

Deliverable D1.1

ESR1 Document: *Preliminary Synthesis*

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Executive Summary

Objectives: Co-creation is a promising avenue for solutions to public health issues. To date, coherent, rigorous and systematic frameworks for co-creation, including theoretical and methodological principles, are currently lacking. Health CASCADE aims to develop such a framework for co-creation in public health. This report describes the first steps towards developing theoretical principles for co-creation in Public Health including: proposing a definition and exploring a potential theoretical lens for understanding evidence-based co-creation.

There are wide-ranging definitions given for the term ‘co-creation’ but in short, Health CASCADE tentatively uses the following working definition: *“An evidence-based methodology for the development, implementation and evaluation of innovations through continuous, open collaboration, interactional knowledge production and shared decision-making among key stakeholders, directed at improving public health”.*

Methods: A (traditional) literature review and primary semi-structured interview (undertaken with researchers in the field of co-creation within public health) were the twofold methods adopted.

Key Findings: Health CASCADE is seeking to provide a methodology for the combination of an evidence-based approach (“mode 1”) and co-creation (“mode 2”). Further, participatory typologies, like Arnstein’s ladder, are very simplified conceptualisations of how participation (adult and child respectively) is seen in a project / research / programme, and so caution must be exercised.

It became clear that co-creation / transdisciplinary knowledge claims are not referenced to a solely objective or subjective reality. Further when exploring suitable lenses, an ontology called ‘critical realism’ emerged in the literature and the primary interviews, as a potentially suitable lens which may be worthwhile to investigate further. For instance, as the propositions of critical realism considers objective reality as well as the role of subjective interpretation in framing reality, it could provide the balance needed for allowing co-creation.

The application of thematic analysis to the primary interview data revealed some important insights. For example, when incorporating paradigms¹ within co-creation theory framework, the interviewees advocated for the best principles from multiple paradigms to be used, and thus not merely relying on one paradigm.

¹ A paradigm is a specific set of concepts and theories, methods in research, assumptions and standards

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Next steps: Although this document produced by ESR1 helped to pave the way for some first steps and ideas, ESR1 will next take a rigorous and systematic approach in forming a theoretical framework for co-creation. An example of a next possible step could include conducting a systematic literature review of existing studies applying co-creation to public health. This may involve using the ‘concept analysis’ technique put forward by Nuopponen, 2010), in exploring the application of critical realism constructs to co-creation, and from there, the development of methodological principles.

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Part A: ‘Setting the stage’

1) Short introduction

A consistent but tentative working definition for Health CASCADE was set for the project. The method and methodology in this section outlines how the resulting definition was determined. This resulting provisional definition is also given as central to the goal of the Health CASCADE project.

2) Method and methodology

<u>Method</u>	<u>Methodology</u>
A (traditional) literature review process was undertaken using Google Scholar.	The method was used to find and extract 30 relevant publications on the subject of ‘co-creation’ by using terms like “co-creation” AND “public health”. However not all literature included were exclusive to the public health field. The search for such definitions were terminated after the ESR1 determined saturation point. Following this process, dominant themes which were found in common as spread across the 30 publications were extracted and formulated across several draft versions. The refinement of these draft versions were informed by input given by a) HC consortium members during pertinent workshops, b) all WP1a members during specific WP1a meetings. See Appendix A for the specific 30 definitions selected and their corresponding author(s).

3) Result: Tentative HC working definition of co-creation

The following provisional definition has been set, and comprises the essence of the Health CASCADE project goal:

“An evidence-based methodology for the development, implementation and evaluation of innovations through continuous, open collaboration, interactional knowledge production and shared decision-making among key stakeholders, directed at improving public health”.

Part B: Literature Synthesis

1) Short Introduction

In giving the literature review a direction, the following research question was posed: *What theoretical constructs and lenses can be used as a basis for understanding co-creation?* In exploring this question, several themes cropped up, including, ‘mode types’, participatory models, epistemological and ontological considerations, such as ‘critical realism’ as a possible lens for co-creation study, underpinning methodological principles and paradigms like Participatory Action Research (PAR) and Participatory Health Research (PHR). The content from this literature synthesis may aid in understanding co-creation from a theoretical perspective and can be points for further investigation.

2) Method and methodology

<u>Method</u>	<u>Methodology</u>
(Traditional) literature review process using Google Scholar.	This method was guided by a clear and overarching research question as follows: “What theoretical constructs and lenses can be used as a basis for understanding co-creation?”. Key terms were inserted into Google Scholar like “co-creation” AND “theory”. Concepts were considered relevant and important when they came up in multiple publications/sources. In addition to this, prior knowledge of ESR1 played into the selection process, as their background is in the Social Sciences (i.e. policy/ social research/ demographics/ human geography) – so ESR1 was relatively familiar with concepts that were felt to be pertinent to co-creation. The synthesis was structured in a clear and logical way in order to ensure that a common basis for understanding could be provided. This was supported by various figures and tables – including outputs entirely devised by ESR1 with relevant supporting materials.

3) Results

Mode Types including Critiques

Three ‘modes’ emerged in the theoretical literature in terms of understanding the different kinds of knowledge production within research. “Mode 1” and “mode 2” are presented in the leading work of Gibbons (2000). “Mode 3” is referred to in the work of Carayannis et al. (2018a,b). *Table 1* displays the main differences between these modes. “Mode 1” is a traditional scientific model which is arguably most ‘rigid’ as it is hierarchal, and prioritises certain methods and expertise over others. On the other hand, “mode 2” is compared with co-creation, emphasizing that knowledge production among stakeholders is crucial (Greenhalgh et al., 2016), and highlights the trends in recent science systems (Hessels and Lente, 2010). For instance, “mode 2” / co-creation emphasises knowledge production (knowledge sharing) which can take place between academics and society (ibid), whereas “mode 1” prioritises knowledge translation. Furthermore, “mode 2” concerns the production of context-specific knowledge (Gibbons, 2000). This means that knowledge derives from an application, relating to a particular and local problem, in which an immediate solution is sought for (Aram and Salipante, 2003). In this way, it draws on a variety of perspectives, expertise and skills which are multi-disciplinary in nature (Langley et al., 2018). Further to this, “mode 2” has a more bottom-up and transient structure, which is of higher social accountability and reflexivity than the traditional “mode 1” (ibid). It can be argued that “mode 1” is a more traditional, evidence-based and closed science whereas “mode 2” is a more contemporary, evidence-informed and open science.

“Mode 1”	“Mode 2”	“Mode 3”
Problems proposed and resolved by a specific community, with respect to a discrete scientific discipline	Problems proposed and resolved in the context of applications	Dynamically uniting different and complex perspectives (FREIE institutional and organisational architecture)
Disciplinary	Trans-disciplinary	Open innovation ecosystem
Homogeneity	Heterogeneity	Higher-order-learning
Hierarchical organisation	Heterarchical organisation	Pro-active and socio-technologically strategic
Permanent	Transitional	Cross-cutting visions, missions, strategies and tactics
Peer quality control	Quality control by diverse actors	Fundamentally self-managing
Less socially accountable	More socially accountable and reflexive	Complementary and reinforcing research

Table 1: The distinction between “mode 1”, “mode 2” and “mode 3”. Information taken from source: *Gibbons et al., 1994* cited in *Jiménez, J., 2008* and *Carayannis et al., 2018a*.

To elaborate further on “mode 2” in terms of knowledge production, Nowotny et al. (2003) have delineated its five characteristics (See *Figure 2*).



Figure 2: Author’s own diagram of the five characteristics of “mode 2” as put forward by source: Nowotny, H., Scott, P. and Gibbons, M., 2003. Introduction: ‘mode 2’ revisited: The new production of knowledge. *Minerva*, 41(3), pp.179-194.

Despite the usefulness of “mode 2” for co-creation, it could be argued that its conceptualisation and empirical assessment in general requires further development and refinement (Hessels and Lente, 2010). Another critique has been given by Bartunek’s (2011:556) paper, claiming “at the very least, it appears that while “mode 2” has stimulated thinking, it has not bridged academia and practice as much as had been hoped for”. Also, Thorén and Breian (2016) argue that “mode 2” persists as a concept that has indeterminate

implications, such as its epistemological basis. It has also been posited that “mode 2” may appear more in line with a political ideology as opposed to a description-based theory (Hessels and Van Lente, 2008). Lastly, as articulated by Soofi (2018), notwithstanding the efforts made by academics to demonstrate the pertinence of “mode 2” to medical research, there is a lack of thorough explanations as to how “mode 2” works within such domain, arguable including public health.

Recently, “mode 3” was proposed in reflecting a novel and more progressive ‘entrepreneurial university’. “Mode 3” is inclined towards innovative means of engaging various principles of knowledge production and associated application. “Mode 3” seeks to integrate and associate “mode 2” and “mode 1” organisations to improve knowledge production, through higher level learning dynamic capacities and abilities. Through “mode 3”, “the co-existence and co-evolution of different knowledge and innovation paradigms” can be realised (Carayannis et al. (2018b:151). Therefore, “mode 3” seems to be a possible avenue to consider further in relation to the context of evidence enabled through co-creation within the Health CASCADE project.

Participatory models

Although the realisation of “mode 2” / co-creation can be deemed more recent, participatory research has a long history. However, Collins and Ison (2006) argue that the epistemological underpinning of participation has not been robustly investigated, and therefore carries risks with how it is ‘practised’ as well as sustaining implications on potentially an inappropriate use of tools and techniques. Other challenges that participatory research is facing, include managing the theoretical and conceptualisation of participation, how to underpin the research with analytical frameworks and how to evaluate participatory research (Carpentier, 2016).

