

Simon Fraser University Undergraduate Journal of Philosophy, Volume 2, Issue 1. 2020. A Narcissism of Small Differences: Reconciling Acquaintance and Ability responses to the Knowledge Argument - © Claire Qiu

A Narcissism of Small Differences: Reconciling Acquaintance and Ability Responses to the Knowledge Argument

Claire Qiu

Frank Jackson's knowledge argument (KA) presents the case of Mary, a scientist who knows all the physical facts (i.e. those of the natural sciences) but has only ever seen in black and white. Eventually, she sees colour for the first time. The non-physicalist says that Mary learns a new, non-physical fact, as Mary already knew all the physical facts; this entails that Mary's previous knowledge was incomplete, and therefore that non-physical knowledge exists. Drawing upon a version of the acquaintance hypothesis, as well as an intellectual account of knowledge-how, I argue for a physicalist response which says that Mary makes gains in non-propositional knowledge, but also enters a new state of propositional knowledge in gaining knowledge-how. Furthermore, I also argue that knowing what it's like to see a certain colour entails having certain abilities to discriminate between colours.

Key words: The Knowledge Argument, Propositional Knowledge, Acquaintance Hypothesis, Physicalism, Mary's Room

Introduction

Responding against the non-physicalist conclusions of Frank Jackson's knowledge argument (KA), some defenders of a version of the acquaintance hypothesis

support that Mary makes some kind of gain in propositional knowledge when she leaves the room and sees colours — she acquires a new mode of acquaintance with colours, allowing her to form thoughts on this new basis. These defenders (e.g. Grzankowski and Tye, Bigelow and Pargetter) deny that Lewisian abilities account for the gain in propositional knowledge and that they are necessary for Mary to know what it's like to see colours. Grzankowski and Tye also argue that Mary makes some sort of nonpropositional gain in objectual knowledge. While I am sympathetic to many of the claims of acquaintance hypothesis supporters (and embrace the non-propositional gain that Grzankowski and Tye propose), I agree with Cath, who says that the ability hypothesis is in fact compatible with a change in Mary's state of propositional knowledge, and I also argue that gains in knowledge-how are at least necessary for Mary's knowing what it's like to see red. I deny that ability acquisition is merely a potential downstream consequence of knowledge by acquaintance, and argue that Mary gains the ability to base thoughts she may already be able to have, but in a new way; the moment Mary is aware of seeing red, she acquires the ability to discriminate between having or imagining red experiences and having or imagining other experiences. Nanay proposes that this discriminatory ability is sufficient for Mary to know what it's like to see red, but I will only argue for its necessity.

1.1. Background Claims for Versions of the "Old Facts, New Knowledge" Response

Here is a condensed version of the case that KA famously presents: Mary is a scientist who knows all the physical facts (i.e. those of the natural sciences), but through

one way or another, she has only ever seen in black and white; the usual scenario is that she has been locked in a black-and-white room. One day, after being released from the room, she sees red for the first time. It seems that she learns something new (about what it's like to see red). The non-physicalist says that Mary learns a new, non-physical fact, as Mary already knew all the physical facts; this entails that Mary's previous knowledge was incomplete. Therefore, physicalism is false, since it relies on the thesis that all facts are physical (or at least that they supervene on the physical). A common physicalist response is to accept that Mary does gain some sort of new knowledge but deny that this entails her learning any new fact.

Among physicalists who accept that Mary learns something new, but avoid the phenomenal concept strategy, these two competing hypotheses are common: firstly, a version of the acquaintance hypothesis that accepts gains in knowledge, and secondly, the ability hypothesis, which roughly says that Mary's gain in knowledge-how upon seeing red constitutes her knowing what it's like to see red. (In denying that Mary gains any knowledge-that, the ability hypothesis supporter easily denies that Mary learns any new fact.) Let us first look at the version of the ability hypothesis I will be defending, and then explore objections raised to "classic" ability hypothesis claims by some acquaintance hypothesis defenders (namely Grzankowski and Tye, and Bigelow and Pargetter).

1.2. A Modified Ability Hypothesis

The classic ability hypothesis response that Lewis and Nemirow advance, according to Cath, relies on "a negative claim about what Mary does not gain after her release, and a positive claim about what she does gain:

(NEG) Upon release Mary does not gain any new knowledge-that.

