Middle School Students' Conceptions of *Normality* and *Normativity* in Biology Education

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Background

- Diversity is simplified in biological research, i.e., the binary gender systematic (Fausto-Sterling, 2020)
- "Knowledge" influenced by social ideas and vice versa (Haraway, 1988)
- Results in conceptions of "normal" bodies and behaviors within the categories gender, "race" and (dis)ability

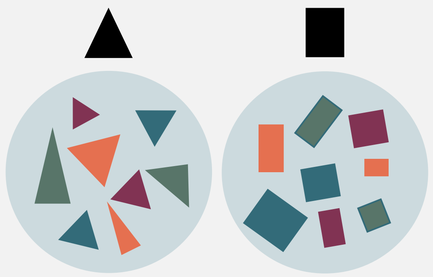

Figure 1 – Simplification of individuals within (biological) research
i.e. binary gender systematic, in which differently pronounced sexual characteristics are sorted into only two categories

- Scientific literacy as one of the aims of biology education = reflect about the research process and the knowledge resulting from it, it's origin and the influence of society, politics and religion on research (KMK, 2020)
- To encourage students' development of knowledge and skills a common approach is the use of pre-conceptions (Kattmann, 2007)

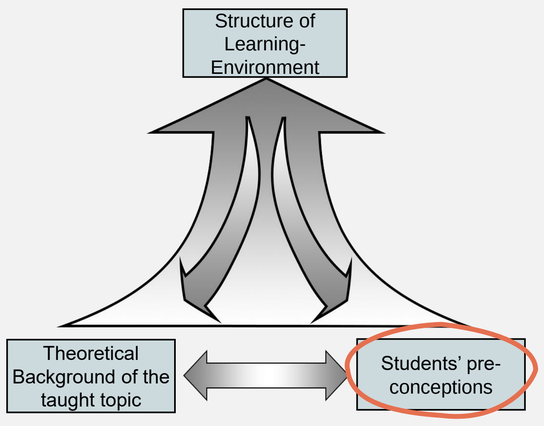

Figure 2 – Model of didactical reconstruction as a concept of planning lessons
Teachers bring the content, the students' pre-conceptions and the structure of the learning-environment together to optimise the learning process

- By using students' pre-conceptions teachers can build a learning-environment that appreciate students' current knowledge and give them the opportunity to reflect it within the learning process (Gropengießer & Kattmann, 2013)

Knowledge Gap and Questions

- Not much is known about either pre-conceptions or the individual construction of the concepts of *normality* and *normativity*

? What conceptions about *normality* and *normativity* do middle school students have?

? How do they construct these two concepts, when confronted with three different examples that are common in biology lessons?

Methods

- Semi-structured interviews with 8th-grade students
- Deductive-inductive categorization process (Mayring, 2000)
- First categories based on theories about construction processes