Regardless, there have been some models put forward in an effort to conceptualise participation. One well-known model on participation is that of Arnstein (1969). In their work, they produced a typology consisting of eight ‘rungs’ of participation in aiding understanding around extents of citizens’ power with influencing the outcome (of a programme). In the lowest rungs there are ‘non-participation’ - ‘manipulation’ and ‘therapy’, which is said to be an alternative to real participation where the aim is embedded in the power holders educating or curing the participants. Further up the rungs is tokenism – ‘informing’ and ‘consultation’, and although in these cases participants feel like they have a voice and can hear other voices, they lack power in ensuring that their voice is noticed by the power holders with no guarantee that the existing state of affairs will change in their favour. ‘Placation’ is merely a higher form of tokenism since the participants have some capacity to

advise, except the power holders have the sustained right to decide. The top three rungs of the ladder are ranks of citizen power with rising extents of decision-making ability. There is 'partnership' which permits participants to enter negotiations and take part in compromises with power holders. Then there is 'delegated power' and at the highest rung 'citizen control', in which case participants assume the most decision-making capacity or meet full decision-making potential. Refer to *Figure 3* which shows Arnstein's typology.

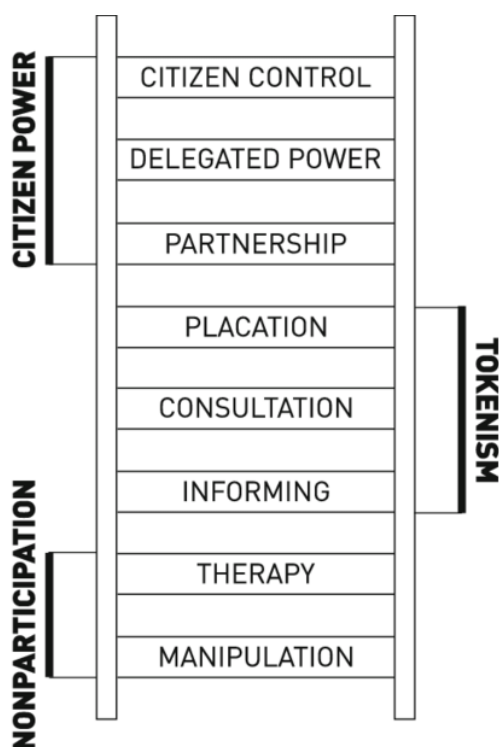


Figure 3: Arnstein's ladder of participation rungs, taken from source: Vardouli, T., 2015. Who designs?. In *Empowering users through design* (pp. 13-41). Springer, Cham.

There are, however, caveats to this work posited by Arnstein. One could argue that the model does not account for the fact that there could be differing levels of participation in various research phases. Further, this participatory typology is very hierarchical in nature of participation – for instance, a higher level of participation is not necessarily 'better', and instead depends on the research project. Also Gershman (2013) points to the fact that given the ladder is too broad, academics must draw on the uniqueness of each case inherent to a given research project. Additionally, Afolabi's (2016) work implies that the comparison of each case with certain 'rungs' is not linear. Certainly Arnstein has reflected in her work the drawbacks which accompany her conceptualisation of participation – including the simplified nature of it (Cardullo and Kitchin, 2019).

Unlike Arnstein's ladder which has an adult focus, Hart's work reflects a participation model for children (Hart, 2008). In fact, Hart's work was based from Arnstein's (Hinton, 2008), and

in a similar vein consists of a ladder with eight rungs; which can be divided into ‘non-participation’, namely ‘manipulation’, ‘decoration’, and ‘tokenism’, as well as a ‘degrees of participation’, including ‘assigned but informed’, ‘consulted and informed’, ‘adult-initiated, shared decisions with children’, ‘child-initiated and directed’, and the highest rung being ‘child-initiated, shared decisions with adults’.

Hart’s work, like Arnstein’s, has been very influential, and can be traced to papers by Lansdown (2001) and Shier (2001). For illustration, in this work, Shier developed a novel model for optimising children’s participation in making decisions, and this model reflects five levels of participation as outlined:

- 1) Children are listened to
- 2) Children are supported in expressing their views
- 3) Children’s views are taken into account
- 4) Children are involved in decision-making processes
- 5) Children share power and responsibility for decision-making

However, Treseder’s (1997 cited in Kellett, 2009) work analyses Hart’s downfall in not recognising the cultural facet to participation. For instance, by identifying the cultural component to participation, it may be better tailored to the stakeholders. Treseder invented their own participation model, which borrows the top five rungs from Hart’s typology except organises them in a circle, in reflecting that they are dissimilar yet equal types of ‘good participation’ – this may, by some, be interpreted as a good attempt in getting rid of the hierarchical ladder.

Another paper by Wetzelhütter and Bacher (2015) had sought to develop a measurement instrument for Hart’s (1992) participation ladder. Their paper was inclined to consider whether participation in school can be measured in a one-dimensional way in line with Hart’s supposition. These authors found much difficulty in separating the eight rungs of participation, for instance with the nature and categorisation of ‘sufficient’, ‘symbolic’ and ‘deficient’ participation. Hinton (2008:288) contends that “often the question of who is included or excluded and on what grounds remains unquestioned”. Hinton argues that such a “snapshot approach” given by the mentioned participation typologies can hinder reflections on processes and power dynamics. Similarly, work by Reed et al. (2018) has shown why different engagement types can implicate on outcomes for stakeholders.

A theoretical lens for co-creation methodology

When considering a suitable lens² for co-creation, it was vital to start off by exploring its corresponding knowledge claims. Regeer and Bunders-Aelen’s (2009) work showed that the knowledge claims deriving from co-creation are neither about an entirely objective or subjective reality. In their work, they argue that knowledge in co-creation is said to be context-specific, where facts and ideas are difficult to distinguish and both internal and external drivers in co-creative research are possible. See *Figure 4* for a relevant output showing “mode 1” and “mode 2” knowledge between science and society, where an epistemological shift can be identified for transdisciplinary research.

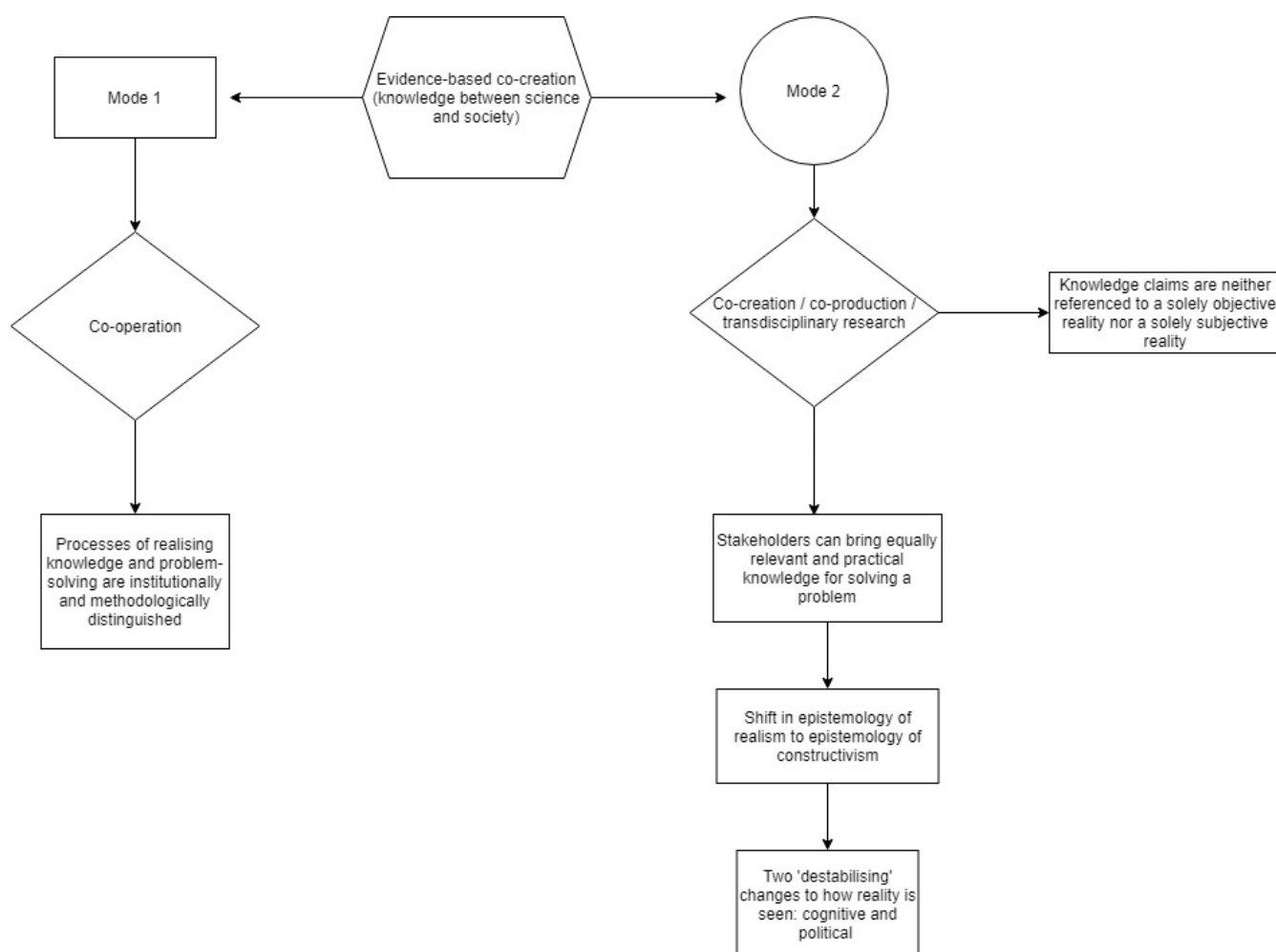


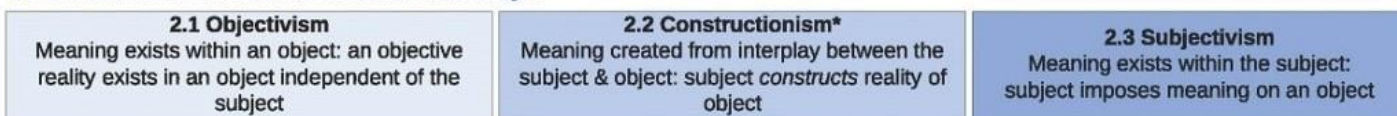
Figure 4: Diagram showing the link of “Mode 1” and “Mode 2” knowledge between science and society based on work from Regeer and Bunders-Aelen (2009).