(POS) Upon release Mary gains new knowledge-how"1.

This knowledge-how is often identified with abilities that Mary also gains (e.g. imaginary abilities, recognitional abilities, abilities to remember); I will argue that Mary gains the ability to discriminate between having or imagining red experiences and having or imagining other experiences, but remain silent on any other abilities she may or may not gain.

An objection to the classic ability hypothesis, raised by Stanley and Williamson, says that knowledge-how is in fact a form of knowledge-that; this renders their account inconsistent with the classic ability hypothesis. Knowledge-how's truth conditions have been proposed by Stanley and Williamson as the following: "S knows how to F is true if and only if there is some way w for S to F such that S stands in the knowledge-that relation to the proposition that w is a way for S to F^{2} , with an added condition of S knowing this proposition under a practical mode of presentation. Cath suggests modifying the ability hypothesis in the following way, such that it retains the spirit of the original but removes the inconsistency:

"(NEG1) Upon release Mary does not gain knowledge of any new proposition.

(POS) Upon release Mary gains knowledge-how."3

The modification to NEG is due to an ambiguity present in it, which allows it to be separated into the two following claims:

¹ Yuri Cath, "The Ability Hypothesis and the New Knowledge-how," *Noûs* 43, no. 1 (2009): 140.

² Cath, "The Ability Hypothesis," 138.

³ Cath, "The Ability Hypothesis," 143.

"(NEG1) Upon release Mary does not gain knowledge of any new proposition.

(NEG2) Upon release Mary does not come to be in any new state of propositional knowledge." 4

By denying NEG2 (while still accepting NEG1), the modified ability hypothesis is now compatible with any "Old Facts/New Knowledge" response that says that Mary enters a new state of propositional knowledge, while maintaining a philosophically important distinction between knowledge-how and knowledge-that, even though the former is a species of the latter. Furthermore, I leave open the question of whether Mary's knowledge-how is identical to her ability or abilities, and I deny that any ability she gains must be utterly distinct from any knowledge-that.⁵ This will be important later, when I reconcile the modified ability hypothesis with some claims advanced by acquaintance hypothesis supporters.

2. What Do "Old Facts/New Knowledge" Acquaintance Hypothesis Supporters Think?

Grzankowski and Tye are uneasy about the notion that any propositional thought is off-limits to Mary, though they believe that "[...] it is necessary and sufficient for knowing what it is like to experience red that one have a propositional thought which constitutes knowledge and which is an appropriate answer to the question 'What is it like to experience red?' If this is correct, non-propositional epistemic gains of the sort offered by

⁴ Cath, "The Ability Hypothesis," 142-143.

⁵ Cath, "The Ability Hypothesis," 145.

the Ability Hypothesis or the Acquaintance Approach don't look to be of the right form to explain Mary's epistemic growth"⁶. However, Grzankowski and Tye argue that "there is a kind of non-propositional knowledge by acquaintance, that it cannot be reduced to propositional knowledge, and that Mary (before experiencing red) doesn't have it."⁷ In particular, Mary ends up gaining objectual knowledge by acquaintance that is an example of a non-propositional, intentional state. It is non-propositional, in that it is not truth-apt or evaluable for accuracy, and intentional because it has aboutness or directedness⁸. "To know simple sensible qualities [such as red], it is necessary and sufficient that one meet them in experience"⁹.

Moreover, Grzankowski and Tye argue for a relation of epistemic basing between a thought which answers the question "What is it like to experience red?" and the acquaintance she has with red. Roughly speaking, her acquaintance provides a *good reason* for her beliefs about experiences of red. Mary, being practically omniscient about physical facts, can have all the possible propositional thoughts (and concepts)¹⁰ about red even before seeing it — for instance, she knows how others react to seeing red in a variety of circumstances and she holds beliefs such as "Seeing red is closer to seeing yellow than hearing a piano play a C-major chord". Therefore, it can be said that Mary knows what it's like to see red if she forms some appropriate thought based on her acquaintance. I will grant that this account may be true, but there is still room left to

_

⁶ Alex Grzankowski and Michael Tye, "What Acquaintance Teaches," in *Acquaintance: New Essays*, ed. Thomas Raleigh & Jonathan Knowles (Oxford University Press, forthcoming), 1.

⁷ Grzankowski and Tye "What Acquaintance Teaches," 3.

