7	More like a robot, but it feels like different animals. Made from metal
B8	A combination, more towards the animalistic material
B9	Alien like, kind of insect looking, similiar to a beetle, black/dark and shimmering
B10	A combination, flesh, metal, plasma
B11	a combination - a mix of electronic and biological body parts; for electronic the material is hard as iron
B12	1 robotic, 2 robotic, 3 animalistic, 4 robotic
B13	1: mechanic, 2 robotic, 3 animalistic, 4 animalistic
B14	Animalistic, probably made of flesh
B15	Robotic, metallic, like Wall-E in the Disney movie
B16	Steel, robotic
B17	Combination. outerworldly alien, materials hard to describe
B18	More Robotic. Made of metall
B19	Cyborg hamster
B20	robotic. made out of metal
B21	Snarare robotaktig. Låter metalliskt, jag tänker en del på Sprak från Mysteriet på Greveholm
B22	Robotic, made out of metal
B23	Robotic and futuristic. A bit like a spaceship. Mostly steel
B24	Same, don't understand the question
B25	1: Combination, 2: Robotic, 3: Animalistic, 4: Combination. Materials — 1, 2, 4: metal, 3: jelly
B26	Robotic cat-demon, scrapmetal and polyesterfleece
B27	More animalistic, some kind of jungle creature that can make fucked up sounds. And its made out of flesh and bone
B28	Humanoid robot made of metal
B29	This is a Robotic sounding creature, that has the height according to my last answer. However, it could be a smaller fary-squirrel-cat like animal in a Fantasy setting aswell, that would in that case have cat-sized height at the withers, but be wider and flatter in its apperance, large eyes and a large mouth, vaguely Lizard-like with hint of Ghost-animal.
B30	Mainly metal, maybe with some gases trapped inside

B31	More robotic, at least some parts made of metal
B32	It feels rather robotic. I'd imagine the creature is made up of mostly some sort of metallic material
B33	Sound 1 and 4 seems more animalistic whereas 2 and 3 seems more robotic. Overall, I'd say that the creature is robotic but could be based on the appearance of an animal.
B34	more robotic, metal
B35	robotic
B36	2 most animalistic, 1 & 4 more robotic and metallic, 3 more animalistic/perhaps a combination and maybe lives around water.
B37	A robotic creature! Metallic with a matt finish
B38	Plåt och skrot
B39	Robotic. Made out of many small parts, like a clock. Many cogs and whirring little metal things.
B40	Robotic
B41	1 metal 2. Metal ,springs 3 wood. 4 metal
B42	It is more robotic than animalistic. It is made out of metal.
B43	Robotic / bat
B44	1: tecknad gnagare 2: verkstadsföremål 3: figur vi i serie med mänskliga egenskaper 4: Metall

## C

C1	unpleasant
C2	Mouse
C3	I imagine it to simulate the sound of an ecosystem that I lack understanding of; maybe of an alien planet. Sound is metallic and has the feel of being synthetic, maybe of an alien race?
C4	1-3 sounds like a toy. 4 sounds more like some broken mechanical device.
C5	Thinking of the movie WALL-E and the characters in it
C6	It's a bit creepy like a rat but also cute and kind, so it's also rounder than a rat. It can take different shapes depending on the mood and intentions. Thin vs Round and when it's round it has another color like pink or blue. When it's thin and angry it's grey-ich
C7	Creepy and malicious
C8	sounds like an evil fairy
C9	they move around in groups, uses sound to navigate surroundings and communicate
C10	1 evil, 2 angry, 3 friendly, 4 intensive
C11	1 could be a cluster of several small creatures, 2 sounds more like a machine than something living, 3 sounds like it's moving slowly, 4 same as no. 1
C12	Long snout of some kind. Sharp teeth. Small beady eyes or eyeless
C13	Maybe more metallic animal than humanoid.
C14	creative, inventive, powerful, capable of doing different things
C15	Scary cute dangerous
C16	Låter lite trasigt
C17	It is tiny but evil and mad
C18	cute!
C19	Sounds like it is trying to communicate different feelings
C20	Humoristic but mean
C21	Feels like it also could be a retarded seagull
C22	The robotic version could be WALL-E like. I feel it is boxy rather than sleek and round, has a bit of Dog-like personality.