² Lens in this context refers to the framing, approach, and means of understanding the research parameters and scope

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In addition, the theory of knowledge and reality is important to understand in terms of epistemologies and ontologies. Epistemology is about what counts as knowledge – so the approach in which researchers take to structure research for gaining knowledge. Relatedly, ontology is about how certain researchers can be about the phenomenon of their research. Both epistemology and ontology exist on a spectrum with “realism” (i.e. where one reality exists) on one end, to “relativism” (i.e. where multiple realities exist) on the other – see *Figure 5* for both the spectrums.

2.0 EPISTEMOLOGY: How do we create knowledge?



* Constructionism can exist in weaker (more positivism) to stronger (more interpretivist) forms

1.0 ONTOLOGY: What exists in the human world that we can acquire knowledge about?

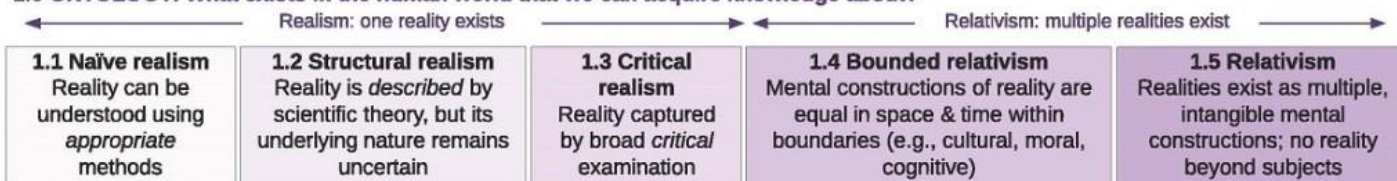


Figure 5: Epistemology and Ontology Spectrum given by Moon and Blackman (2014).

Given the variety of epistemologies and ontologies that exist, there are different kinds of theoretical lenses which could be used to frame research. See *Table 2* for a description of each theoretical lens as linked to either epistemology and ontology, and further aligned with a main critique.

Epistemology		
	<u>Lens description</u>	<u>Critique</u>
<i>Objectivism (positivism)</i>	Accepts only empirical (e.g. measurable) experiences about reality; with findings about positive or absolute truths	Asserts that truth about reality is best given by meticulously planned observations
<i>Constructionism*</i>	Posits that meaningful human reality is not entirely objective but	Appears to reject natural laws about human agency, and rather contending

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	constructed by people via their interactions and perspectives	that processes are both individualized and context-specific
<i>Subjectivism (interpretivist)</i>	People form knowledge as they understand their experiences of reality (socially-constructed meaning)	Focuses on values and therefore not generalizable to the extent that it directly applies to other people
<i>Ontology</i>		
	<u>Lens description</u>	<u>Critique</u>
<i>Naïve realism</i>	Suggests that given normal circumstances, everything is how we perceive them to be	Not appropriate lens for research that is not directly perceptible
<i>Structural realism</i>	Maintains that there is a singular version of reality that can be identified, yet the structures (like norms, technology etc.) can influence it such that the nature of reality can change	Merely interested in the structure of the unobservable world and not about its nature
<i>Critical realism</i>	Considered an all-inclusive philosophy of science as it uses both the positivist and constructivist schools of thought	Interested in measuring the underlying causal relationships between social events
<i>Bounded relativism</i>	Posits that one shared reality exists within a limited group, yet various realities exist across groups	One reality can exist in parallel with a particular moral position, yet this reality can differ when considered from a dissimilar moral stance
<i>Relativism</i>	Argues that there is no absolute representative for people's beliefs, behaviours and ethics	People comprehend and evaluate beliefs and behaviours in relation to their context

Table 2. Descriptions and Critiques of Theoretical Lenses given for Epistemology and Ontology. Information obtained from various sources: Hiller, 2016; Given, 2008; Lawani, 2020; Moon and Blackman, 2014; Harvey, 2012.

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It may be important to select a lens regarding epistemology and ontology for understanding co-creation. Considering this notion, and since knowledge claims within co-creation do not come from a purely objective or subjective lens (Regeer and Bunders-Aelen, 2009), perhaps ‘critical realism’ could be a suitable lens for co-creation as it tries to reconcile both the objective and subjective understandings of reality. According to Taylor (2018), critical realism maintains objective reality as existing independently of singular perception but also appreciates the part that subjective interpretation has in defining reality. Its ontology is developed between positivism and subjectivism (ibid).

Pertinent discourse serves to confirm the suitability of a critical realism lens for understanding co-creation. For instance, in context of their paper on ‘service co-creation’, Hilton et al. (2012) determined that critical realism is suitable as it is accountable to various perspectives addressing complex phenomena. Therefore, it goes beyond an exclusively quantitative approach. Further, another paper by Uppström and Lönn (2017) scrutinises co-creation processes through critical realism, in context of the interaction between technological and social facets of information systems ‘boundary objects’. See *Table 3* for more supporting arguments on the suitability of critical realism as a lens for co-creation, as substantiated by the literature.

<i>Source</i>	<i>Derived points</i>
Marisa, K. (2019). Critical Perspectives on Co-Creation for Sustainable Development (Master's thesis).	<ul style="list-style-type: none"> - Critical realism (CR) allows for the ambiguity of co-creation as it's philosophy is based around the interplay between two ‘extreme’ realities: objectivism and subjectivism - CR is complementary for highly contextual and relatively abstract research - CR enables a way to address the rigour-relevance gap
Sturgiss, E. A., & Clark, A. M. (2020). Using critical realism in primary care research: an overview of methods. <i>Fam Pract</i> , 37, 143-5.	<ul style="list-style-type: none"> - CR posits a mind-independent nature of reality, so that “while human perspectives are important, these are always ‘accounts of reality’”. As such various dimensions of reality can be considered as part of CR - CR can form the research methods to account for outcomes and events in natural settings – giving rise to answers on how and why phenomenon occur (e.g., pertaining to public health issues) - CR identifies that ‘emergent mechanisms’ make up the interventions and systems involved – which is about the synergy

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	<p>between elements of a complex system – appearing relevant for public health concerns</p> <ul style="list-style-type: none"> - CR can enable research to respond to questions like ‘how and why intervention programs work within the complex system of primary care?’ It can also help to unpick the influence of context on intervention outcomes
<p>Uppström, E., 2017. Re-visiting IS design science artifacts: making a case for critical realism. In Hawaii International Conference on System Sciences (HICSS), Puako, Hawaii, USA, January 4-7, 2017 (pp. 4675-4684).</p>	<ul style="list-style-type: none"> - CR enables a perspective with a grounding for both reflective and critical analysis work - CR is useful as it emphasises ‘knowing through making’ - With respect to methodologies [in co-creation], CR can be beneficial in that it promotes a variety of methods for the purposes of identifying the mechanisms of observed phenomenon
<p>Kontos, P.C. and Poland, B.D., 2009. Mapping new theoretical and methodological terrain for knowledge translation: contributions from critical realism and the arts. Implementation Science, 4(1), pp.1-10.</p>	<ul style="list-style-type: none"> - CR permits understanding of clinical settings through offering insight into the interrelatedness between its structures and potentials, and individual action - CR can recognise more precisely how structural, agential, and intervention components of research are intertwined and how such enables or restricts action with respect to the uptake of research
<p>Coghlan, D. and Brydon-Miller, M. eds., 2014. The SAGE encyclopedia of action research. Sage.</p>	<ul style="list-style-type: none"> - CR helps to recognise causal mechanisms within research and aligns with the concerns of action research (e.g. co-creation work) - CR has a space for human agency in influencing social outcomes, with individuals being impacted by various mechanisms yet can modify their effects - Within CR both reflecting and doing shapes problem-solving

Table 3: Literature substantiation of the suitability of critical realism as a lens for co-creation work.

Given time restraints in producing this document for December 2021, it was mostly explored why critical realism can be rendered a suitable lens for co-creation. However it was not found as easily the promotion of other ontological lenses for co-creation. The next phase of this research may entail investigating further the lens of critical realism, but also exploring other ontological lenses in terms of their suitability for co-creation.

Methodological principles

If critical realism is to align best with co-creation, it is important that the methodological principles are to follow its epistemological and ontological assumptions. *Figure 6* promotes the ontological, epistemological and methodological assumptions inherent with a critical realist lens.