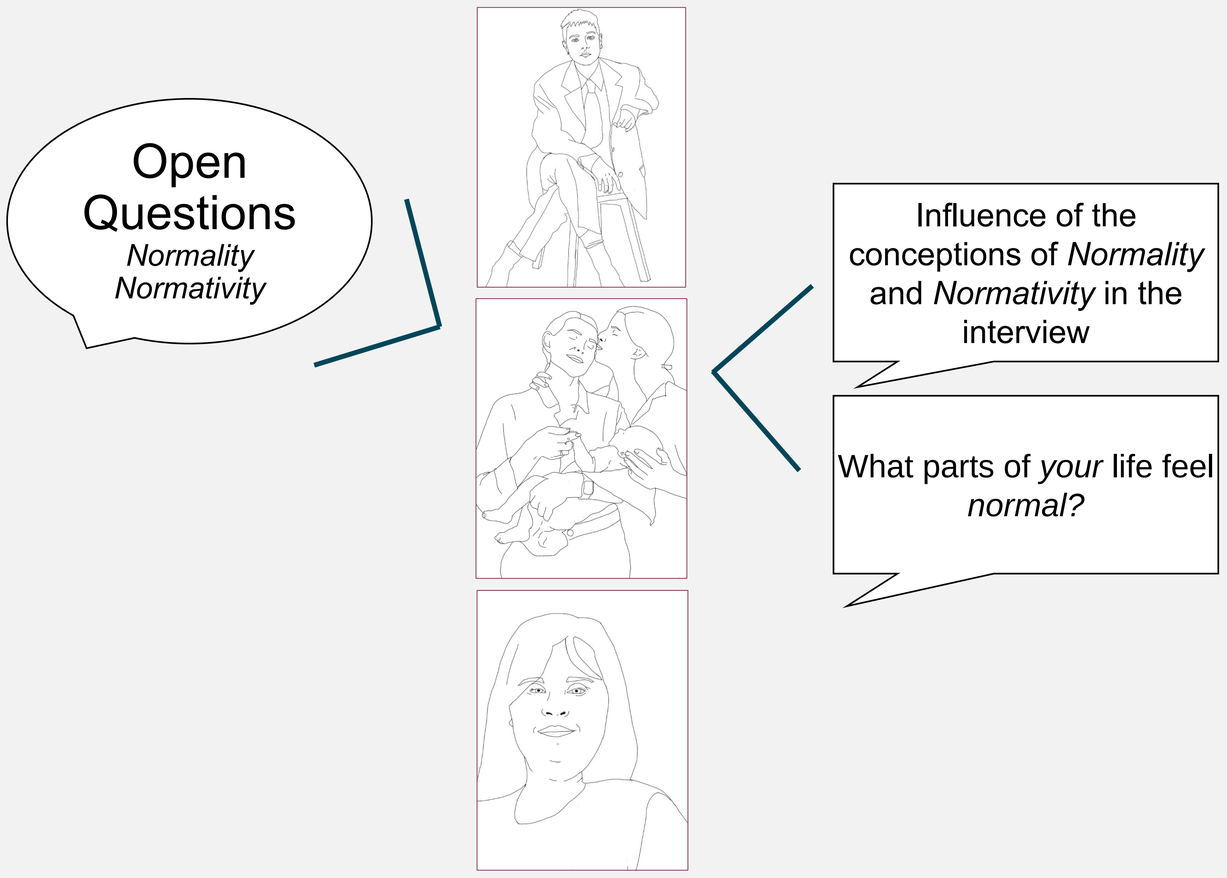

Figure 3 – Interview procedure
Procedure of the semi-structured interview, from open questions about *normality* and *normativity* to more precise examples within biology: pictures (drafts) based on (a) a non-binary person to challenge a binary thinking, (b) a queer couple to talk about naturalistic fallacies and (c) an actress with trisomy 21 to talk about ability-based constructions of normality, closed with open questions about the interview

1. Analysis of boundaries (Link, 2006)

Protonormalism

- Relatively narrow corridor of "being normal"
- Dichotomous categories (e.g., healthy/sick, heterosexual/homosexual)
- Stabilization through legal and normative expectations, rules, and sanctions

Flexible Normalism

- spectrum of "still normal" with flexible boundaries
- Boundaries of normality stem from the center, with peripheral areas
- Sanctions are expected only at the farthest edges, encouragement to self-"normalize" within the boundaries

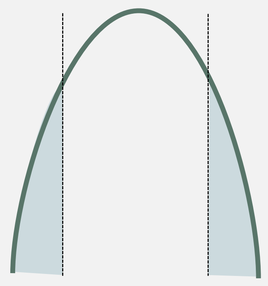

Figure 5 – Protonormalism as graphic

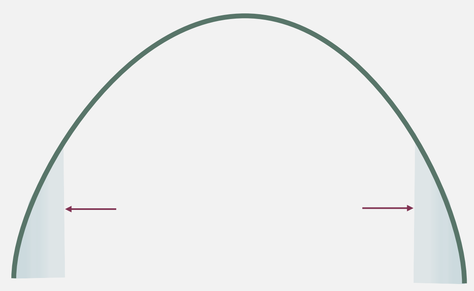

Figure 6 – Flexible normalism as graphic

2. Analysis of reference points

	Description
Socio-cultural ideas (Hirschhauer, 2017)	proximity or distance to one's own identity and construction as a result of comparison
Ability-based construction (Hirschhauer, 2017)	based on performance-related criteria, though often in contrast to "inability"
Othering-processes (Baar, 2019)	through othering processes, i.e., boundary-setting between "I/we" and "the others"

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Possibility to leave comments, feedback and ideas.