⁸ Grzankowski and Tye "What Acquaintance Teaches," 4.

⁹ Grzankowski and Tye "What Acquaintance Teaches," 6.

¹⁰ Following Burge and the Arthritis-Man, I am convinced that Mary already possesses deferential colour concepts.

debate the nature of the thought that Mary must form and whether there is a change to her *state* of propositional knowledge even though she can already have all the possible propositional thoughts about red experiences.

While Grzankowski and Tye recognize ties to the ability hypothesis, they claim that "Mary can know what it's like by looking at red and thinking an appropriate thought on its basis while lacking all those abilities. So the Ability Hypothesis fails to provide a necessary condition for knowing what it is like. But we do think that someone who has the abilities to recall, imagine and identify has something important. Their abilities *sustain* their acquaintance and allow them to retain the link between it and a retained propositional answer."¹¹

Bigelow and Pargetter object to the ability hypothesis in a not-dissimilar way to Grzankowski and Tye: the former "[...] argue that there are no relevant abilities that she must *always* acquire when she sees colours and thereby comes to 'know what it is like' to see colours. We argue that there are no relevant abilities that she could acquire *only* by coming to see colours for herself. Even when she does acquire abilities, she acquires those abilities *because* she has learned what it is like to see colours—and the acquisition of those abilities is *not* what *constitutes* knowing what it is like"¹². Curiously, they do say that Mary acquires in a

[...] relatively trivial manner [...] new ways of categorizing things. She acquires the ability to categorize things in terms of whether or not they possess the

12 - 4 - - -

¹¹ Grzankowski and Tye "What Acquaintance Teaches," 16.

¹² John Bigelow and Robert Pargetter, "Re-acquaintance with qualia," *Australian Journal of Philosophy* 84, no. 3 (2006), 372.

relational property of 'being like this new thing': whereas beforehand she could only categorize things in terms of whether or not they possessed the relational property of 'being like those old things'. [...] *for Mary*, there is also a new way of referring to properties of her experiences, one which constitutes a far from trivial acquisition. She stands in new kinds of relationships to these properties of experiences, which had previously been instantiated only in other people. These new kinds of relationships enable her to say, and to think, 'old things 'in 'new ways'.¹³

This account allows them to tie in positive claims about the properties of experience (which, of course, are physical for Bigelow and Pargetter) — they do not importantly differ in kind from person to person, but merely stand in different relationships.

2.1. Specific Objections to the Ability Hypothesis by Acquaintance Hypothesis Supporters

It is easy to see that the aforementioned acquaintance hypothesis defenders make rather hasty rejections of the ability hypothesis, even as they acknowledge that it was somewhere on the right track. Let me go over the notable objections:

1. From Grzankowski and Tye: The ability hypothesis offers only non-propositional epistemic gains and thus does not meet the condition that it is necessary and sufficient for knowing what it is like to experience red that one have a propositional thought which

-

¹³ Bigelow and Pargetter, "Reacquaintance with qualia," 362.

constitutes knowledge and which is an appropriate answer to the question 'What is it like to experience red?'.

Response: One can use the modified ability hypothesis instead, which renders it compatible with the condition of having a propositional thought and having some change in one's state of propositional knowledge.

2. From Grzankowski and Tye (also applies to Bigelow and Pargetter): Mary can know what it's like by looking at red and thinking an appropriate thought on its basis while lacking all those abilities. So the Ability Hypothesis fails to provide a necessary condition for knowing what it is like.

Response: In the words of Nemirow, making such "radical hypothetical alterations" to Mary's mental apparatus 14 may have unintended consequences. I think that at the moment of seeing red, in order for Mary to know what it's like, she must have some ability to distinguish between her current, first-hand experience of seeing red and her previous experiences. Otherwise, she will not have based any thoughts about red experiences in the correct way; she may be seeing red, but if she somehow lacks this ability and thus fails to believe that seeing red is any different from seeing black, then it cannot be said that she knows what it's like to see red. However, this is not necessarily a fatal flaw for Grzankowski and Tye, for the more charitable interpretation of their objection is to say that Mary does not in fact *gain* any particular ability through seeing red. I will explore ability acquisition later.

