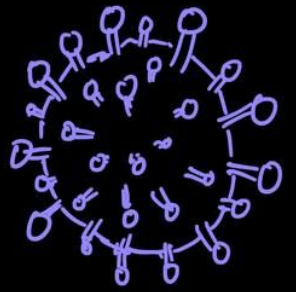
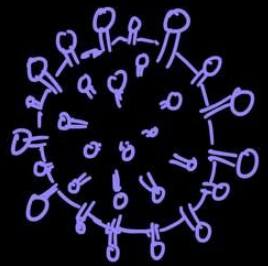
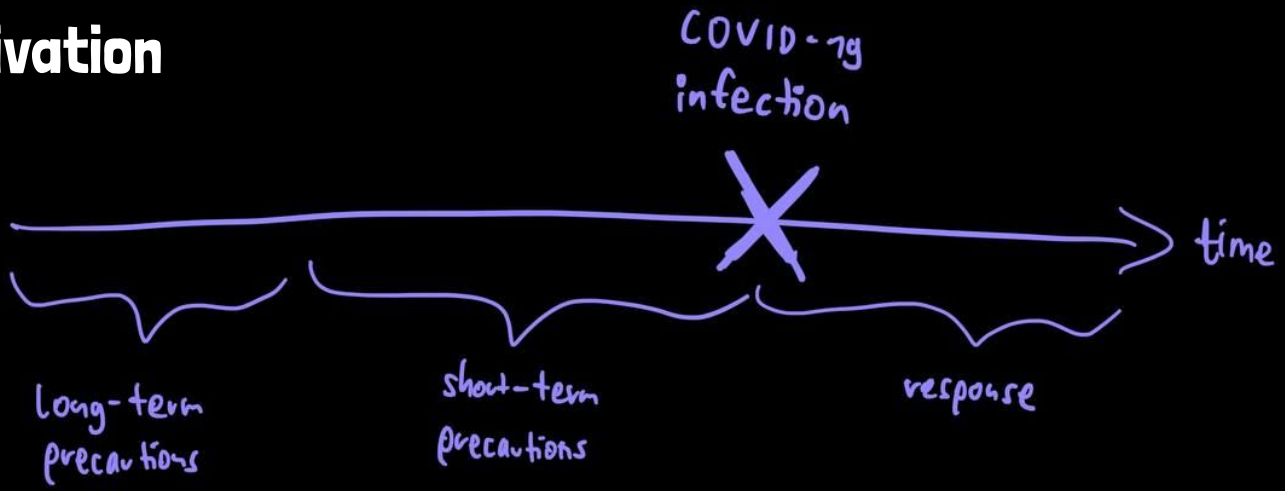


Encouraging people to be more careful in situations with high infection risk



presented by Marcel Garus
marcel.garus@student.hpi.de
HPI – IT Systems Engineering

Motivation



Vaccination

Not going to crowded places

Wear a mask

Ventilation

Stick to the less crowded parts of a place

Testing

Contact tracing

Make people aware of infection risk

Motivation

Functional Fear Predicts Public Health Compliance in the COVID-19 Pandemic

April 2020; Craig A. Harper, Liam P. Satchell, Dean Fido & Robert D. Latzman

[Social distancing] is being practiced inconsistently in the absence of government enforcement. In this paper, we explore some of the potential psychological triggers for this inconsistency in social distancing behavior.

Fear of the virus

Moral foundations

Political orientation

Positive behavior change in response to the pandemic (e.g., social distancing, improved hand hygiene)

Compliance with COVID-19 Mitigation Measures in the United States

August 2021; Benjamin van Rooij, Anne Leonore de Bruijn, Chris Reinders Folmer, Emmeke Barbara Kooistra, Malouke Esra Kuiper, Megan Brownlee, Elke Olthuis, Adam Fine

[People] actually comply less when they fear the authorities.