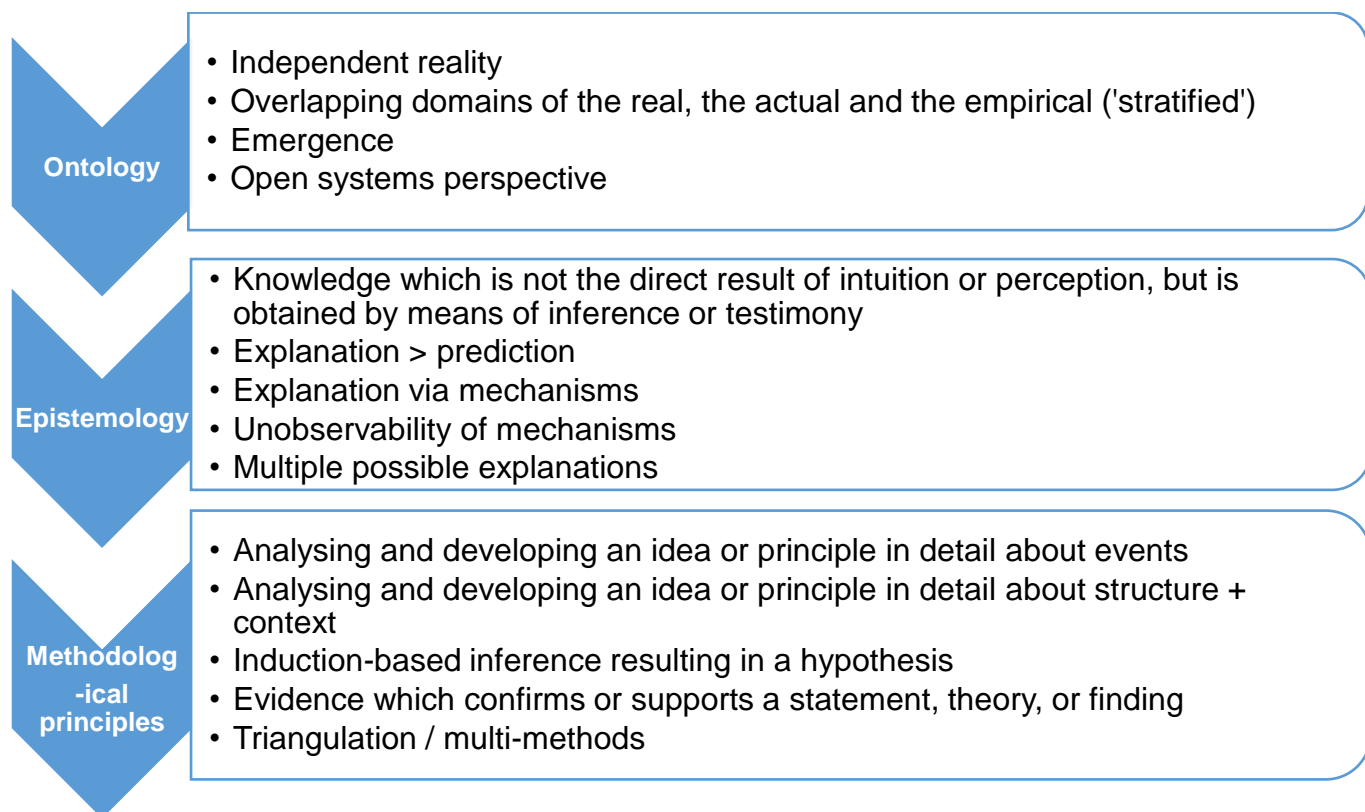


Figure 6: Diagram to show the assumptions and propositions of critical realism, namely through its tied ontology, epistemology and methodological principles. Author's adaptation of the output on pg. 797 by Wynn Jr, D. and Williams, C.K., 2012. Principles for conducting critical realist case study research in information systems. *MIS quarterly*, pp.787-810.

Critical realism can inform methodological principles as shown in *Figure 6*. As articulated by Wynn and Williams (2012), the elements of the critical realism ontology is around an independent reality. This means that the nature of reality is such that is not easily understood or measured; so humans only experience a fraction of it. Then there is a stratification of reality into three areas: the real (structures), actual (which is a subset of the real) and then the empirical (which is a subset of the actual, and can be experienced via perception or measurement). Additionally, through the critical realism lens, reality is an open system in the sense that it is not possible to directly control.

Moving to critical realism epistemology, Wynn and Williams (2012) explain that there is mediated knowledge which is about the aspects of reality we seek to explain but are independent of our experiences. It is also about researchers' observations and theories about the independent world. Emphasis is on explanation via mechanisms, and where mechanisms cannot be observed, then inference is to be made to identify them.

The methodological principles resulting from the assumptions of critical realism can therefore cover a number of aspects. As said by Wynn and Williams (2012), it is about identifying events being studied via experiences as a basis for understanding. Then it is about recognising components of social and physical structures, contexts and relations. It is also concerned with analysing the powers and structural tendencies which have led to the events. Another aspect is about ensuring that mechanisms, like interventions, have causal power and superior explanatory capacity. Finally, it is important to use multiple methods to support causal analysis.

Paradigms

According to Leask et al. (2019), co-creation processes can be influenced by participatory methodologies / paradigms – with named examples such as PAR. In line with MacDonald's (2012) paper, PAR demonstrates principles like democracy and life-changing inquiry. Additionally, PAR can use mixed-methods for which is important because it may enhance understanding of contextual factors, in turn enabling a realistic intervention for shaping health behaviour (Sendall et al., 2018). For example, Moreno-Poyato (2020) used a mixed-method design to apply PAR to implement evidence-based nursing practices. See *Figure 7* for a mapping output of PAR in which draws on various literature sources using "PAR" terms – showing aspects like its methodology type, how PAR is practiced (including steps and approach), method types and design. The parallels of PAR can be traced to co-creation, which can be referred to in *Figure 8* – this output explores themes such as co-creation background and history, examples of co-creation roles found in the literature, co-creation organisation type (i.e. bottom-up), and process elements, aims and outcomes identified from pertinent papers in the literature.

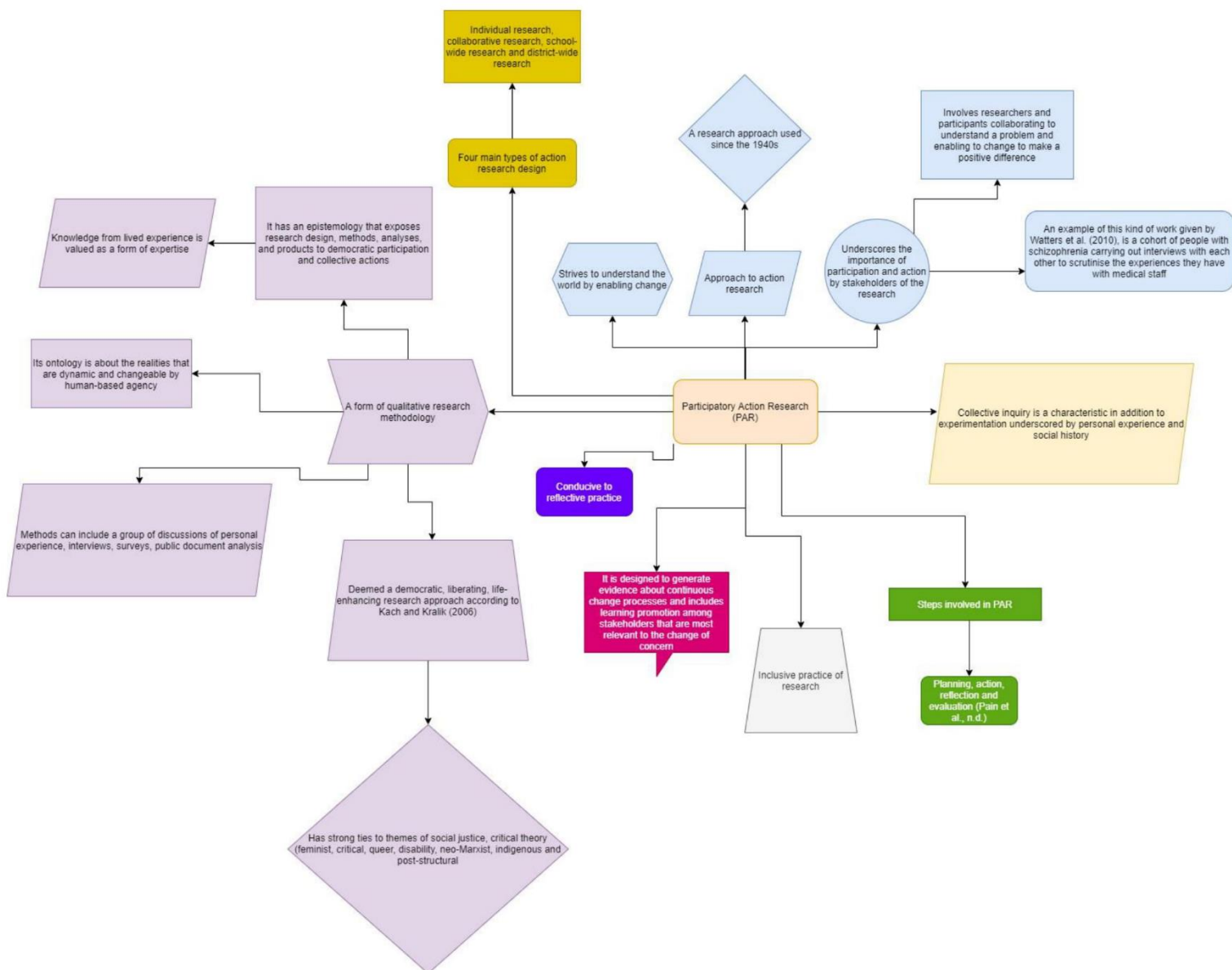


Figure 7: Author’s own output of PAR concepts which draws on the key themes about the nature of PAR.