14 Lawrence Nemirow, "So This Is What It's Like: A Defense of the Ability Hypothesis," in *Phenomenal Concepts and Phenomenal Knowledge: New Essays on Consciousness and Physicalism*, ed. Torin Alter

Concepts and Phenomenal Knowledge: New Essays on Consciousness and Physicalism, ed. Torin Alter and Sven Walter (Oxford University Press, 2007), 34.

3. From Bigelow and Pargetter. We argue that there are no relevant abilities that she could acquire only by coming to see colours for herself. Even when she does acquire abilities, she acquires those abilities because she has learned what it is like to see colours—and the acquisition of those abilities is not what constitutes knowing what it is like.

Response: This is a trickier objection; following my previous statement about ability acquisition, I believe that the task of the ability hypothesis defender is not to merely show that Mary has any ability or abilities in the moments that she knows what it's like to see red, but rather that she *lacked* those abilities beforehand and needed to see red for herself to gain them. Furthermore, the matter of explanatory and causal priority at hand here is also unintuitive to address, since there is no temporal gap between Mary seeing red and acquiring some ability or knowledge-how¹⁵. However, even if acquaintance is a precursor for abilities, I believe that there is a new claim being made when it is affirmed that Mary must exercise those abilities in order to know what it's like. These issues will be elaborated upon in the following sections.

3. The Modified Ability/Acquaintance Synthesis

My first claim is straightforward and (hopefully) uncontroversial, and establishes that knowing what it's like to see red entails a certain ability:

¹⁵ Bence Nanay, "Imagining, Recognizing and Discriminating: Reconsidering the Ability Hypothesis," *Philosophy and Phenomenological Research* 79, no. 3 (2009), 711.

Claim 1: If Mary knows what it's like to see red, then Mary has the ability to discriminate between having or imagining red experiences and having or imagining other experiences¹⁶.

For Mary to know what it's like to see a specific colour, she must first distinguish her experience of that colour from her experiences of other colours. Nemirow's response to the red 17 case helps to illustrate this:

Consider what abilities Tye's Mary must have in order to know what it is like to see red 17 while seeing red 17. First, she must be able to reliably distinguish red 17 from samples of red 16 and red 18 that are placed before her next to the sample of red 17. If she lacked this ability, we would be inclined to deny that she knows what red 17 looks like even while looking at red 17, since she can't recognize it. (We might agree, however, that she knows what it's like to see a more broadly defined spectrum of color that could be designated "red (16–18)".)¹⁷

Claim 1 is very similar to what Bigelow and Pargetter have acknowledged (that Mary gains the ability to categorize things according to whether they have the relational property of 'being like this new thing'); however, it does not require their specific ontological account.

I leave open the possibility that this discriminatory ability may be a reducible entity (i.e. that it is composed of other abilities which, together, let Mary distinguish the relevant experiences).

¹⁶ Nanay, "Imagining, Recognizing and Discriminating," 705.

¹⁷ Nemirow, "So This Is What It's Like," 36.

My second claim is as follows, and has the purpose of maintaining consistency between the ability hypothesis and changes in one's state of propositional knowledge (as we accept that knowledge-how may be a species of knowledge-that):

Claim 2: If Mary has the ability to discriminate between having or imagining red experiences and having or imagining other experiences (and this action is intentional)¹⁸, then she has the knowledge-how to discriminate between having or imagining red experiences and having or imagining other experiences.

For Stanley and Williamson, "intentional actions are 'employments of knowledge-how'"¹⁹, and ability entails knowledge-how (but not necessarily vice versa). My argument does not depend on whether ability and knowledge-how must be identified with each other, but I will act on the thought that it is more plausible that there is some degree of separation.

My next few claims require more support; to convince the acquaintance hypothesis to accept some elements of the ability hypothesis, I must not only show that all the elements are compatible, but that the presence of the ability hypothesis elements is more plausible than their absence:

Claim 3: Necessarily, Mary gains some knowledge-how the moment she knows what it's like to see red.

Following Grzankowski and Tye, I agree that Mary does not in principle have any propositional thoughts off-limits to her even before seeing red; Mary gaining knowledge-how involves her holding the same propositions, and upon seeing red, she may think any relevant thoughts about red that she could already have had beforehand. Rather than

-

¹⁸ Cath, "The Ability Hypothesis," 146.