Motivation

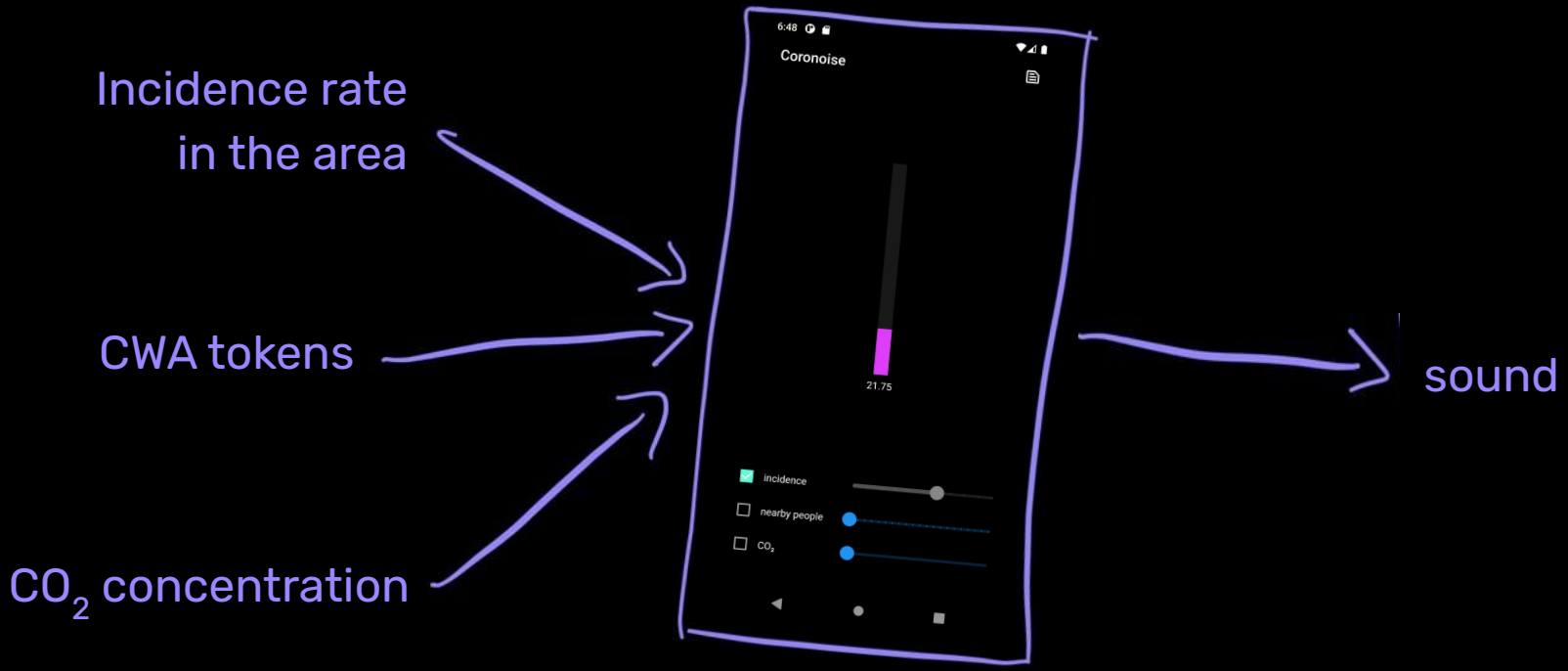
The emotional path to action: Empathy promotes physical distancing and wearing of face masks during the COVID-19 pandemic

March 2020; Stefan Pfattheicher Laila Nockur Robert Böhm Claudia Sassenrath Michael Bang Petersen

- “empathy for those most vulnerable to the virus represents an emotional basis regarding the motivation for physical distancing and wearing a face mask”
- “we can actually *use* empathy to promote the motivation in people to follow these two important measure”

  “providing individuals with mere background information […] was not enough to significantly increase the behavioral motivation; only if empathy was added did motivation increase.”

Concept


Incidence rate
in the area
CWA tokens
CO_2 concentration
6:48
Coronoise
21.75
incidence
nearby people
CO_2
sound

Input: Incidence

https://services7.arcgis.com/mOBPykOjAyBO2ZKk/arcgis/rest/services/RKI_Landkreisdaten/FeatureServer/0/query?where=1%3D1&outFields=GEN,EWZ,last_update,cases7_lk&returnGeometry=false&outSR=4326&f=json

6.9 MB
of JSON data
if set to `true`


```
{
  "GEN": "Potsdam",
  "last_update": "05.02.2022, 00:00 Uhr",
  "EWZ": 182112,
  "cases7_lk": 3298
}
```