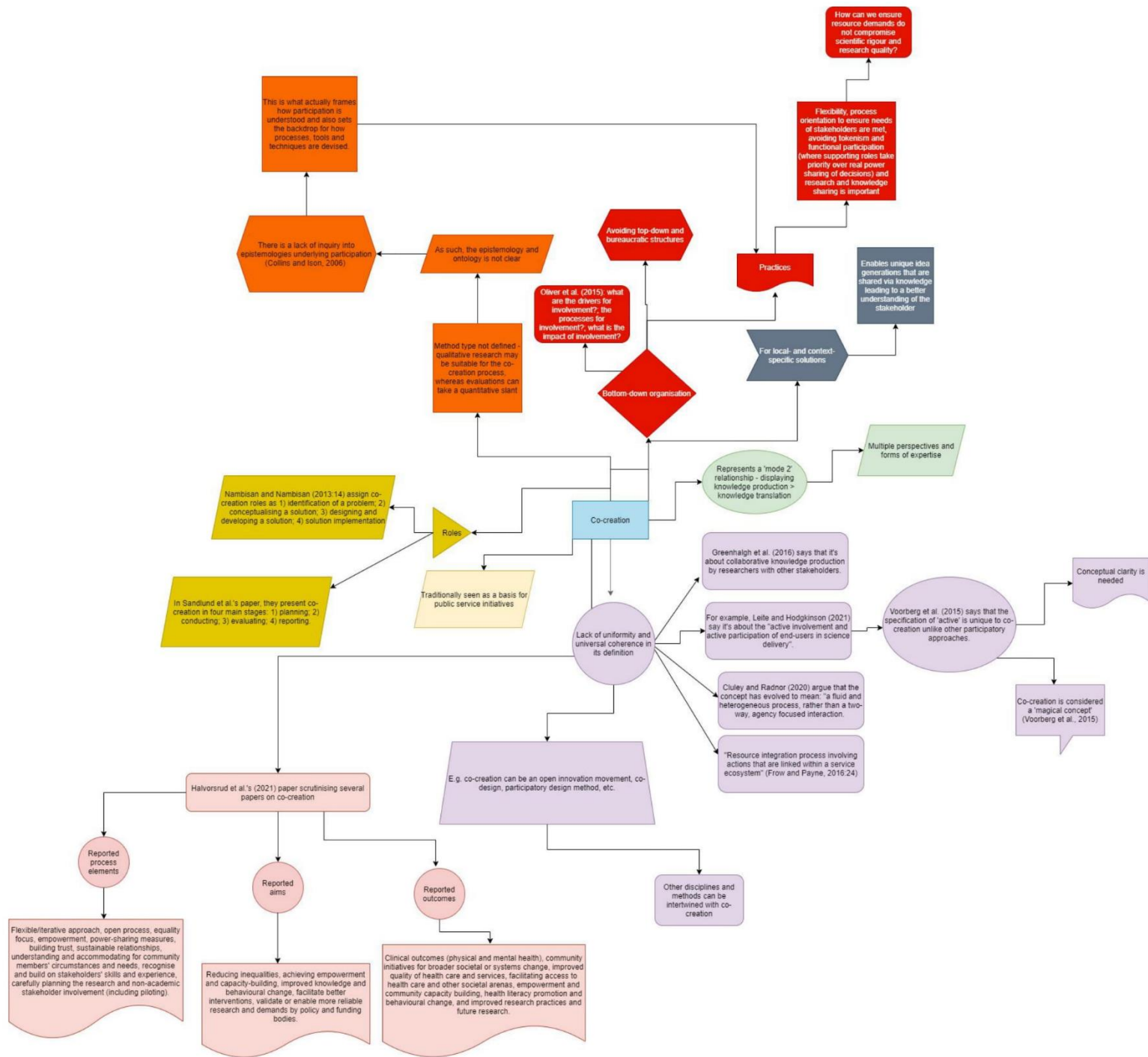


Figure 8: Author's own output of Co-creation concepts which draws on the key themes about the nature of Co-creation.

Another paradigm that could be used to inform co-creation is PHR. PHR can be used to reinforce understandings of the empowerment of stakeholders in challenging contexts (Groot and Abma, 2020). According to Groot and Abma, the full research process of PHR involves:

forming research questions and goals, research design development, appropriate method selection for data collection and synthesis, findings dissemination, teamwork and actions. There may be subtle differences among the paradigm types; for instance, Vaughn and Jacquez (2020) maintain that PAR is about uniting participation with action to solve social problems, whereas PHR is concerned with stakeholder participation in research as a means of enhancing its pertinence and quality.

4) Conclusion

What does Part B (literature synthesis) tell us for the direction of theory in co-creation?

With respect to the modes referred to in the literature, it appears that the fusion of both mode 1 and "mode 2" is what Health CASCADE is attempting to provide a methodology for as it is about the evidence-based approach (mode 1) and co-creation ("mode 2"). One could argue that since mode 3 achieves this combined mode effect, albeit devoid of a (systematic) methodology, Health CASCADE could derive inspiration from this mode as well.

Established participatory typologies, such as Arnstein's ladder and Hart's model are very simplified conceptualisations of how participation (adult and child respectively) is seen in a project / research / programme. This comes with ranging critiques - from making participation seem linear (when in reality it is complex) - to its very hierarchical depiction of the nature of participation. Thus Health CASCADE ought to be very careful when using these models as a 'prototype'.

It became apparent that knowledge claims from co-creation comes neither from a purely subjective or objective reality. As such, it could be argued that the ontology of critical realism can be rendered as a plausible candidate for this work since critical realism sits between the 'two extreme realities' on the spectrum and thus can offer the balance and flexibility needed for enabling co-creation. Thus this lens is riddled with promise and potential that is yet to be investigated deeply. Methodological principles are to accompany an ontological lens if chosen for co-creation, and an example of such can take inspiration from Wynn and Williams's (2012) work. Paradigms of co-creation like PAR and PHR may carry some good principles to incorporate in the theoretical framework.

Part C: Thematic Analysis of Interviews with Co-creation researchers

1) Short Introduction

The rationale behind conducting the interviews was to develop a clearer understanding of the aims and boundaries of co-creation, from the perspective of researchers with first-hand expertise in co-creation within the field of public health. Thus the guiding research question for the interviews was as follows: *What are the aims and delimits of co-creation from a theoretical standpoint?*

2) Method and methodology

<u>Method</u>	<u>Methodology</u>
Semi-structured interviews and thematic analysis method (thematic analysis conducted in accordance to Braun et al.'s work)	The rationale behind the method choice was to respond to the following research question: "What are the aims and delimits of co-creation from a theoretical standpoint?". Semi-structured interviews were conducted with researchers (participants) in the co-creation field with respect to set eligibility criteria (see <i>Table 1</i>). The recruitment strategy was in line with convenience and purposive sampling. An interview schedule (see <i>Table 2</i>) prepared beforehand in order to ensure that broad but relevant considerations tied to co-creation theory were integrated within the interview. However the necessary flexibility to transiently divert from the interview schedule was permissible due to the nature of the semi-structured interview format. In line with the consent form and information sheet, all participants were anonymised and GDPR was adhered to. A characteristics overview on the profile of these participants can be found in <i>Table 3</i> . This was to show relevance of the participants' background as a complementary feature. A thematic map for the resulting analysis of the interviews can be found in <i>Figure 1</i> .

Eligibility criteria and recruitment strategy

Participants were researchers in the field of co-creation in public health, who met the inclusion criteria listed in Table 1. Potential participants were recruited via convenience and purposive sampling, and found via their publications. Ten potential participants were found to match the eligibility criteria, with six non-responses or non-participation, and one drop out before the session. ESR1 conducted informal, semi-structured interviews with three participants lasting approximately thirty minutes.

<i>Participants</i>	<i>Inclusion criteria</i>
All “researchers on “citizen” “co-creation, in public health contexts	<ul style="list-style-type: none"> - Published at least one peer-reviewed relevant journal paper on the topic of ‘co-creation’ in public health from 2015 - Refers to the active involvement of the target group (stakeholders) - Refers to a means of quantifying (describing) or qualifying (measuring) (citizen) co-creation - Consolidates any theory, literature, and empirical works pertaining to i) co-creation; ii) public health within their paper - Refers to principles, constructs of or links to co-creation e.g., self-organisation, connectivity etc.

Table 1: Eligibility criteria.

Interview schedule

The interview schedule was designed to meet the rationale behind the interview which was to develop a clearer understanding of the aims and boundaries of co-creation from the perspective of researchers’ with first-hand expertise with co-creation in public health. The following was developed to ensure that the interview aligned with the overarching research question: “What are the aims and delimits of co-creation from a theoretical standpoint?”. See *Table 2* for the exact interview schedule used.

<u>Focus area</u>	<u>Questions + probes</u>
<i>Making sense of ‘co-creation’</i>	<ol style="list-style-type: none"> 1) How do you define ‘co-creation’? 2) What is ‘not’ co-creation? 3) Do you know of any existing key theories about co-creation? 4) What do you think makes a ‘strong’ theory for co-creation, and why? 5) What do you think makes a ‘weak’ theory for co-creation, and why? 6) What is needed to develop co-creation further?
<i>Epistemology and ontology</i>	<ol style="list-style-type: none"> 7) A lot of epistemological inquiry is missing from participatory typologies, is there a ‘philosophical frame’ you think is best for co-creation theory? <ol style="list-style-type: none"> i) If so, why / why not?