¹⁹ Cath, "The Ability Hypothesis," 146.

relying on Stanley and Williamson's claim that Mary knows an old proposition under a new mode of presentation (something that Grzankowski and Tye reject), I will instead put forth these suggestions:

Claim 4: Mary's knowledge-how must be based in her acquaintance with red.

Claim 5: In order for Mary to know what it's like to see red, it is necessary for Mary to 1) have objectual acquaintance with the sensible quality (in this case, red) and 2) have knowledge-how that allows her to discriminate between having or imagining experiences of red and having or imagining other experiences.²⁰

Claim 6: Gaining knowledge-how entails that Mary learns how to do something.

The addition I wish to make to Grzankowski's and Tye's account is that the thought process Mary must have in order to know what it's like to see red is an exercise of her knowledge-how. Her acquaintance with red "upgrades" previous propositional knowledge about red into knowledge-how.

Some questions arise: "Firstly, why does Mary gain *knowledge-how*, in particular? Secondly, can we really say that she *has* gained any new ability or knowledge-how? Doesn't Mary, with her vast knowledge of neurophysiology and colour science, already know how people know what it's like to see red? Isn't Mary's knowledge-how still insufficient for her to know what it's like to see red?" To answer the first question, there is a general agreement among Stanley and Williamson and Grzankowski and Tye that the distinction between knowledge-that and knowledge-how involves the latter having some further connection to "ability, action, or performance" though Grzankowski and

²⁰ In the Mary scenario, these two components are also sufficient for her to know what it's like to see red.

²¹ Grzankowski and Tye, "What Acquaintance Teaches," 15.

Tye specify that it is to a particular way in which Mary's knowledge is formed; either way, Mary, operating on the basis of her acquaintance, can now *wield* her knowledge in a way she couldn't before by performing an intentional action — thinking the appropriate thought about red.

The second question (and its sub-questions) can be answered by bringing in Wallbridge's account of subject-specific knowledge-how. He proposes that "S knows how to phi iff S knows of some way w, that w is a way *for some person P* to phi, where who the relevant P is can shift from context to context"²². Let's look at a simple non-Mary example first, in which someone asks "Do you know how to play this scherzo by Chopin?" to a distinguished piano performer whose arthritis is now too severe for her to play the piano:

Context 1: The asker is an event manager who is looking to find performers for a concert.

Context 2: The asker is a student who is looking to learn how to play the Chopin scherzo.

In the first context, we cannot say that the piano performer knows how to play the scherzo—it is not enough for her to know how a way that someone with healthy fingers could play it. She must know a way for *her* to play the scherzo. However, in the second case, the performer's knowing a way for her healthy student to play the scherzo does suffice for an affirmative answer to the question.²³ The idea is that Mary, before seeing red, finds herself in a situation analogous to context 1: she cannot answer yes to the (admittedly

²² Kevin Wallbridge, "Subject-specific intellectualism: re-examining know how and ability," *Synthese* (2018), 11.

²³ Wallbridge, "Subject-specific intellectualism," 12.

unwieldy) question "Do you know how to know what it's like to see red?" even though she knows a way that people who are not locked in black-and-white rooms know what it's like to see red. Only after seeing red can she answer yes.

4. Why Discriminatory Ability, While Necessary, May Not be Sufficient

This qualification to discriminatory ability is somewhat technical, but it is worth mentioning in order to bring light to the difficult-to-elucidate notion of a "red experience". Here is my last principal claim:

Claim 7: Having the ability to discriminate between having or imagining experiences of red and having or imagining other experiences does not entail knowing what it's like to see red.

Colour phenomenology turns out to be much more complex than the common notion of "colour sensation"²⁴, which seems to be what "colour experience" generally constitutes (i.e. something along the lines of a simple, sensible qualitative particular). Our visual system doesn't process for colour *per se* — rather, it engages in a variety of tasks such as processing for contrast, brightness, texture, motion, etc. A "red experience", I think, should be understood as involving multiple components (phenomenological or otherwise), among which "red sensation" may be a part; it is, however, not as intuitive as one might assume to figure out exactly which components are essential for the experience.

²⁴ Martin Hahn, "Phenomenal Concepts." Class lecture, Simon Fraser University, Burnaby, BC, June 5, 2019.