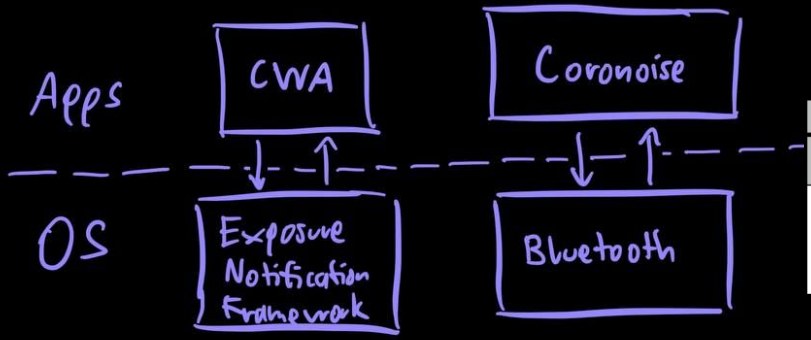

$$\text{Incidence rate} = \frac{100000 * \text{EWZ}}{\text{cases_7lk}}$$

Input: Exposure Notifications

Bluetooth Low Energy

Generate pseudo-random token every 10 - 20 minutes

Broadcast token every 200 - 270 milliseconds



Google

Exposure Notification

Bluetooth Specification

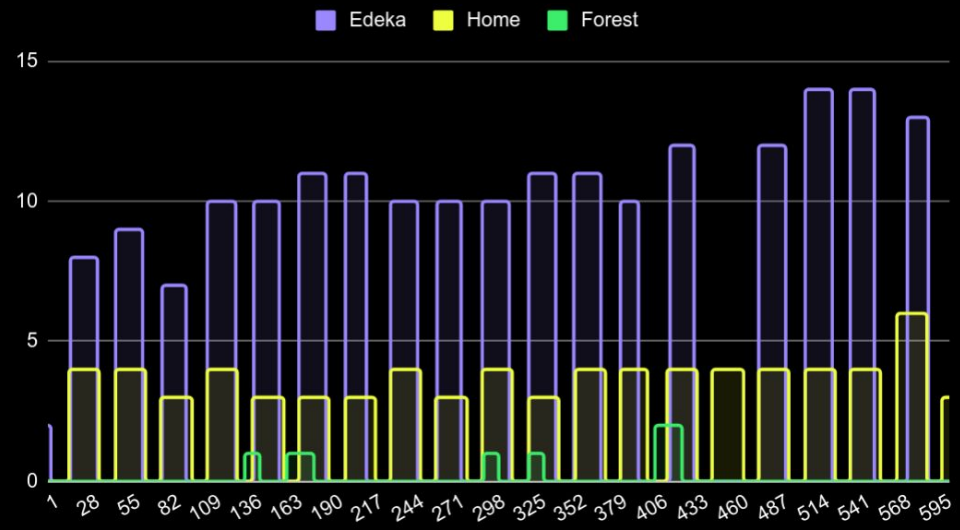
Preliminary — Subject to Modification and Extension

April 2020

v1.2

Flags			Complete 16-bit Service UUID			Service Data - 16 bit UUID				
Length	**Type**	**Flags**	**Length**	**Type**	**Service UUID**	**Length**	**Type**	**Service Data**		
0x02	0x01 (Flag)	0x1A	0x03	0x03 (Complete 16-bit Service UUID)	0xFD6F (Exposure Notification Service)	0x17	0x16 (Service Data - 16 bit UUID)	0xFD6F (Exposure Notification Service)	**16 bytes** **Rolling Proximity Identifier**	**4 bytes** **Associated Encrypted Metadata**

Input: Exposure Notifications



- gaps and plateaus?
- smoothing

Input: CO_2 levels

Predictive and retrospective modelling of airborne infection risk using monitored carbon dioxide

September 2021; Henry C. Burridge, Shiwei Fan, Roderic L. Jones, Catherine J. Noakes, and P. F. Linden

"We recommend that more widespread monitoring of CO_2 is carried out within occupied spaces."