C23	It's capable of sudden movements, quite nimble considering its size. There are some small intricate parts on its body that rattle during these moves. It doesn't have mouth as such, the sounds come from elsewhere in it
C24	May have shapes that look like a face. Does not need to be an actual face (sight, speech, hearing etc) but humans would treat it as such when interacting with creature.
C25	The creature doesn't seem to be intellectual. I sort of get the vibe of an 80's cleaning robot with a synthesised "voice"
C26	The robotic creature seems multifaceted. That is, its sounds indicate a creature with different skills or purposes. Perhaps related to this, I think that the creature is capable of moving or fitting in different environments.
C27	kanske lite som en vessla
C28	1 & 4 are quite menacing, 2 aggressive, 3 derpy/calm
C29	I think it worries a lot, a nervous soul
C30	1.Ledsen valp, 2. Aggressiv plåtleksak 3 förundrad loppa 4. Svärm av ilskna små fåglar
C31	Sound 2 is absolutely terrible, it sounds like the creature dies :( all its little bits and bobs just crashes to the ground. Makes me ache. Besides that, the creature feels pleasant and friendly.
C32	1Thin flying 2 Compact box- ish. 3 soft rounded. 4 thin flying
C33	It is "wisp-like", perhaps able to fly. Translucent in some occasions.
C34	Emotional

## D

Animal	Maliscous	Cute	Fantasy/Scifi creature
It's a bit creepy like a rat but also cute and kind, so it's also rounder than a rat. It can take different shapes depending on the mood and intentions. Thin vs Round and when its round it has another color like pink or blue. When it's thin and angry its grey-ich.	It's a bit creepy like a rat but also cute and kind, so it's also rounder than a rat. It can take different shapes depending on the mood and intentions. Thin vs Round and when its round it has another color like pink or blue. When it's thin and angry its grey-ich	Scary cute dangerous	It is "wisp-like", perhaps able to fly. Translucent in some occasions.
Maybe a bit like a weasel		The creature is about 30 cm long han t-rex arms and big legs! With a litte cute tail, nearly like a rat	I imagine it to simulate the sound of an ecosystem that I lack understanding of; maybe of an alien planet. Sound is metallic and has the feel of being synthetic, maybe of an alien race?
Mouse	Humoristic but mean sounds like an evil fairy	cute!	Mechanical. I imagine it to be some kind of alien droid.Metallic
1.Sad puppy,3 amazed flea 4. Swarm of small angry birds	1 evil, 2 angry, 3 friendly, 4 intensive	It's a bit creepy like a rat but also cute and kind, so it's also rounder than a rat. It can take different shapes depending on the mood and intentions. Thin vs Round and when its round it has another color like pink or blue. When it's thin and angry its grey-ich	Alien like, kind of insect looking, I to a beetle, black/dark and shimmering
Feels like it also could be a retarded seagull	1 & 4 are quite menacing, 2		Combination. Outerworldly alien, materials hard to describe
Cyborg hamster	Creepy and malicious Unpleasant		Robotic cat-demon, scrapmetal and polyesterfleece
Robotic cat-demon, scrapmetal and polyesterfleece	Scary cute dangerous It is tiny but evil and mad		
Robotic / bat Cat-size	aggressive, 3 derpy/calm		
small spider			