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	<p>8) Have you heard of ‘critical realism’?</p> <p>i) If so, what do you think of it in terms of using it as a lens for co-creation?</p>
<i>Suitable paradigms for co-creation</i>	<p>9) Have you come across research paradigms in your work which you think is suitable for applying to co-creation?</p> <p>i) If so, why / why not?</p> <p>10) What do you think of the participatory action research (PAR) paradigm as a framework for co-creation?</p> <p>i) Any benefits / drawbacks you think are linked to using PAR for co-creation?</p> <p>i) If so, why / why not?</p>
<i>Methodological principles</i>	<p>11) Do you think co-creation can be evidence-based?</p> <p>i) Why / why not?</p> <p>12) Do you think co-creation is more evidence-based or evidence-informed? (elaborate on definitions of these terms if needed)</p> <p>i) Why / why not?</p> <p>13) Apart from basing the methodological principles on the selected epistemology and ontology (e.g. critical realism), are there other aspects these principles should take into account?</p> <p>i) Why / why not?</p>
<i>Aims / purpose of co-creation</i>	<p>14) What do you think the point of co-creation is?</p> <p>15) What level of participation do you think would be optimal for all stakeholders throughout the process of co-creation?</p> <p>i) Why / why not?</p> <p>16) What is the minimum level of stakeholder participation to meet a co-creation standard?</p>

Table 2: Interview schedule.

Characteristics profile of Participants

Table 3 shows the characteristics profile of the participants involved in the interview study, who were all anonymised in line with GDPR protocol.

<i>Participant denotation (anonymised)</i>	<i>Profile summary</i>
C1	Sports science background, research work (including methods). Main research interest: Older adults and reducing sedentary behaviour which evolved into co-creation and how it could be used to develop an intervention to reduce sedentary behaviours in adults. Main focus of the research was to develop a framework to develop and evaluation (including scaling-up) any public health intervention through co-creation. Uses principles of co-creation in current work when designing and implementing evaluation frameworks and delivers training to organisations about how they can use co-creation to develop their services.
C2	Health sciences background, with previous research interest in self-management in family medicine. Involved in a ‘big network’ with stakeholders and researchers. C2’s role is about supporting the researchers in co-creation – such as how they could work together with all the stakeholders in the network. Further C2 alongside colleagues developed a tool which can be used for co-creation.
C3	Works in security and risk management at a university of applied sciences, and does a lot of project work – such as, Horizon2020 projects. Ministry of education requires the university to do project work, and they get a certain amount of external funding. In the Horizon2020 projects, they have a group of people that come together, where the tying glue is that they are part of a consortium which has to find its way to create common goals, and to create ways of working, thus call it co-creation.

Table 3: Characteristics of the participants’ profile.

3) Results: Thematic Analysis

The resulting thematic analysis in the form of a thematic map can be found in *Figure 1*.

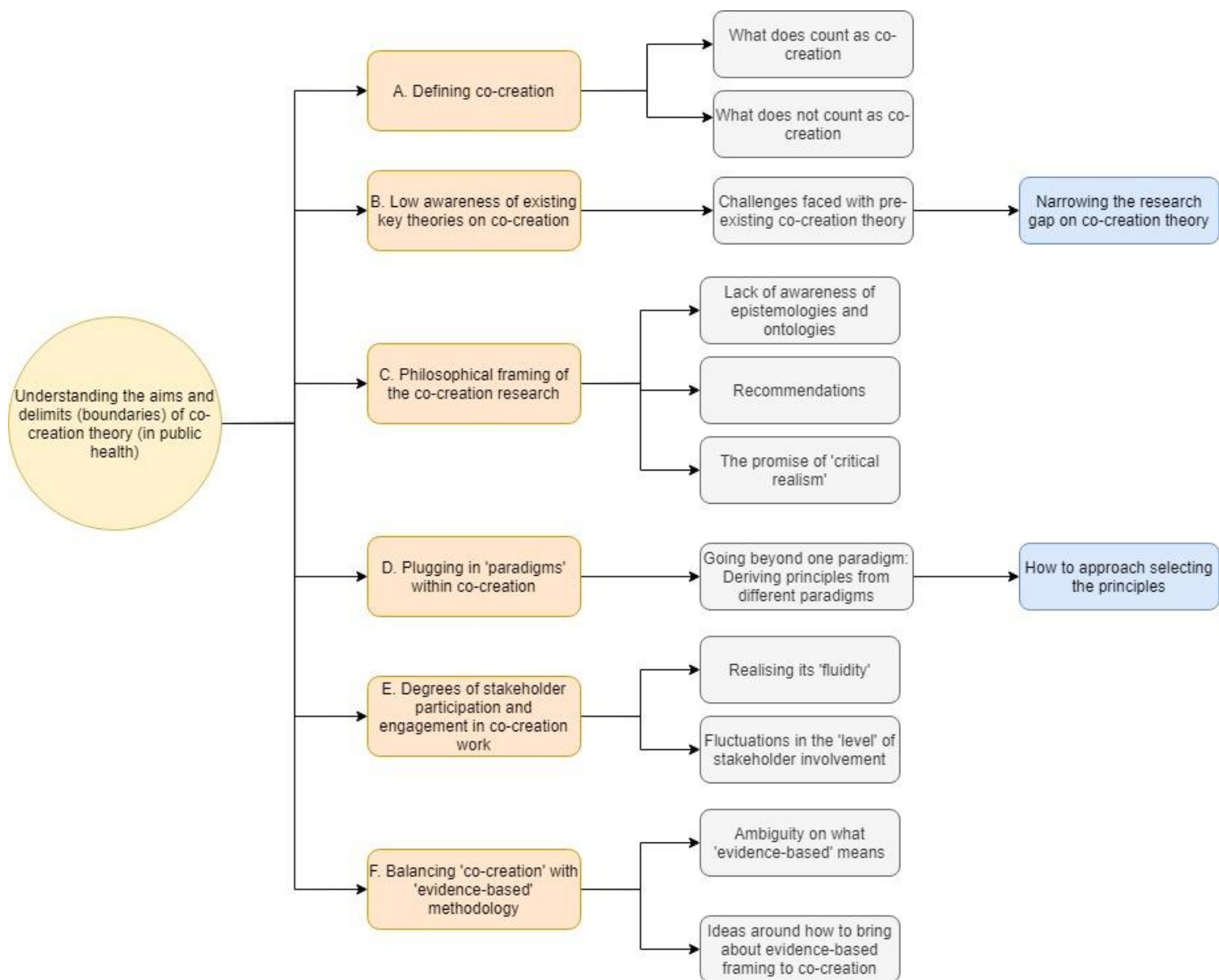


Figure 1: Thematic map from the Interviews regarding Co-creation Theory.

In understanding the aims and delimits of co-creation theory (in public health) the following themes emerged from the analysis of the primary interview data collection. For a visual overview, see *Figure 1* which is the resulting thematic map.

A. Defining ‘co-creation’

1. What does count as co-creation

When the participants were asked to reflect on how they would define co-creation, the general themes which came to the fore, considered aspects like ‘collaboration’, ‘meaningful involvement’ and about a ‘gain’. For illustration, [C1] commented that co-creation is a *“collaboration between different groups of stakeholders to develop a mutually-beneficial outcome”*.

Additionally, [C2] referred to co-creation with respect to it covering the whole research process and including active participation in a meaningful way, within this process: *“it’s the whole process of involving stakeholders from the first stage of the research, from prioritising ideas to implementing to dissemination, that you involve the relevant stakeholders, that they have an active participation in that process. So it’s more like a mind-set, so how can you support meaningful involvement of stakeholders instead of it’s just a method or technique to get ideas from others or it’s more than the end-users, it’s all stakeholders that need to be involved”*.

Similarly [C3] emphasised the notion that co-creation involves representatives who are involved in the creation of something beneficial: *“it’s a process where, we have people representing organisations. Organisations are always made of people. When I say people, or organisations or they’re represented as their people. They come together and they try to create something. Where they create something, it requires knowledge transfers, so it’s something which we are basically create something – an old saying ‘the sum of the parts is greater than any of the parts alone’ and I think that applied to co-creation. So we can either be faster, or more efficient, we can be more innovative. So there is something that we gain by doing it with others”*.

2. What does not count as co-creation

Participants were similarly asked to contemplate what is not meant by co-creation, as co-creation itself is arguably such a vague yet overly-used and broad term. In line with this, themes of ‘doing things alone’ and tokenism were key considerations held by the participants. For example, [C1] reflected the following: *“...something that doesn’t benefit all groups of stakeholders I would argue as not co-creation. So everybody has to gain some*

value from a wave of the process itself or the output of that process I think is one. The second one would be there is definitely something about engagement and the type of engagement people have in that process so if you want to co-create effectively everybody needs basically access to the same amount of knowledge and there is a process of upskilling that is required, I think, between different groups of stakeholders so they can share their knowledge and expertise in a variety of different things. [...]Any process which doesn't highlight or identify the need or doesn't promote a shared sense of ownership and trust within a group of people cannot be co-creation, it's likely to be something that is quite tokenistic – which means people engage in that process without being able to honestly give their thoughts and opinions, and contribute to the process in a way that they could do if that psychological safety was in place”.

Similarly, [C2] referred to how tokenism is not co-creation: *“just more tokenism, that you have your own ideas but you involve others to strengthen your own ideas”.*

[C3] brought up the difference between ‘surface’ and ‘deep’ co-creation, which may be important for raising the nuances in how co-creation can be understood: *“well there’s a lot of things that’s co-creation. Doing it on your own is not co-creation... Let’s say we have a company who wants to better their project and they have a focus group and they kind of let’s say they have a focus group taste their product, and they say we like this better and this better and we should do this and that. It’s called by definition that’s co-creation, but I’d argue it’s kind of on the fringes. And the reason is that there is a one-sided control. I think in true co-creation, there’s a level of equality. And even in a large corporation, there’s a small SME, in the same project but when it comes to that project and the work done in that project, they’re actually equals. And that level of equality is what I think adds to the level of co-creation. So I see that there are different levels of co-creation. So there’s deep co-creation and then there’s surface co-creation and that deep co-creation it means we are on equal terms with those that we co-create with”.*

A. Low awareness of existing key theories on co-creation

1. Key challenges faced with pre-existing co-creation theory

Part of developing new theory for co-creation is about having an understanding of the pre-existing theory and yet the participants were able to identify many challenges with doing so. For instance, [C1] refers to the research gap there is around that, especially in regard for co-creation theory, with respect to public health: *“one of the challenges within co-creation – application of co-creation in a systematic application of that for public health then to my knowledge, there may be some evidence that emerged recently on that, but to my knowledge that is a bit of a gap. I mean I know that historically there has been a lot of theories around co-creation and how you ‘do it’ but I mean historically that was in industry, in*

business, in technology and a lot less so in the public health sphere". Then [C1] also referred to other challenges: "...I guess the challenge is for a lot of stuff, is that the way that you know we do co-creation right is, or you know, in academia, is that you go out to recruit some volunteers to be part of this study, and what that does straight away is put the onus on 'we are the people in charge here', 'you are volunteering your time', so there's already that imbalance I guess of power".