CO_2 concentration visualization for COVID-19 infection prevention in concert halls

October 2021; Hiroko Kitamura, Yo Ishigaki, Tomoko Kuriyama, and Takashi Moritake

53.8% felt "much safer" and want future visualization

"To visualize the CO_2 concentration as needed based on prior estimation is strongly expected to become part of the standard operational procedure of concerts […]."

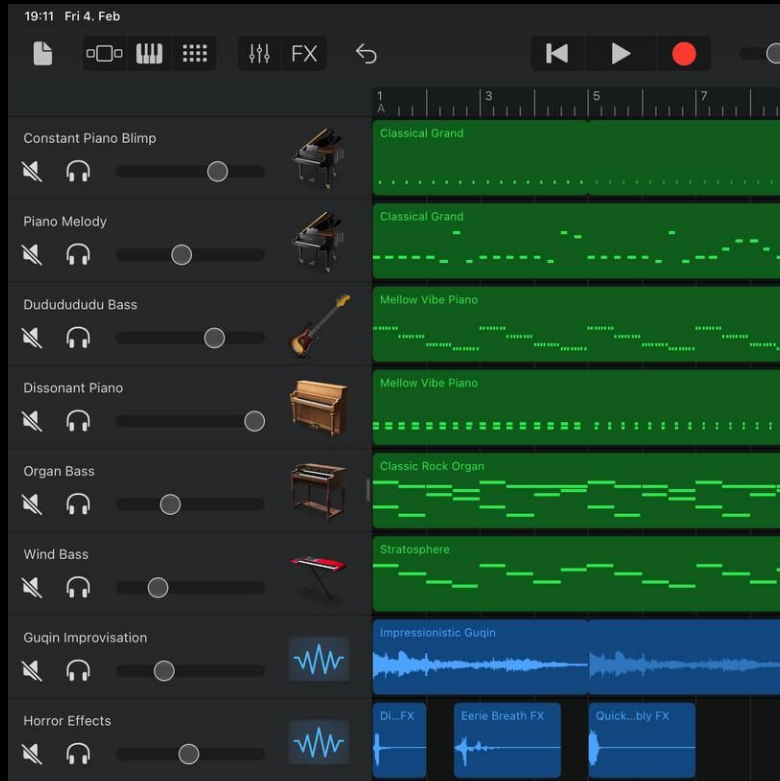
Output: Scary music

Music and sound in the horror film & why some modern and avant-garde music lends itself to it so well

April 2012; Julia Heimerdinger

Creating suspense in music and sound:

- Sustained high tone
- Deep drone
- An annoying repetitive motive
- Specific noises like the howling wind