<p>The size of a chimpanzee</p> <p>The size of a sheep?</p> <p>Raccoon-sized; smaller than big carnivores but larger than insects or rats</p> <p>1: Bird size, 2: Dinosaur size, 3: Small near size, 4: Big bird/hyena</p> <p>This is a Robotic sounding creature, that has the height according to my last answer. However, it could be a smaller fary-squirrel-cat like animal in a Fantasy setting aswell, that would in that case have cat-sized height at the withers, but be wider and flatter in its appearance, large eyes and a large mouth, vaguely Lizard-like with hint of Ghost-animal.</p> <p>The creature is about 30 cm long han t-rex arms and big legs! With a litte cute tail, nearly like a rat.</p> <p>Size if a medium to large dog 1 &amp; 4 smaller ant-like or cat sized. 3 perhaps small to medium sized dog. 2 is intense but still rather high-pitched/screechy, so anywhere from a larger bird to big cat sized</p> <p>1&amp;4 A small Pippi, 2 a big bird, 3 a flera</p> <p>1: mouse size 2: Large as a tractor wheel 3: Delicate, large as a water droplet or flower 4: A rat herd</p> <p>Alien like, kind of insect looking, I to a beetle, black/dark and shimmering The robotic version could be WALL-E like. I feel it is boxy rather than sleek and round, has a bit of Dog-like personality.</p>		<p>This is a Robotic sounding creature, that has the height according to my last answer. However, it could be a smaller fary-squirrel-cat like animal in a Fantasy setting aswell, that would in that case have cat-sized height at the withers, but be wider and flatter in its apperance, large eyes and a large mouth, vaguely Lizard-like with hint of Ghost-animal.</p>
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1: Cartoon Rodent 2:  
Workshop item 3:Character  
in Comic with human traits  
4: Metal

1&4) the same small size,  
insect 2) bigger than the  
others 3) small, bug

## E

<b>Cat-like</b>
Maybe a bit like a weasel
Robotic cat-demon, scrapmetal and polyesterfleece
This is a Robotic sounding creature, that has the height according to my last answer. However, it could be a smaller fary-squirrel-cat like animal in a Fantasy setting aswell, that would in that case have cat-sized height at the withers, but be wider and flatter in its apperance, large eyes and a large mouth, vaguely Lizard-like with hint of Ghost-animal.
1 & 4 smaller ant-like or cat sized. 3 perhaps small to medium sized dog. 2 is intense but still rather high-pitched/screechy, so anywhere from a larger bird to big cat sized
Cat-size

<b>Rodent</b>
Mouse
like a rat
The creature is about 30 cm long han t-rex arms and big legs! With a litte cute tail, nearly like a rat.
Cyborg hamster
Robotic / bat
1: mouse size 2: Large as a tractor wheel 3: Delicate, large as a water droplet or flower 4: A rat herd
1: Cartoon Rodent 2: Workshop item 3:Character in Comic with human traits 4: Metal

<b>Dog</b>
1.Sad puppy Aggressive metaltoy 3 amazed flea 4. Swarm of small angry birds
Size if a medium to large dog

1 & 4 smaller ant-like or cat sized. 3 perhaps small to medium sized dog. 2 is intense but still rather high-pitched/screechy, so anywhere from a larger bird to big cat sized

The robotic version could be WALL-E like. I feel it is boxy rather than sleek and round, has a bit of Dog-like personality.

#### **Bird**

1.Sad puppy Aggressive metaltoy 3 amazed flea 4. Swarm of small angry birds

Feels like it also could be a retarded seagull

1&4 A small Pippi, 2 a big bird, 3 a flera

1: Bird size, 2: Dinosaur size, 3: Small near size, 4: Big bird/hyena

1 & 4 smaller ant-like or cat sized. 3 perhaps small to medium sized dog. 2 is intense but still rather high-pitched/screechy, so anywhere from a larger bird to big cat sized

#### **Reptile**

1: Bird size, 2: Dinosaur size, 3: Small near size, 4: Big bird/hyena

The creature is about 30 cm long han t-rex arms and big legs! With a litte cute tail, nearly like a rat.

This is a Robotic sounding creature, that has the height according to my last answer. However, it could be a smaller fary-squirrel-cat like animal in a Fantasy setting aswell, that would in that case have cat-sized height at the withers, but be wider and flatter in its apperance, large eyes and a large mouth, vaguely Lizard-like with hint of Ghost-animal.

#### **Insect**

1 & 4 smaller ant-like or cat sized. 3 perhaps small to medium sized dog. 2 is intense but still rather high-pitched/screechy, so anywhere from a larger bird to big cat sized
small spider
Alien like, kind of insect looking, similiar to a beetle, black/dark and shimmering
1.Sad puppy Aggressive metaltoy 3 amazed flea 4. Swarm of small angry birds
1&4) the same small size, insect 2) bigger than the others 3) small, bug

<b>Other</b>
The size of a chimpanzee
The size of a sheep?
raccoon-sized; smaller than big carnivores but larger than insects or rats