In a study by Heywood et. al, an achromatopsic subject named M.S. was able to make out certain shapes even though he did not see those shapes as differing in colour from surrounding patterns; for instance, when viewing Ishihara plates at a certain distance, he could read the numbers correctly, but he always described the numbers as grey or the same colour as the surround²⁵. Heywood et. al also state that "M.S.'s inability to select the chromatic target from an array of neutral greys differing in brightness is consistent with a complete absence of the conscious appreciation of colour"²⁶. This case is contrary to our intuition that we see a number or shape *because* we see it as a different colour from the background. Instead, M.S. relied on his ability to detect chromatic borders, and was still able to perform heterochromatic brightness matches.

The relevance to the Mary case is that someone could in principle have a sort of "red experience" without having colour sensations, and therefore be able to discriminate between those red experiences and other experiences through components of colour phenomenology that do not involve the popular notion of red sensation. However, we would be reluctant to admit that someone like M.S. actually knows what it's like to see red, even if he has a specific phenomenology associated with that colour. For someone like Mary, who has intact cognitive and physiological functions, gaining the discriminatory ability will certainly help to fill in the puzzle; but it is not sufficient by itself in all cases.

This complication about colour experience is a general caution about the casual usage of the phrase; while it could be said that interlocutors generally understand and share the irreducible notion of "red sensation" or "red experience" ("But seeing red *just is*!

²⁵ Heywood et. al, "Chromatic Discrimination in a Cortically Colour Blind Observer," *European Journal of Neuroscience* 3 (1991), 807.

²⁶ Heywood et. al, "Chromatic Discrimination," 810.

Why do we need to complicate the idea of a red experience when everyone knows what we mean by it?"), I think we should be aware that many different functions and abilities actually go into colour detection and discrimination. To isolate "red experience" in a way that is too far removed from the reality of how people come to see red risks carrying the dialectic into convoluted speculation.

5. Conclusion

It is somewhat surprising that acquaintance hypothesis defenders have been dismissive of the possibilities that the ability hypothesis offers, as well as some basic intuitions about what Mary can and cannot do before seeing red. At its core, the ability hypothesis is flexible — defenders can choose to defend different abilities, and also make use of different accounts of knowledge-how; in order to offer a rapprochement with the acquaintance hypothesis supporters covered in this paper, I have offered an intellectualist version of knowledge-how, but it may very well be possible to maintain a hybrid ability/acquaintance view without defending intellectualism. Under the hybrid account, abilities do not wholly constitute knowing what it's like, but they remain a necessary condition. I also leave open the possibility of a viable "pure" ability hypothesis; how such a hypothesis is defended will depend heavily on whether one chooses to go with an intellectualist or anti-intellectualist account of knowledge-how, since the characterization of the knowledge-how/knowledge-that distinction is quite important for physicalist responses to KA and determines whether one thinks that Mary either makes no changes

in her propositional knowledge at all, or if her propositional knowledge changes in a way that does not rule out physicalism.

Bibliography

- Bigelow, John and Robert Pargetter. "Re-acquaintance with qualia." *Australasian Journal of Philosophy* 84, no. 3 (2006): 353-378.
- Cath, Yuri. "The Ability Hypothesis and the New Knowledge-how." *Noûs* 43, no. 1 (2009): 137-156.
- Grzankowski, Alex and Michael Tye. "What Acquaintance Teaches." In *Acquaintance: New Essays*, edited by Thomas Raleigh & Jonathan Knowles, 1-20. Oxford University Press, forthcoming.
- Hahn, Martin." Phenomenal Concepts." Class lecture, Simon Fraser University, Burnaby, BC, June 5, 2019.
- Heywood, C.A., A. Cowey and F. Newcombe. "Chromatic Discrimination in a Cortically Colour Blind Observer." *European Journal of Neuroscience* 3 (1991): 802-812.
- Nanay, Bence. "Imagining, Recognizing and Discriminating: Reconsidering the Ability Hypothesis." *Philosophy and Phenomenological Research* 79, no. 3 (2009): 699-717.
- Nemirow, Lawrence. "So This Is What It's Like: A Defense of the Ability Hypothesis." In *Phenomenal Concepts and Phenomenal Knowledge: New Essays on Consciousness and Physicalism*, edited by Torin Alter and Sven Walter, 33-51. Oxford University Press, 2007.
- Wallbridge, Kevin. "Subject-specific intellectualism: re-examining know how and ability." *Synthese* (2018): 1-20.