Demo

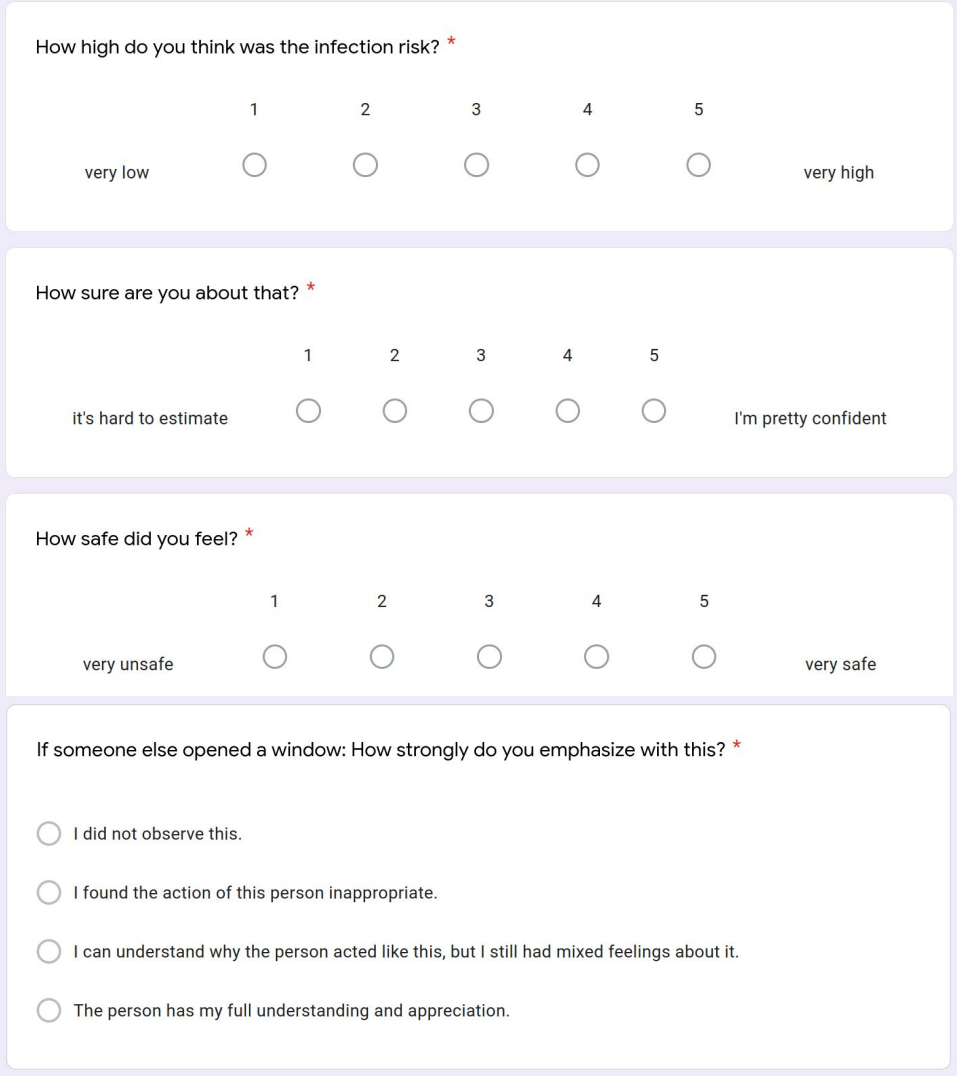
github.com/MarcelGarus/coronoise

Hypothesis

While working, employees/students empathize more with the decisions of colleagues to take protective measures against the corona pandemic, if they are acutely made aware of the infection risk via sonic feedback.

Study: Using sonfication in work contexts

- Work context: Meeting of the MobileDev club
  - Multiple hours
- Log protective measures
  - open/close window
  - put on/off mask
- 2 hours without and with sound, then survey



How high do you think was the infection risk? *

	1	2	3	4	5	
very low	○	○	○	○	○	very high

How sure are you about that? *

	1	2	3	4	5	
it's hard to estimate	○	○	○	○	○	I'm pretty confident

How safe did you feel? *

	1	2	3	4	5	
very unsafe	○	○	○	○	○	very safe

If someone else opened a window: How strongly do you emphasize with this? *

- ○ I did not observe this.
- ○ I found the action of this person inappropriate.
- ○ I can understand why the person acted like this, but I still had mixed feelings about it.
- ○ The person has my full understanding and appreciation.

If someone else wore a mask: How strongly do you emphasize with this? *

- I did not observe this.
- I found the action of this person inappropriate.
- I can understand why the person acted like this, but I still had mixed feelings about it.
- The person has my full understanding and appreciation.

If *you* took protective measures: How do you feel other people felt towards that? *