Additionally, [C3] emphasised the lack of co-creation theory looking at the resilience of the co-creative group, "...And then we have started to look at organisational and societal resilience. But I was trying to look at, okay if we have this group that's co-creating together, what is the resilience of that group as a co-creative group. Which is something that I kind of found lacking. At least I think I was maybe one of the first to dabble around that idea".

2. Narrowing the research gap on co-creation theory

The participants had thought about ways to reduce the research gap as far as co-creation theory.

For example, [C1] gave the following reflection: *"I mean methodology is one thing. We are also pretty kind of early in this, you know, broadly exploring whether co-creation is feasible to do or not. You know there is obvious next steps to that, which may be slightly further on now... so understanding the effect of co-created interventions, do they actually change behaviour or not? Where I got to with the work I'd done, is that we developed something which was theoretically-sound and made sense, but didn't have the opportunity to actually test that or effect, so there's a question about how can co-created interventions – how do they match up against the traditional top-down interventions, against the usual care, and you know the other types of things that would be important for public health. So if this is effective in one setting, so what does that mean for other settings? Are these interventions actually scalable? Is this something that we can spread using a variety of different methods to reach the impact on our broader range of people? ...there is also a question of the long standing benefits of co-creation which warrants further consideration".*

[C3] implied that it is not obvious how to develop a theory framing of co-creation, and so it's about using a variety of approaches in trying to understand and to somehow combine the complexity in co-creation with the theory of complexity: *"there are these 10 fairly widely accepted elements on complexity and they're explained but so what do we do with that? How do we take advantage of that knowledge? And I tried to kind of put that into the context of what we were doing. And I think that's something which would be interesting to follow up on a little more. I think that would be interesting train of theory to go down, deeper and deeper".*

B. *Philosophical framing of the co-creation research*

1. Lack of strong awareness of key epistemologies and ontologies

When the participants were asked about their awareness of epistemologies and ontologies, as is key to understanding knowledge and realities attached to co-creation, there was a sense that the awareness of such was not obvious among them. For instance, [C1] commented: *“I have not done that for years and years, so I may not be particularly helpful”*. Further to this, [C3] had difficulty in naming a known epistemology or ontology that could be used but liked the approach of making a ‘unique’ lens: *“I couldn’t say which would’ve been my favourite or what is. I kind of like the train of thought where I started looking at complexity in co-creation and kind of there’s this theory of complexity and so I tried to put these two things together”*.

2. Recommendations

In line with allocating a theoretical ‘lens’ for the co-creation work, [C1] advised the following: *“so I guess the whole point about, you know, you can do co-creation in a way where you can provide a framework to it, but you shouldn’t be limited by a particular bias towards a particular type of method or data collection or whatever. The whole point about co-creation is you should start where you have a rough idea about what the end goal is but don’t have any kind pre-conceived ideas about how you get there. And if you do, and if you maybe following on a particular path of data collection, or perspective then you are probably not doing co-creation at all. Because you are then not understand the views of the collective”*.

Moreover, [C3] implied it’s important to be open to more than one ‘truth’: *“...I couldn’t put my thumb on one great theory that hey this is the truth and nothing but the truth. But there are elements that you can bring in into the theoretical discussion of co-creation from different directions. So for instance, in my dissertation, I looked at it from the network theory, the lens of network theory, so what does it mean for network. And there was a bunch of literature there. I looked at it from a systems point of view, another group of literature leaning another way. I looked at it from a knowledge creation point of view, so there’s a bunch of literature that looks at how we create knowledge together”*.

3. The promise of critical realism

In the interviews held with the participants, it seemed clear that ‘critical realism’ could be feasible ontology for understanding co-creation.

For example, [C2] said: *“I have looked up the critical realism, I found the picture of the model. And I can understand that you think about this model because I think it’s very nice lens for co-creation because in co-creation you want to address or take into account the*

underlying – how do they call it – the influence that cannot be measured but they play a role of the perspectives of the stakeholders, the ideas, how they want to be involved, their influence”.

Further to this, [C3] was supporting of using critical realism for co-creation: [regarding use of critical realism for co-creation] *“...I think it’s a very good starting point. I don’t see any reason why not”.*

Relevantly, [C1] comments that a level of openness and transparency is needed with the stakeholders when pursuing a lens that can work: *“So yeah it [critical realism] can work, but what that probably requires is an open and transparent dialogue about how the process is going to unfold and how that will look like”.*

A caveat of this portion of the interview is that attention turned towards critical realism, and not the other ontologies, or epistemology types. At times it was necessary for the interviewer to clarify what was meant by critical realism and explain why it could be favourable as a lens for co-creation, and thus this may have introduced some bias.

Plugging in ‘paradigms’ within co-creation

1. Going beyond one paradigm: Deriving principles from different paradigms

All of the participants highlighted the need to use a variety of different paradigms in order to inform co-creation theory.

For instance, [C1] said in regard to paradigms the following: *“... So I know a lot of my colleagues say PAR is the kind of approach that they most closely align to, I don’t have a particular preference – I think you can get thinking that is too bogged down on picking this one is better than this one and this one is better than this one, but I think they should all totally inform your thinking or not. There is not that big a difference between all of them, to be honest”.*

Similarly [C2] advocates for different approaches to inform co-creation theory: *“I think it was very helpful in our approach that we combine different perspectives because when we talked with the design thinker, the only things about co-creation was the end-users to empathise with them and understand their needs and values. Then, business model helped us to focus on how do you define your added value proposition and we want to have a societal impact or economic impact, for example. And the implementation and participatory research action approach helps to co-create during your evaluation and learning stages of your research. Not all the research is based on the PAR, but also researchers within effective trial or clinical trial are supported by co-creation, by their mindset of co-creation”.*

Finally [C3] confirms the notion of going beyond ‘one’ kind of approach: *“I avoid trying to pick this is the ‘one’, because I don’t believe in that. It depends a little on how you see, how*

everybody else sees it, and I think it's something where once we are co-creating, we also need to come together".

2. How to approach selecting the principles

In trying to unpick the theoretical principles more, most participants were able to advise and provide their thoughts on how to go about doing so.

For illustration, [C1] said: *"I don't necessarily think it's [the principles from paradigms] something that you can foresee at the beginning of a process. Some of it might be something that emerge as time goes on and it's something that you just want to be aware of. You know there might be instances where they speak about how do you get representative sample of people or what types interactive activities do you do with people? So these might be things which, yes it's helpful to have an understanding of when you are embarking on co-creation, but not necessarily something where you've got say, I'm going to do this, this, this, this and this".* Moreover, [C3] referred to a theory on expansive learning that could be used to inform principles of co-creation theory: *"there's this Finnish guy called Engestrom, who has this theory on expansive learning, it's co-creative. There's this cycle of expansive learning, I don't know if you know that, it has 7 different stages. You start with kind of presenting a problem, or at least trying to knock down the status quo and then this turns into a cycle where they test. It also has something to do with the way that engineers do their development work. So it's been a nice way to get people, it's fairly easily adaptable".*

C. Degrees of stakeholder participation and engagement in co-creation work

1. Realising its 'fluidity'

There was a sense among the participants that stakeholder participation and engagement is not something that can reasonably be prescribed or fixed in the co-creation process.

For instance, [C1] said: *"what I don't think co-creation is death by committee where absolutely everybody has to be around absolutely every decision at every time... So I think whilst naturally and ultimately it would be a pragmatic undertaking – the levels of engagement throughout the process are fluid".*

Further [C1] relayed a degree of pragmatism ought to be had concerning this: *"there are some fundamental questions to think about – how those decisions are made and who is making those decisions as well. I guess there are other things within that, people who are involved in the co-creation process, most of them, they don't have unlimited time, they don't have the time to be involved in absolutely everything".*

Also, [C2] highlighted the need to ask stakeholders how they would like to participate: *"I would say every project must start with mapping the stakeholders, and asking them how they want to participate".*

In a parallel way, [C3] informed: *“I don’t really believe that it can be pre-decided in a way yeah everyone’s going to easily say yeah we want the fullest form of co-creation. Even though people say it, you may not get it...it makes sense to try to define what the level of co-creation is aiming for but that’s not enough in itself, I don’t think”.*

2. Fluctuations in the ‘level’ of stakeholder involvement

In addition to describing stakeholder involvement as ‘fluid’, the majority of participants referred to how there are changing levels of involvement within co-creation.