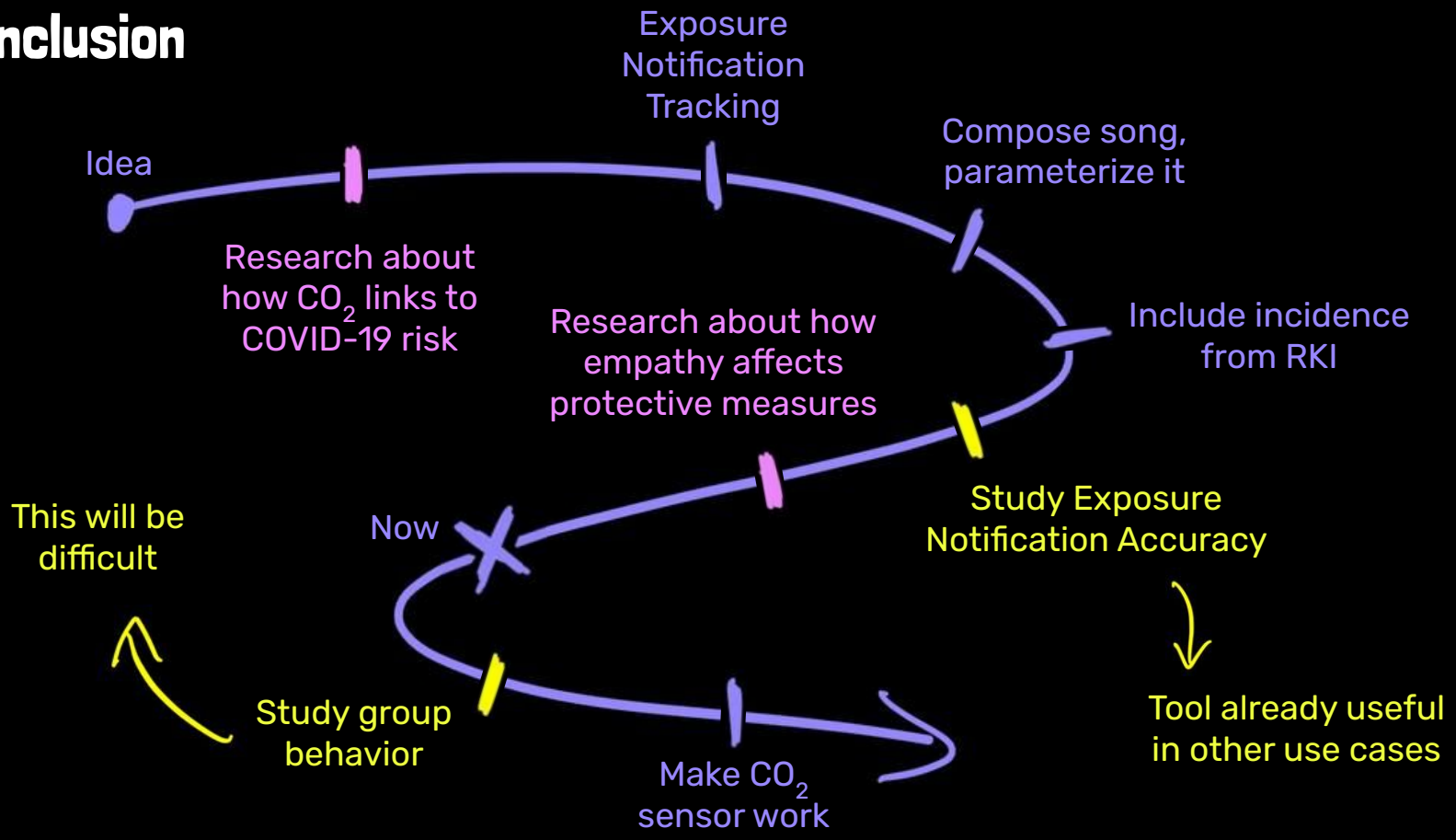
- I didn't take protective measures.
- I feel people juged me.
- I feel people didn't really care.
- I feel like people sympathized with me, but had mixed feelings about it.
- I feel like people appreciated me for doing this.

What adjective best describes the music?

Short-answer text

- A good study needs to actually explore a range of different risk levels
  - But: That's what we try to avoid
- Put people in such situations purposefully? Better: Find some existing gatherings!
  - But: Most online

Conclusion


Idea
Exposure Notification Tracking
Compose song, parameterize it
Include incidence from RKI
Study Exposure Notification Accuracy
Tool already useful in other use cases
Make CO_2 sensor work
Study group behavior
This will be difficult
Now
Research about how CO_2 links to COVID-19 risk
Research about how empathy affects protective measures

References

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link.springer.com/article/10.1007/s11469-020-00281-5

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psyarxiv.com/y2cg5

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journals.sagepub.com/doi/10.1177/1420326X211043564

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doi.org/10.1539/eohp.2021-0010-OA

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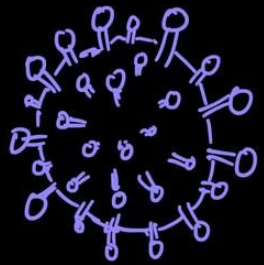
April 2012; Julia Heimerdinger
www.academia.edu/1510776/Music_and_sound_in_the_horror_film_and_why_some_modern_and_avant_garde_music_lends_itself_to_it_so_well