For a case in point, [C1] claimed: *“...so there is an element of what is the appropriate levels of engagement at particular times, what instances do people just need to be informed about what’s going on? At what points do they need to be actively engaging in it?”.*

This can also be linked to what [C3] relayed: *“it’s [stakeholder involvement] not linear, I don’t think it is linear. I think it kind of fluctuates, so even in the same groupings, you may have sessions where you are really in the flow and everything goes co-creatively, and then you might have sessions where it’s not. And so there’s a fluctuation from let’s say session to session. Or if we co-create over a longer period of time, then we might evolve through that time range from let’s say a lesser or a more surface type of a co-creation to a deeper type of co-creation. Or vice versa”.*

D. *Balancing ‘co-creation’ with ‘evidence-based’ for the methodology*

1. Ambiguity on what ‘evidence-based’ means

It did not appear clear that the participants were familiar of what ‘evidence-based’ definitely means for co-creation methodology. As an example, [C2] suggests that there are indications of evidence-based in the co-creation literature, but not to a reasonable degree: *“so literature suggests that you have more impact when you use co-creation. So there is an evidence-based a little bit...”.*

Another participant, [C3] required the interviewer to elucidate what is meant by ‘evidence-based’ since it was implied that the term is not overt: *“I’m not quite sure I get a grip of what you mean by ‘evidence-based’”.*³

2. Ideas around how to bring about evidence-based framing to co-creation

Despite limited understanding of what makes research ‘evidence-based’ in relation to co-creation, most participants could offer some ideas around how an ‘evidence-based’ approach could be included for co-creation.

[C2], for example, referred to method comparison as a form of achieving that: *“but what I*

³ It was highlighted to this participant (i.e. [C3]) that HC are still attempting to define this for our project.

found in the articles you are able to compare one method with another and find okay this is more helpful than another method.... So that makes evidence-based, and I think I would also be very curious about studies that compare different approaches in the long-term impact of the intervention”.

Additionally, [C3] pitched new concepts as a way of generating an evidence-based co-creation model: “...so why couldn’t you do that to any co-creation process in terms of creating a set of templates where you would kind of go through a fairly structured way of doing it. So for example if you take Engestrom’s process, and then you take this canvas idea from service innovation design, you would end up with a lot of outputs that are because of canvases are structured in a certain way, the outputs would be structured in a different way. Thus you would have a lot of evidence. So I don’t know if that would qualify as a way of creating an evidence-based co-creation model?”.

4) Conclusion

What does Part C (primary interview data analysis / synthesis) tell us for the direction of theory in co-creation?

The interviews conducted with three participants who had experience in the field of co-creation, generated some interesting insights through theme categorisations. The structure of the interview was served around: making sense of 'co-creation' – epistemology and ontology – suitable paradigms for co-creation – methodological principles – aims and purpose of co-creation. The main themes derived from all the interviews led to: defining 'co-creation', low awareness of existing key theories on co-creation, philosophical framing of the co-creation research, plugging in 'paradigms' within co-creation, degrees of stakeholder participation and engagement in the co-creation work, and lastly, balancing 'co-creation' with 'evidence-based' for the methodology.

The subthemes resulting from the thematic analysis of the interview data was able to detail some crucial points to aid with the trajectory of the theory strand of the Health CASCADE project. For instance, the participants gave their views for what counts or does not count for co-creation – the examples given for each can help with the shaping of theory in terms of scope and remit. Then they relayed the gaps in co-creation theory literature, including challenges that theory could account for. Whilst the participants had a limited knowledge of epistemology and ontology – they did appear to appreciate the potential of the critical realism ontological lens for co-creation.

The participants also advocated for an approach that draws on multiple paradigms, thus not merely relying on one paradigm, like participatory action research. From different paradigms used in co-creation, the 'best' principles can be extracted, although it was not clear from the interviews, how to go about doing that in a way that is obvious. Another consideration to arise from the interviews is that participation of stakeholder is a fluid process and that levels of participation and engagement fluctuate across the research process. Further, they claimed that the level of stakeholder participation cannot be predetermined as there is a pragmatic component to participation that relies on the stakeholders' time, motivation, resources, etc. Thus suggesting participation mapping with stakeholders from the start could be helpful. Lastly, the interviewees expressed ambiguity over what 'evidence-based' means for co-creation, however they offered some thoughts regarding how co-creation may account for an evidence-based approach.

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Appendices

Appendix A: 30 definitions of co-creation from the relevant discourse to inform tentative HC definition

How is ‘Co-creation’ defined according to the literature?

1. “Collaborative public health intervention development by academics working alongside other stakeholders” (Sandlund et al., 2019)
2. “Together (co-) make or produce something (new) to exist (creation)” (De Koning et al., 2016)
3. “Active involvement of end-users in various stages of the production process” (Voorberg et al., 2015)
4. “The collaborative generation of knowledge by academics working alongside stakeholders from other sectors” (Halvorsrud et al., 2021)
5. “Process of co-creation of knowledge, which provides insight into the causes of, and the means required to transform, a situation” (Collins and Ison, 2006)
6. “Collaborative knowledge generation by academics working alongside other stakeholders” (Greenhalgh et al., 2016).
7. “A resource integration process involving actors that are linked within a service ecosystem” (Frow et al., 2016).
8. “Understood as a participatory multi-stakeholder innovation process, forms the context in which citizen science is realized... Co-creation can be understood as a method, process, or service” (Eckhardt et al., 2021).
9. “A widely used term to describe a shift in thinking from the organization as a definer of value to a more participative process where people and organizations together generate and develop meaning” (Ind and Coates, 2013).
10. “Enactment of interactional creation across interactive system-environments (afforded by interactive platforms), entailing agencing engagements and structuring organizations (Ramaswamy and Ozcan, 2018).

11. “Planned resource integration behaviours by actors intended to realise a value proposition. We provide guidance to assist practitioners seeking to enhance the value their customers might realise (Hilton et al., 2012).
12. “Centered on enhancing the customer experience in the context of use” (Kohtamäki and Rajala, 2016).
13. “Any act of collective creativity that is experienced jointly by two or more people (Sanders and Simons, 2009)
14. “The process of feedback, opinions, and other resources such as their intellectual capabilities and personalities, integrated alongside institutional resources, which can offer mutual value” (Dollinger et al., 2018)
15. “Higher rungs (associated with “partnership” or “delegated power”) generate the most authentic participation through citizen empowerment. These higher rungs align with Simon’s (2010) definition of co-creation (with co-determined aims, process, and outcomes) and with collaborative learning, where a real degree of authority and power is handed over and “takes both the student and the professor ‘into enemy territory’” (Gamson, 1994, p. 46)” (Rock et al., 2018)
16. “Co-creation of learning and teaching occurs when staff and students work collaboratively with one another to create components of curricula and/or pedagogical approaches” (Bovill, 2019)
17. “Co-creation is not a one off event, like a referendum in which the community decides what should be done. Developing services that promote health will take more time. Nor is co-creation just a question of formal consultation in which professionals give users a chance to voice their views on a limited number of alternatives. It is a more creative and interactive process which challenges the views of all parties and seeks to combine professional and local expertise in new ways” (Cottam & Leadbeater, 2004:22 cited in Holmlid, 2012)

18. “Includes a wide range of participatory practices for design and decision making with stakeholders and users. Generally co-creation refers to a style of design or business practice characterized by facilitated participation in orchestrated multi-stakeholder engagements, such as structured workshops and self-organizing modes of engagement. Co-creation envelopes a wide range of skilled social practices that can considerably inform and enhance the effectiveness of organizational development, collaboration, and positive group outcomes. New modes of co-creation have emerged, evolving from legacy forms of engagement such as participatory design and charrettes and newer forms such as collaboratories, generative design, sprints, and labs. Often sessions are structured by methods that recommend common steps or stages, as in design thinking workshops, and some are explicitly undirected and open” (Jones, 2018)
19. “An approach to service design and delivery where the customer is seen as an active collaborator. Co-creation is becoming increasingly important as customers engage ever more in service relations involving networks of professional actors and fellow consumers. Furthermore, customers often are actively involved in processes to design and develop new or improved services” (Følstad, 2017)
20. “Co-creation has been adopted in many recent design and innovation projects, bringing different stakeholders together and creating a shared understanding and new ideas through creative and participative approaches (Lee et al., 2018)
21. “An open, active, and creative process in which all relevant stakeholders are engaged in an innovation process” (van Dijk-de Vries et al., 2020)
22. “A collaborative new product development activity in which consumers dynamically contribute and select various elements of a new product offering” (Mandolfo et al., 2020)

23. “Co-creation on complex problems requires a specific research mindset towards stakeholder involvement. Stakeholders help co-create an understanding of the problem, as well as charting a path forward in dealing with it” (Bammer, 2019)
24. “Co-creation involves a multi-directional approach to problem solving” (Leino and Puumala, 2021)
25. “Activities with self or in collaboration with members of the service delivery network including self, family, friends, other patients, health professionals and the outside community” (McColl-Kennedy et al. 2009:11 cited in Yin et al., 2017)
26. “Assumed to contribute to (knowledge about) local strategies for community-oriented care that integrates medical health and social wellbeing (Metze and Gradener, 2018).
27. “People who use services work with professors to design, create, and deliver services. Involvement of users in the planning process as well as in service delivery is what distinguishes co-creation” (Fox et al., 2019)
28. “Opportunity, ownership, good collaboration, autonomy and experienced meaningfulness are all important parts of letting participants reach their full potential as creative co-creators” (Mogstad et al., 2018)
29. “The ability to recognise service users, providers, and formal leaders as colleagues who co-create services and value in a reciprocally empowering working alliance. Further, some specific requirements of co-creation leadership are presented: 1) enabling dialogue and adaptive spaces, 2) acknowledging that power is negotiated and relational, 3) co-constructing and connecting leadership to core tasks and functions (not just formal position), 4) recognising consultation, facilitation and delegation as key to decision commitment and collective mobilisation, and 5) ambidextrously manoeuvring between participation and decisiveness, care and autonomy, and production and innovation” (Larsen, 2021)

30. “A means to improve and foster the participation of end-users by actively involving them in innovation processes” (Hirschnitz-Garbers, 2018)